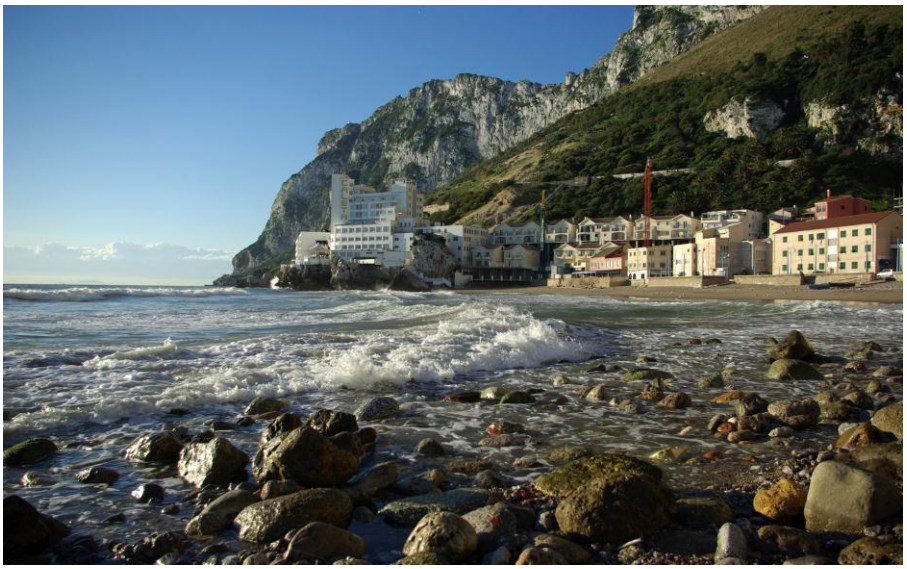
Government of Gibraltar

Gibraltar River Basin Management Plan

Annexes

March 2012



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Document Revisions

No.	Details	Date
1	Draft for client comment	March 2011
2	Final issue 1	June 2011
3	Final Draft	July 2011

Contents

A. Current State of Waters

A.1 Introduction

This annex presents the current status of the water bodies in the Gibraltar River Basin District in a series of maps. The monitoring locations are also presented. Annex B presents more detail on the classification of each of the four water bodies, whilst Annex D lists the protected areas established under other directives and shows their relevant monitoring locations.

A.2 Classification Results

Status classification is a method of reporting on the quality of the environment and can indicate where improvements may be required. The methods used for classification are described in the main report in Section 3.1. A brief overview is presented below.

The coastal water body has been classified for ecology and chemistry. For the water body to achieve good overall status both ecological and chemical status must be at least good.

The groundwater bodies have been classified for chemical status and quantitative status. For a groundwater body to achieve good overall status both chemical and quantitative status must be at least good. Due to the length of monitoring records available for the RBMP, it has not been possible to report on whether the quality of groundwater is deteriorating.

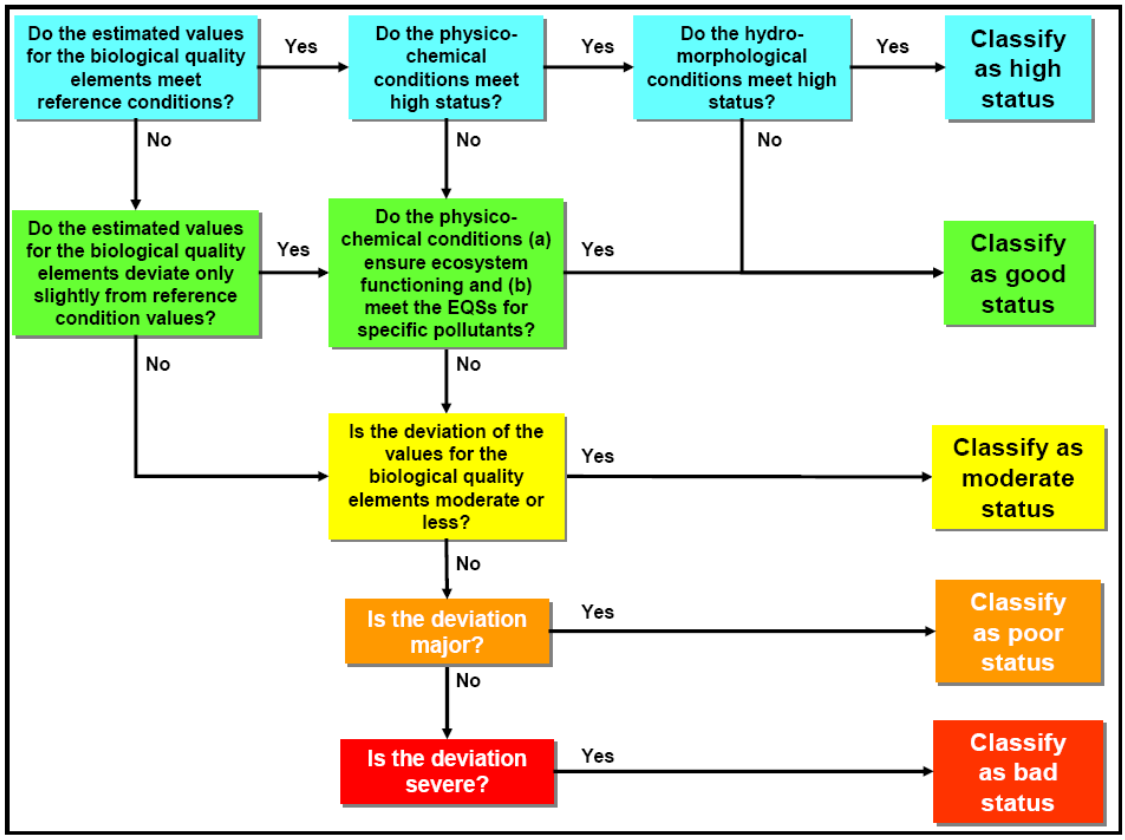
A.2.1 Ecological Status (Coastal Waters)

Ecological status is recorded on the scale of high, good, moderate, poor or bad. 'High' indicates largely undisturbed conditions and the other classes represent increasing deviation from this natural condition – from here on described as 'reference condition'. The ecological status classification for the water body, and the confidence in this, is determined by the worst scoring quality element.

The ecological classification is summarised in Figure A1 below and comprises:

- The condition of biological element, e.g. benthic invertebrates, phytoplankton;
- Concentrations of supporting physio-chemical elements, e.g. oxygen, dissolved inorganic nitrogen;
- Concentrations of specific pollutants, e.g. copper, chromium, zinc, ammonia.

Figure A1 Decision tree illustrating the criteria determining the different ecological status classes



A.2.2 Chemical Status (Coastal Waters)

The chemical status is assessed by compliance with environmental standards for chemicals that are priority substances and priority hazardous substances and other substances carried over from the Dangerous Substance Directive, which are listed in the Priority Substance Daughter Directive 2008/105/EC. Chemical status is recorded as good or fail. The chemical status classification for the water body, and the certainty in this, is determined by the worst scoring chemical.

Chemical status assessment is required in water bodies only where priority substances and other specific pollutants are known to be discharged in significant quantities. Only the substances detected in the monitoring from July 2009 to June 2011 have been used for the chemical status classification, as presented in Figure 3.6 of the Main Report.

A.2.3 Ecological Potential (Heavily Modified Water Body)

For the harbour water body that has been designated as heavily modified (HMWBs see Annex I), the status must be classified according to the ecological potential rather than status. UKTAG have adopted the 'mitigation measures approach' for classifying Heavily Modified and Artificial water bodies.

This approach first assesses whether actions to mitigate the impact of physical modification are in place to the extent that could reasonably be expected. If this mitigation is in place, then the water body may be classified as achieving good or better ecological potential. If this level of mitigation is not in place, then the water body will be classed as moderate or worse ecological potential.

Before an overall ecological potential classification is applied, the second step is for the results of the mitigation measures assessment to be cross-checked with data from biological and physico-chemical assessments.

In principle, there are five ecological potential classes: Maximum, good, moderate, poor and bad. In the first cycle of the River Basin Management Planning process however, classification of HMWBs will be according to two classes: those water bodies that have met the target of Good Ecological Potential and those that have not. The method will enable water bodies to be classified as:

(i) Good Ecological Potential or better; or

(ii) Moderate Ecological Potential or worse.

A.2.4 Chemical and Quantitative Status (Groundwater)

The achievement of good status in groundwater involves meeting a series of conditions which are defined in the Water Framework Directive (2000/60/EC) and Groundwater Directive (2006/118/EC). In order to assess whether these conditions are being met, a series of tests has been designed for each of the quality elements defining good (chemical and quantitative) groundwater status.

There are five chemical and four quantitative tests. Each test should be applied independently and the results combined to give an overall assessment of groundwater body chemical and quantitative status. The worst case classification from the relevant chemical status tests is reported as the overall chemical status for the groundwater body and the worst case classification of the quantitative tests reported as the overall quantitative status for the groundwater body. The worst result of these two is reported as the overall groundwater body status. Groundwater bodies are at either good or poor status.

For the Gibraltar groundwater bodies, only one test has been used out of the five chemical tests (for General Chemical Assessment) and only the Groundwater Resource Balance has been used out of the four quantitative tests. Further information is provided in Section 3.1 of the main report.

Groundwater Trend assessment

For groundwater bodies that have been identified as being at risk of failing to meet their environmental objectives for groundwater quality, there is a requirement to identify any significant and sustained upward trends in pollutant concentrations. A significant trend is one that could lead to a groundwater body failing to meet its environmental objectives before 2021 (the end of two river basin cycles) if measures are not put in place to reverse the trend.

There is insufficient data on groundwater quality available in Gibraltar to determine trends in the two groundwater bodies identified. During the assessment of trends it is important to use a statistically robust dataset to ensure that confidence in the identification of significant trends is high. UKTAG guidance on groundwater trend assessment states:

"For assessment of anthropogenically induced upward trends in pollutant concentrations, monitoring data for a period of between 6 and 10 years, prior to the date at which assessment is being made, should be used for identifying the presence of an upward trend. Where data are inadequate, then no trend assessment should be carried out and an explanation recorded."

Groundwater quality data for monitoring points in the groundwater bodies making up the Gibraltar RBD are only available for the period 2008-2010 and are therefore inadequate for the purposes of trend assessment. The lack of data is due to the delayed commencement of the groundwater monitoring programme in line with the specific requirements of the WFD. Therefore trend assessment has not been carried out for this River Basin Cycle, but should be carried out in the next cycle.

A.2.5 Results of Classification

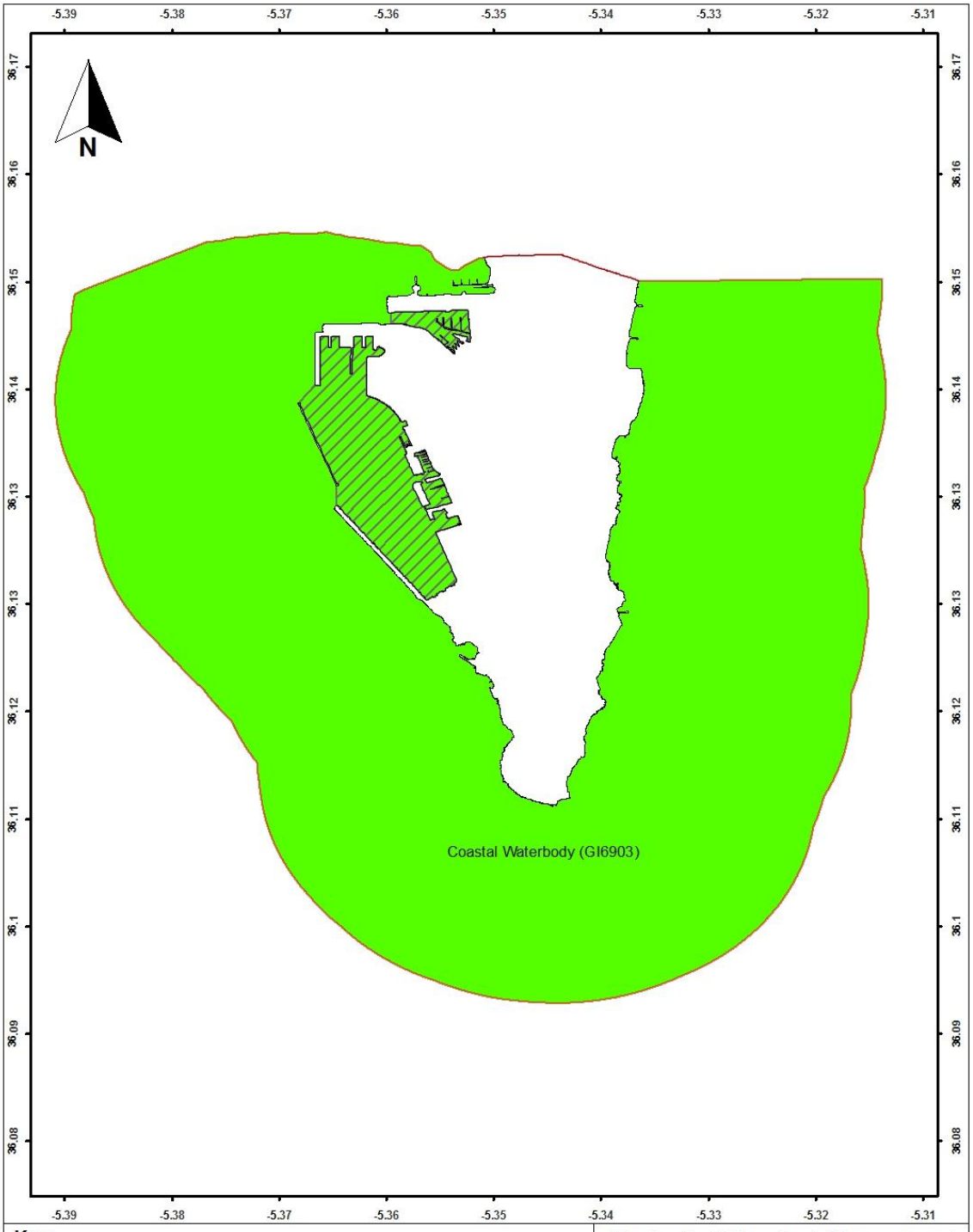
In the Gibraltar River Basin District, the following results have been obtained:

Table A1 Results of Water Body Status Classification

Water Body Name	Water Body ID	Type of Water Body	Status 1	Status 2	Overall Status
Coastal Water Body	UKGIB03	Coastal	Good Ecological Status	Good Chemical Status	Good Status
Gibraltar Harbour & Marina Bay	UKGIB01	Heavily Modified (Coastal)	Good Ecological Potential	Fail Chemical Status	Moderate Potential
Gibraltar North	GI4172	Groundwater	Good Qualitative	Good Quantitative	Good Status
Gibraltar South	GI4171	Groundwater	Good Qualitative	Good Quantitative	Good Status

The mitigation measures approach has been used to identify the HMWB as being at Good Ecological Potential. However, as the certainty of failure of chemical status is high in the harbour area, the physico-chemical elements must be considered in the overall potential, which leads to a Moderate Potential classification.

Both the groundwater bodies are classified as Good Status overall. The confidence in the qualitative status is considered high when following the UK guidance, which requires six or more monitoring points to provide a higher level of confidence in the classification. There is no reference to the size or extent of the groundwater body, and it is recognised that the Gibraltar groundwater bodies are relatively small.



Key:

- River Basin District
- **Gibraltar coastline**
- **Heavily Modified Water Body - Good Potential**
- **Coastal Water Body- Good Status**

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Figure A2
Ecological Status of coastal water body

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Geographic Coordinate System - WGS84 Spheroid

March 2011
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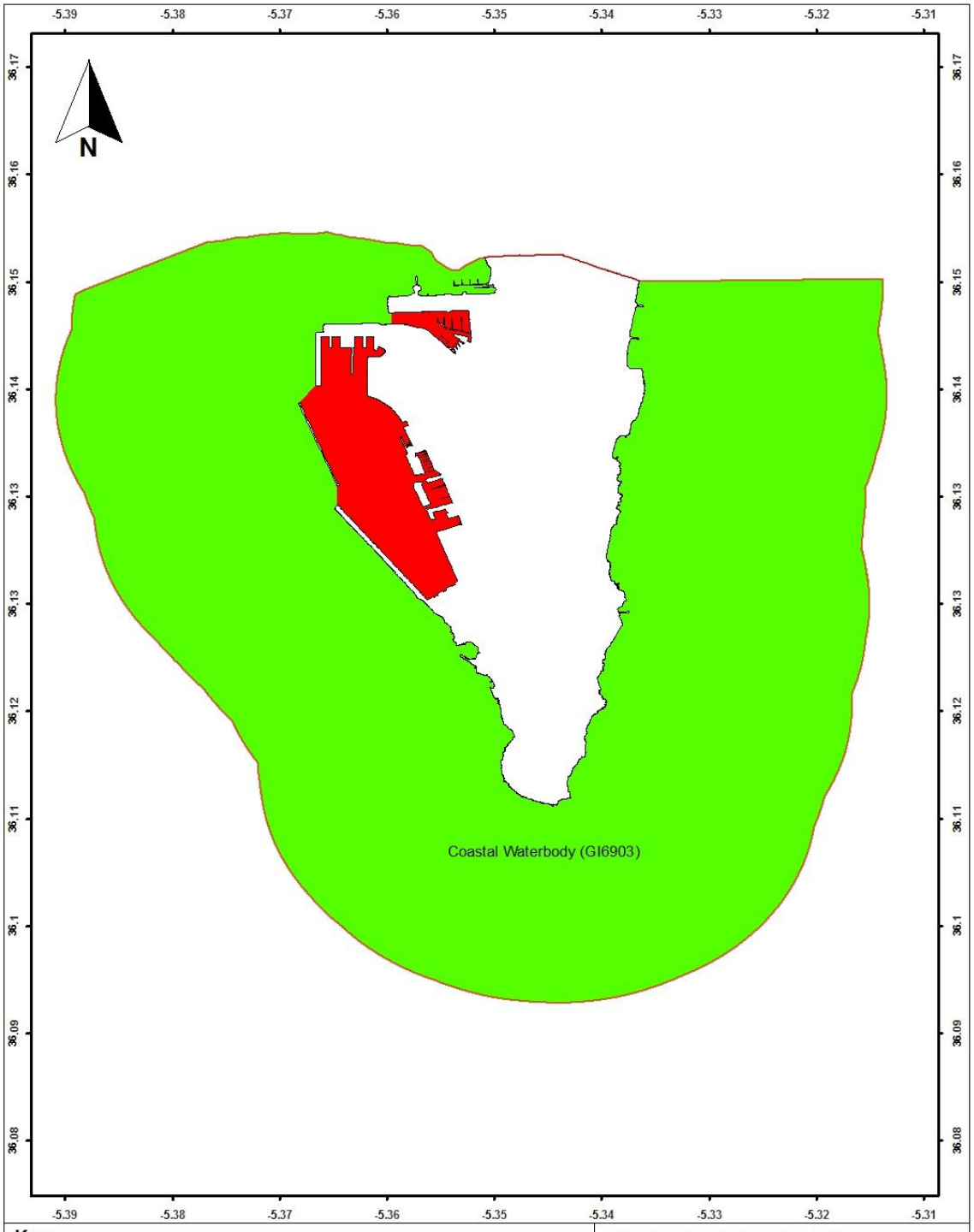

Key:

- River Basin District
- **Gibraltar coastline**
- **Heavily Modified Water Body - Fail**
- **Coastal Water Body- Pass**

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Figure A3
Chemical Status of coastal water body

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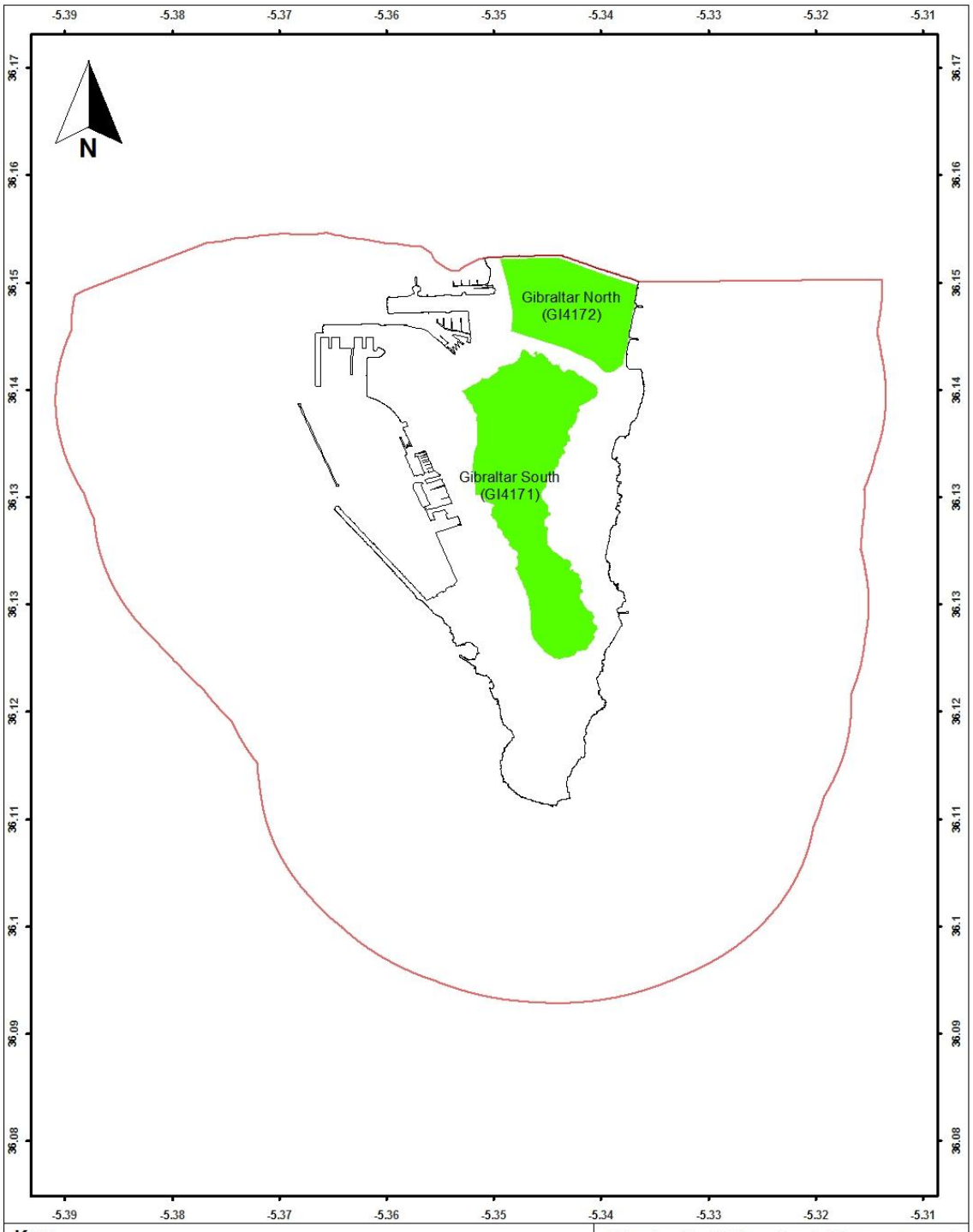

Key:

- River Basin District
- **Gibraltar coastline**
- Groundwater Bodies - Good status

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Figure A4
Chemical Status for groundwater

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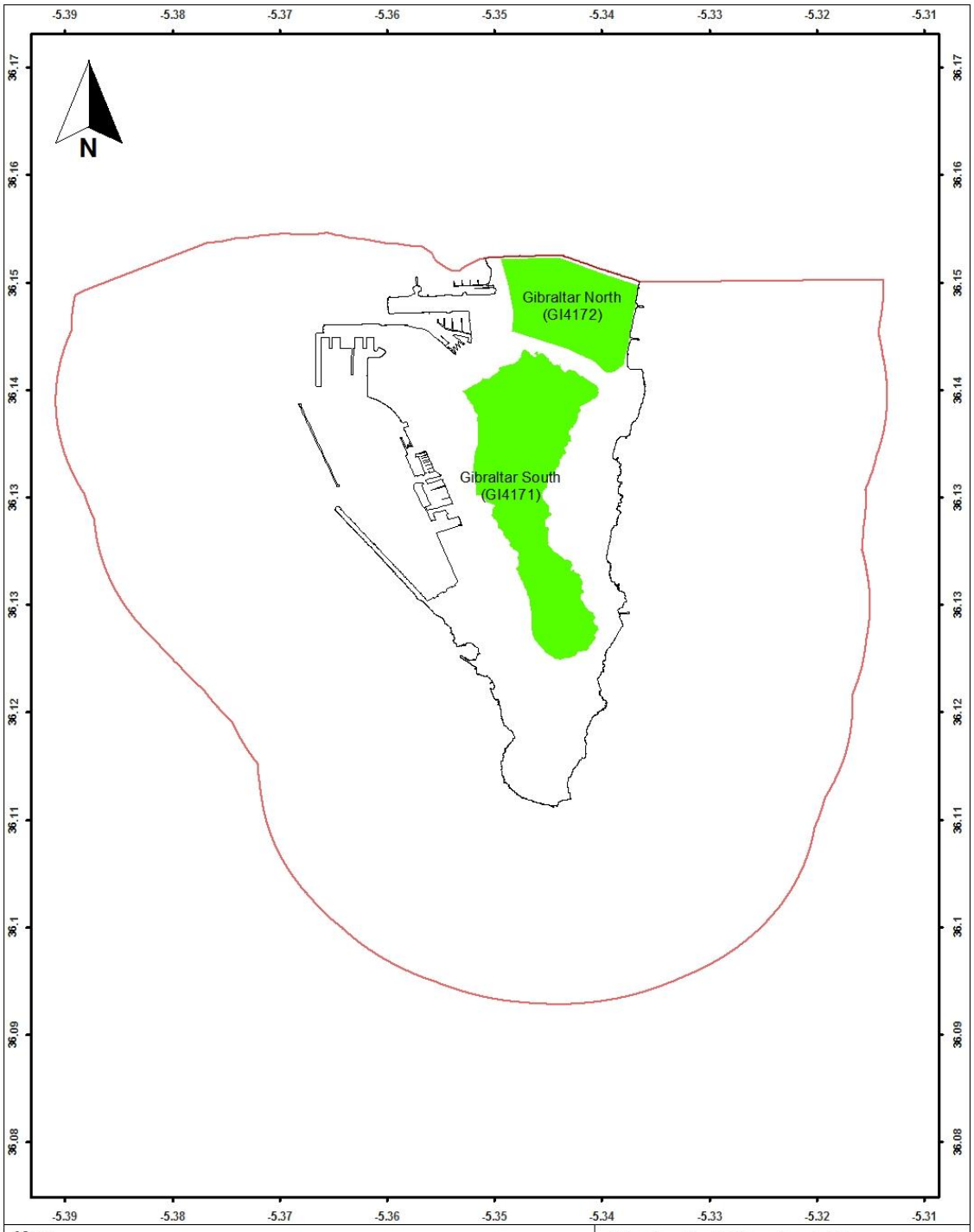

Key:

- River Basin District
- **Gibraltar coastline**
- Groundwater Bodies - Good status

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Figure A5
Quantitative Status for groundwater

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March 2011
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Monitoring Network

There are three surveillance monitoring sites in the coastal water body, and one located within the harbour (HMWB). Monitoring of physico chemical parameters is undertaken monthly, and phytoplankton samples are taken at quarterly intervals. This programme has been ongoing since July 2009 and Tables A2 and A3 below show the elements that are monitored.

Table A2 Physico-Chemical and Specific Pollutant Monitoring Parameters

Physico-chemical	
Depth	Total dissolved solids
Temperature	Total suspended solids
Nutrient status - Total N, Total P, NO_3^-, NO_2^-, NH_4^+, PO_4^{3-}	Dissolved Oxygen (DO)
Salinity	Transparency
Conductivity	Chlorophyll-a
Specific Pollutants	
Ammonia	Copper
Chromium **	Zinc

Table A3 Chemical Monitoring Parameters

Category	Substance	Category	Substance
Priority substances			
Pesticides	Alachlor	Chlorinated hydrocarbons	1,2-Dichloroethane
	Atrazine		Dichloromethane
	Chlorfenvinphos		Hexachlorobenzene
	Chlorpyrifos-ethyl		Pentachlorobenzene ***
	Chlorpyrifos-methyl		Trichlorobenzenes (1,2,4-Trichlorobenzene)
	Endosulfan (alpha-endosulfan) ***		Trichloromethane (Chloroform)
	Hexachlorobutadiene	TBT	Tributyltin compounds (tributyltin-cation) ***
	Hexachlorocyclohexane (alpha, beta, delta, epsilon, gamma) ***	Other hydrocarbons	C_{10-13}-chloroalkanes
	(gamma-isomer, Lindane)		Benzene
	Simazine	BDEs	Brominated diphenylethers
	Trifluralin	DEHP	Di(2-ethylhexyl)phthalate
Metals	Cadmium and its compounds	Urons	Diuron
	Lead and its compounds		Isoproturon
	Mercury and its compounds	Phenols	Nonylphenols (4-(para)-nonylphenol)
	Nickel and its compounds		Octylphenols (para-tert-octylphenol)
Polynuclear aromatic hydrocarbons	Anthracene		Pentachlorophenol
	Fluoranthene		
	Naphthalene		
	(Benzo(a)pyrene)		
	(Benzo(b)fluoranthene) ***		
	(Benzo(g,h,i)perylene)		
	(Benzo(k)fluoranthene)		
	(Indeno(1,2,3-cd)pyrene) ***		

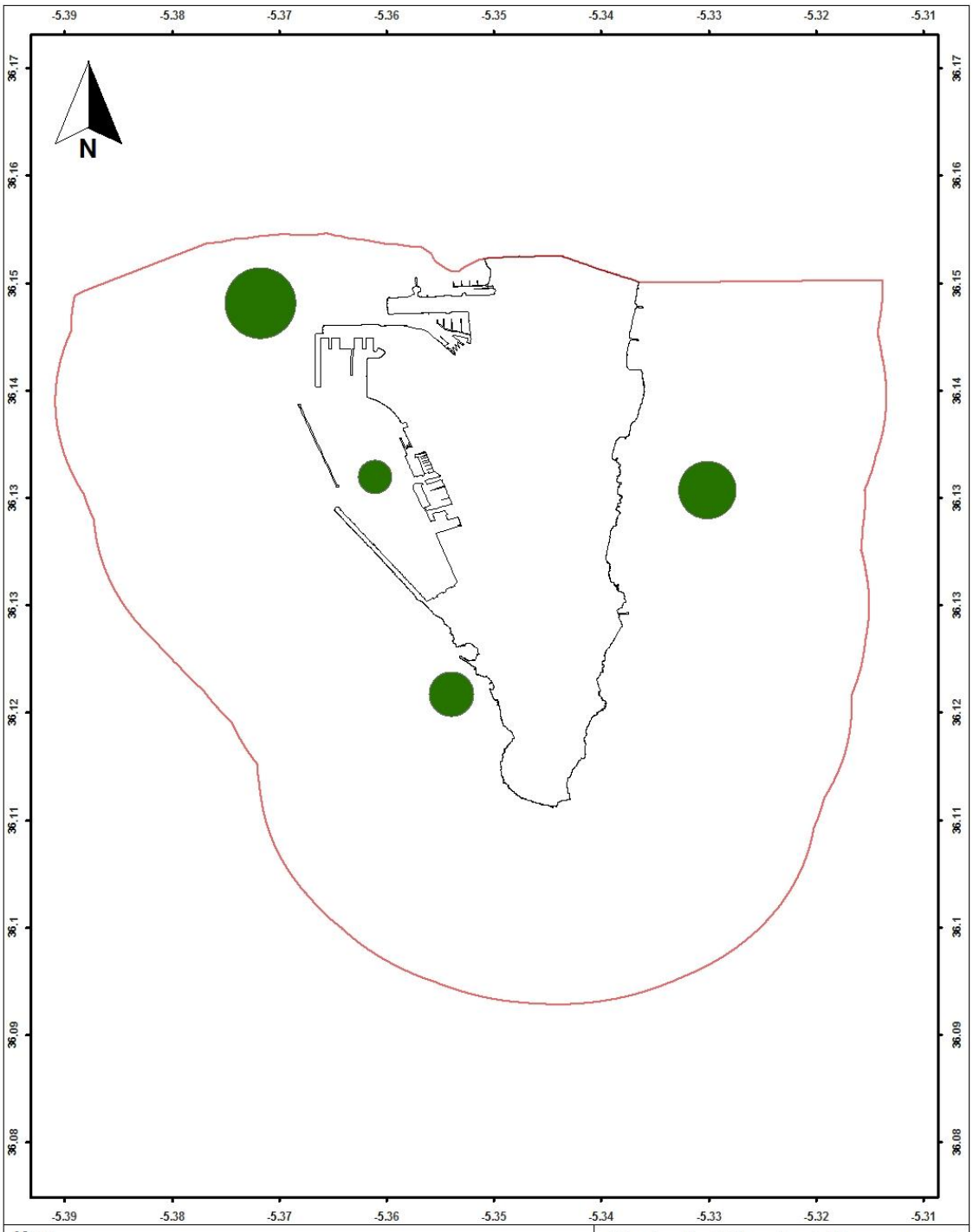
Note that for substances marked *** the analytical detection limit is greater than the environmental quality standard.

The indicative locations of the four surveillance sites are presented in Figure A6.

Benthic invertebrate monitoring was undertaken in July and August 2010.

The Northern groundwater body contains four monitoring points and the Southern groundwater body contains three monitoring points. Data for qualitative status assessment for these monitoring points for the period October 2008 to November 2010 have been used for this assessment.

For quantitative status, the groundwater body resource test comprises of a comparison of abstraction with recharge to the groundwater body to assess if water abstraction is too high. No groundwater is abstracted from the southern groundwater body. Prior to 2009, water was abstracted from the Northern groundwater body for potable supply and sanitation although this operation has now ceased. Abstraction for laundry purposes from the Northern aquifer continues to take place. This abstraction is licensed and does not exceed more than 12,000 litres a day. A very minor abstraction for the cemetery is also in operation, although this is for less than 1,000 litres per day. This information has been used to inform the groundwater body resource test and the quantitative status.



Key:

- River Basin District
- **Gibraltar coastline**
- Coastal monitoring locations

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Figure A6
Coastal monitoring sites

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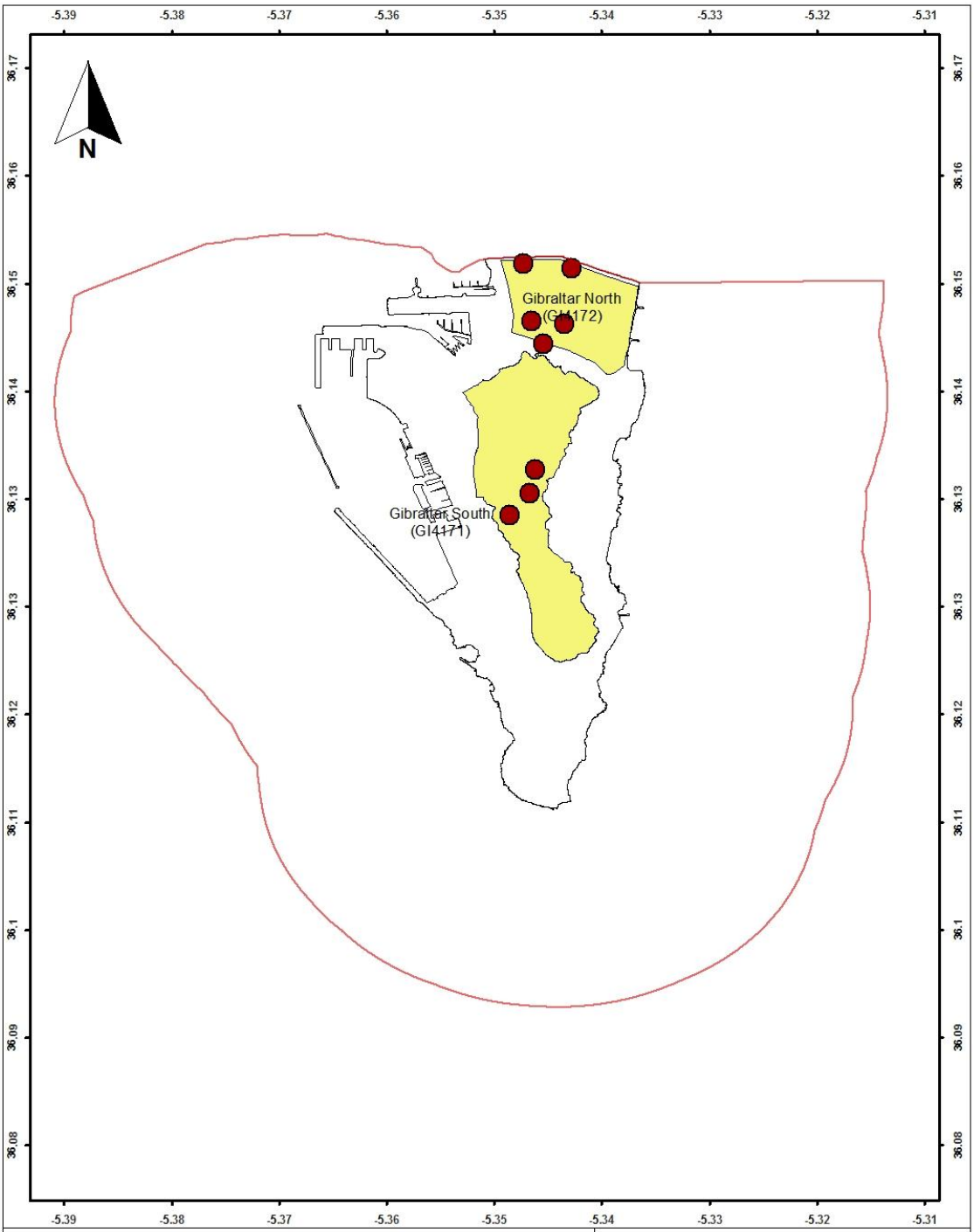

Key:

- River Basin District
- **Gibraltar coastline**
- GW Monitoring Stations
- Groundwater Bodies

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Geographic Coordinate System - WGS84 Spheroid

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Figure A7
Groundwater monitoring stations

March 2011
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Based Upon Government of Gibraltar survey, updated 2011

Coastal Water Types and Reference Conditions

The Water Framework Directive specifies that one of two systems (System A and System B) is to be used to differentiate the water body type. The types indicate, in very general terms the types of ecology likely to be present in water bodies of that type in undisturbed conditions. Using System A (the most applicable system for Gibraltar coastal waters), there is a requirement to differentiate surface water bodies by the relevant eco-regions in accordance with the geographical areas identified within the Directive and then within each eco-region differentiate by type according to specified descriptors. At an initial glance, the eco-region that would best describe the Gibraltar coastal waters would most probably be the Mediterranean sea eco-region (one of six coastal water eco-regions defined in the Directive), though the coastal waters do lie within both the Mediterranean and Atlantic eco-region. The type is defined based on mean annual salinity and mean depth using the following criteria:

Mean Annual Salinity

- <0.5 - freshwater;
- 0.5 to <5 - oligohaline;
- 5 to 18 - mesohaline;
- 18 to < 30 - polyhaline;
- 30 to <40 - euhaline.

Mean Depth

- Shallow waters <30m;
- Intermediate (30 to 200 m);
- Deep >200m.

Salinity levels within Gibraltar coastal waters generally lie within the euhaline range. Depths within one nautical mile of the coast are quite variable however. West of Europa Point depths range from several metres to over 200 metres, whereas east of Europa point the waters are generally shallower and rarely exceed 50 metres. Mean depth would therefore equate more closely to the intermediate type. The coastal water type therefore can be considered as Mediterranean euhaline intermediate.

Reference conditions (which are equivalent to high status) need to be set in relation to the ecology expected to be found in each type and represent undisturbed or nearly undisturbed conditions. Reference conditions provide the basis on which the quality status classification will be built, consisting of high, good, moderate, poor and bad status.

The Mediterranean Sea eco-region, characterised by its rocky reefs, seagrass meadows and upwelling areas includes particularly important habitats that support high biodiversity. Gibraltar coastal waters demonstrate these characteristics, and indeed relicts of seagrass meadows are reported to occur along the northern periphery of the Bay of Gibraltar. However, as a result of the unique hydrological regime within the bay of Gibraltar, where the Mediterranean waters are influenced by mixing with Atlantic waters, distinctive mixtures of typically African, Mediterranean or Atlantic species are reported to co-exist (Smith and Fa, 2004). These conditions apply to the adjacent Spanish coast as well and biological reference conditions have

therefore been harmonised with those being applied more widely in the area, as set out in the report.

A.5 Confidence and Precision of Monitoring

A.5.1 Coastal Waters

Surveillance monitoring has taken place over two years, as required by Annex V of the WFD. Data has been processed for Year 1, providing an adequate number of samples, allowing status to be assessed with a high degree of certainty for most parameters.

However, for some priority substances, developments in analytical techniques have not kept pace with the environmental quality standards (EQS) being set and analytical detection limits remain higher than the standards. This is the case for TBT. When concentrations exceeding the detection limits are recorded, failure to comply is certain if any of these levels exceed the maximum allowable concentration (short-term EQS). Even if some results are recorded as less than the detection limit, measured values may be high enough for it to be certain that the overall mean will exceed the annual average (long-term standard) but, in other cases, this may not be the case the range of possible mean values may extend from less than to greater than the EQS. For the Gibraltar Costal Waters water body, the annual average complies with the EQS for TBT when taking Year 2 data into account. For some sets of results however, the limit of detection is not reached and therefore the good status is given as uncertain.

A.5.2 Groundwater

The confidence in status assessment for groundwater bodies in the UK is linked to the number of monitoring points in the GWB. In the UK, any assessment of general chemical quality based on 6 or fewer monitoring points was made with low confidence (or low certainty), although, the UKTAG guidance on monitoring network design does not stipulate a lower limit on the number of monitoring points in a GWB (UKTAG, 2005).

It is noted that neither of the Gibraltar GWBs have more than 6 monitoring points, but that the water bodies are relatively small, i.e. less than 1 hectare in size, compared to UK groundwater bodies. Given the small footprint of the groundwater bodies and considering that that they each contain three monitoring locations, the chemical assessment result is given with high confidence.

B. Water Body Status Objectives

B.1 Introduction

This annex sets out the environmental objectives for all four water bodies in the Gibraltar River Basin District. The reasoning behind the status objectives is also presented. Annex E presents further information on how the actions to meet the objectives were assessed.

B.2 The objectives of the Water Framework Directive

The default environmental objectives set by the WFD are summarised in the table below.

Table B.1 WFD Objectives

Surface Waters	Groundwater
Prevent deterioration in status for water bodies	Prevent deterioration in the status of groundwater bodies
Aim to achieve good ecological and good surface water chemical status in water bodies by 2015	Aim to achieve good quantitative and good groundwater chemical status by 2015 in all those bodies currently at poor status
For water bodies that are designated as artificial or heavily modified, aim to achieve good ecological potential by 2015	Implement actions to reverse any significant and sustained upward trends in pollutant concentrations in groundwater
Comply with objectives and standards for protected areas where relevant	Comply with the objectives and standards for protected areas where relevant
Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.	Prevent or limit the input of pollutants into groundwater

B.2.1 Good Status

The Directive sets a target of aiming to achieve at least 'good status' in all waters. For surface waters there are two separate classifications for water bodies; ecological and chemical. For a surface water body to be in overall 'good' status both ecological and chemical status must be at least 'good'. Ecological status is recorded on a scale high, good, moderate, poor and bad; chemical status is recorded as good or fail. If a water body is at less than good ecological status it is also reported how certain it is that the water body does not meet good status. For groundwater, there are also two separate classifications for water bodies; quantitative and chemical. For a groundwater water body to be in overall 'good' status, both quantitative and chemical status must be 'good'. Groundwater status is recorded as good or poor.

B.2.2 Heavily Modified Water Bodies

Where it is not possible for a water body to achieve good status because of substantial alterations made for specified purposes such as navigation, water storage, flood defence and land drainage the Directive recognises that the benefits of such uses need to be retained and allows these water bodies to be designated as Heavily Modified Water Bodies (HMWBs).

For such water bodies good ecological potential (GEP) can be set as the environmental objective. This objective therefore takes into account the constraints imposed by the physical structure of the water body. Good ecological potential is not a derogation but represents an alternative objective to GES. Derogations form GEP itself can be justified on the basis of technical feasibility or disproportionate costs of measures to reach GEP.

B.2.3 Protected Areas

The Directive specifies that areas requiring special protection under other EC Directives are identified as protected areas. These areas have their own objectives and standards. Article 4 of the Water Framework Directive requires Member States to achieve compliance with any standards and objectives set for each protected area by 22 December 2015, unless otherwise specified in the Community legislation under which the protected area was established. Where a protected area also has a surface water or groundwater objective the most stringent objective applies.

The objectives reported in this annex (Annex B) are those related to WFD water body status only. However, where a protected area coincides with a water body, this is indicated in the water body tables in this annex. It is not possible to link the water body status objectives in this annex with the protected area objectives in Annex D since the two sets of objectives are not always directly comparable. In addition, in some cases the size and scale of water bodies under the WFD are not the same as waters identified as protected areas. More information about protected areas and their objectives and standards are shown in Annex D.

B.2.4 Prevent or limit discharges to ground (re groundwater directive)

Article 6 of the Groundwater Directive (2006/118/EC) requires that member states put in place measures that prevent the input of Hazardous Substances to Groundwater, and limit the input of all other substances to groundwater in order to ensure that such inputs do not cause deterioration or significant and sustained upward trends in the concentration of the pollutants in groundwater. These status objectives are implemented through legislation (e.g. the Groundwater Regulations in the UK) which applies conditions to authorisations for discharges of substances to ground.

Groundwater quality monitoring is required to assess the effectiveness of the measures introduced to prevent or limit the deterioration of the status of groundwater.

B.2.5 Prevent deterioration in status and exceptions

Other than in very exceptional circumstances, the objective to prevent deterioration in status of a water body must always be met, for example, when the deterioration is caused by physical modifications. These new activities may change the physical characteristics of a surface water body, which may be the case in building new flood defences. Even in these cases it is necessary to comply with a number of conditions before this derogation can be relied upon.

B.2.6 Water bodies where deterioration of status has been permitted under the terms of Article 4 (7)

One of the objectives of the Water Framework Directive is to ensure the status of water bodies is protected from deterioration. This objective applies to all water bodies no matter what their status. However, in specific circumstances, the Directive does provide for exemptions or reasons why this objective should not be applied. Although protecting the water environment is a priority, some new modifications may provide important benefits to human health, human safety and/or sustainable development.

Such benefits can include:

- Public water supply;
- Flood defence/alleviation;
- Hydropower generation;
- Navigation.

It is sometimes not possible to undertake such activities without causing deterioration of status to the water body, or preventing the water body from reaching its environmental objectives. The benefits such developments can bring need to be balanced against the social and economic benefits gained by maintaining the status of the water body.

No developments occurring between 1st July 2009 and 1st July 2010 were identified as likely to cause deterioration in the ecological status or potential of water bodies within the Gibraltar River Basin District.

B.3 Water Body tables explained

Classification and objectives for the four water bodies are set out below. The entries in the tables are explained in Figures B1 and B2.

Figure B1 Surface Water tables explained

Waterbody Category:	Type of waterbody (e.g coastal)	**Surveillance site:**	Monitoring locations (see map A6)
Waterbody ID and Name:	Unique code of the waterbody submitted to the EU, and specific water body name		
Current Overall Status:	The overall classification status for the water body, based on WFD Year 1 monitoring data (July 2009 to June 2010)		
Status Objective (Overall):	The overall status objective for the water body		
Status Objective(s):	The ecological status (or ecological potential for the Heavily Modified water body)		
Justification if overall objective is not good status by 2015:	The reason why an alternative status has been set		
Protected Area designation:	States whether part of the water body contains a Protected Area Designation (objectives for protected areas are presented in Annex D)		
Hydro-morphological designation:	States is the water body is Heavily Modified / Not Designated		
Reason for designation (HMWB only)	States reason for heavily modified designation, based on Annex I		

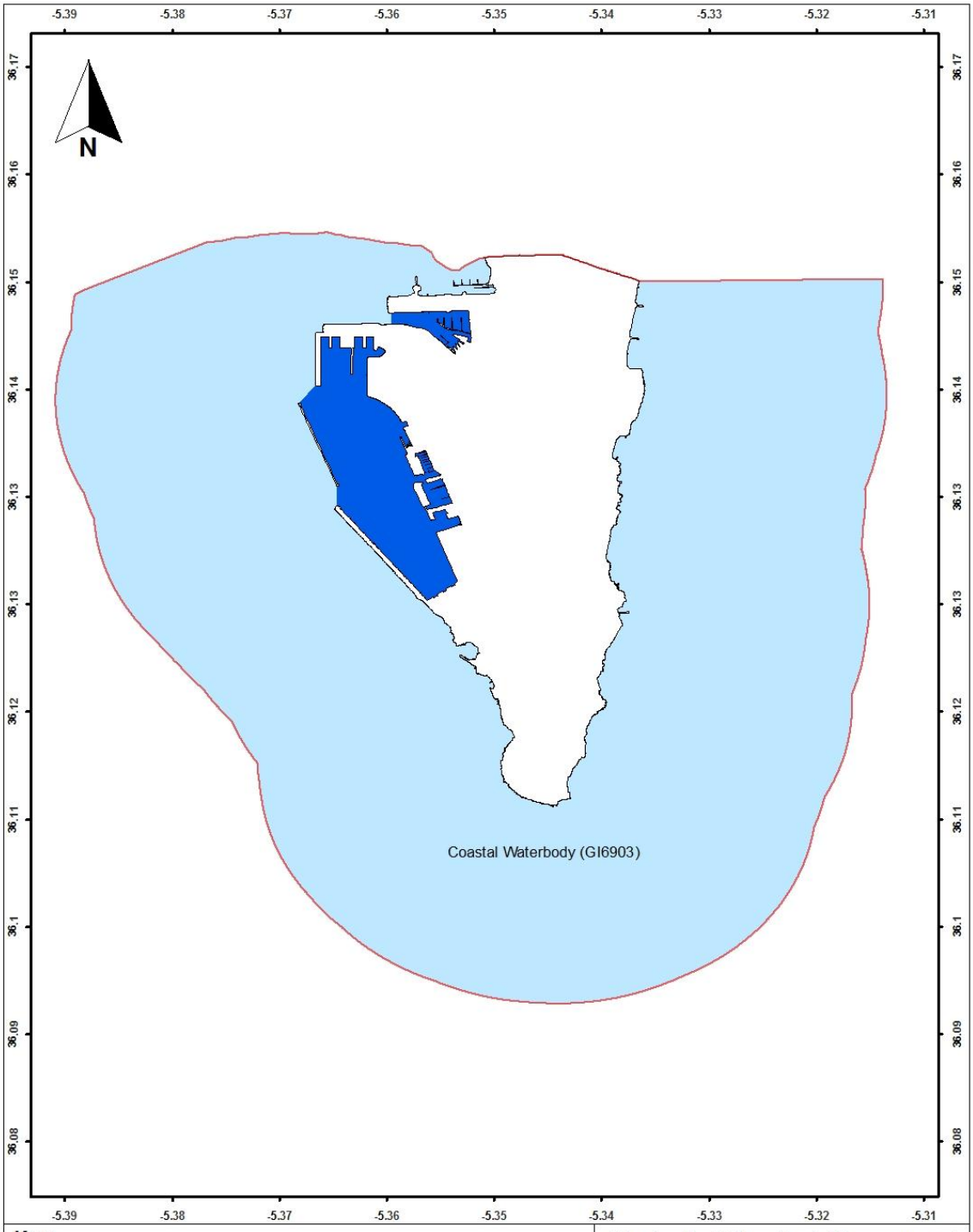
Ecological Status			
Current Status (and confidence in this assessment)		Presents current ecological status, based on methodology set out in Section 3.1.1 of the Main Report. The levels of certainty in the classification are described in Section 1.3 of Annex A)	
Biological Elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Provides a breakdown of the biological elements available and used for the classification, with the status objectives for each element.			
Supporting Elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Provides a breakdown of the specific pollutants and physio-chemical elements available and used for the classification, with the status objectives for each element.			
Only present for Heavily Modified Water Body			
Ecological Potential Assessment			
Current Potential	**Predicted Potential by 2015**		**Justification for not achieving good status by 2015:**
Ecological potential and prediction of when good potential will be achieved			
Mitigation measures that have defined ecological potential			
Mitigation Measure			*Status*
Lists mitigation measures needed for HMWB to meet Good Ecological Potential. The status of each measure is listed as either being **in place** or **not in place**. Measures listed as not being in place are included in Annex C as being required to meet the status objectives. Measures that are not applicable are not listed. Such measures have been assessed in Annex I, but have been ruled out for having either a significant impact on the use of the HMWB, or a significant environmental impact (or both).			
Chemical Status			
Current Status (and confidence in this assessment)		Presents current chemical status, based on methodology set out in Section 3.1.1 of the Main Report. The levels of certainty in the classification are described in Section 1.3 of Annex A)	
Chemical elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Provides a breakdown of the priority substances available and used for the classification, with the status objectives for each element. If required a justification is provided for not achieving good status by 2015.			

Figure B2 Groundwater tables explained

Waterbody Category:	Type of water body (i.e. groundwater)		
Waterbody ID and Name:	Unique code of the waterbody submitted to the EU, and specific water body name		
Current Overall Status:	The overall classification status for the water body		
Status Objective (Overall):	The overall status objective for the water body		
Status Objective(s):	The ecological status (or ecological potential for the Heavily Modified water body)		
Justification if overall objective is not good status by 2015:	The reason why an alternative status has been set		
Protected Area Designation:	States whether part of the water body contains a Protected Area Designation (objectives for protected areas are presented in Annex D)		
Quantitative Status			
Current Status (and confidence in this assessment)	Presents current quantitative status, based on methodology set out in Section 3.1.3 of the Main Report. The levels of confidence in the classification are described in Section 1.3 of Annex A)		
Quantitative Elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Provides a breakdown of the quantitative elements available and used for the classification, with the status objectives for each element. For Gibraltar groundwater bodies, only the groundwater resource balance is used (see Section 3.1.3 of Main Report)			
Chemical Status			
Current Status (and confidence in this assessment)	Presents current quantitative status, based on methodology set out in Section 3.1.3 of the Main Report. The levels of confidence in the classification are described in Section 1.3 of Annex A)		
Chemical elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Provides a breakdown of the chemical elements available and used for the classification, with the status objectives for each element. For Gibraltar groundwater bodies, only the general chemical assessment (GCA) is used (see Section 3.1.3 of Main Report)			
Pressures and Risks			
Pressures	**Risk Category**	**Element against which assessed**	
Provides a summary of pressures facing water body that could lead to status not being good and risks for each element			

B.4 Coastal Waters

There is one coastal water body and one heavily modified coastal water body in the Gibraltar River Basin District.



Key:

- River Basin District
- **Gibraltar coastline**
- **Heavily Modified Water Body**
- **Coastal Water Body**

0 500 1,000 1,500 2,000 Metres

Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

Project Path:
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Gibraltar Draft River Basin Managemment Plan

Figure B1
Coastal Water Bodies in Gibraltar

March 2011
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Based Upon Government of Gibraltar survey, updated 2011

B.4.1 Water body tables for coastal waters

Waterbody Category:	Coastal	**Surveillance site:**	Sites 1, 2 & 3
Waterbody ID and Name:	GI6903 Gibraltar Coastal Waters		
Current Overall Status:	Good		
Status Objective (Overall):	To maintain Good Status		
Status Objective(s):	To maintain Good Ecological Status		
Justification if overall objective is not good status by 2015:	N/A		
Protected Area Designation:	Southern Waters are a Special Area of Conservation (Habitats Directive). There are also six bathing areas in Gibraltar coastal waters designated under the Bathing Waters Directive.		
Hydro-morphological Designation:	Not designated as Heavily Modified		

Ecological Status			
Current Status (and certainty that status is less than good)		Good	
Biological Elements			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Phytoplankton	Good	Good	
Benthic macro-invertebrates	Good	Good	
Supporting Elements			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Dissolved Inorganic Nitrogen	Good	Good	
Dissolved Oxygen	High	High	
Ammonia	Good	Good	
Chromium	Less than good (uncertain)	Good	
Copper	Good	Good	
Zinc	Good	Good	
Chemical Status			
Current Status (and certainty that status is less than good)		Moderate (uncertain)	
Chemical elements **			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Lead	Good	Good	
Nickel	Good	Good	
TBT	Good (uncertain)	Good	
Benzene	Good	Good	
Di(2-ethylhexyl)phthalate	Good	Good	

** Other priority substances analysed but not detected are listed in Table A3. Apart from those where the analytical detection limit is higher than the environmental quality standard (and where status is therefore uncertain), these substances are all at good status.

Waterbody Category:	Coastal	**Surveillance site:**	Site 4
Waterbody ID and Name:	GI6901 Gibraltar Harbour and Marina Bay		
Current Overall Potential:	Moderate		
Status Objective (Overall):	Good Potential by 2027		
Status Objective(s):	Good Ecological Potential by 2027		
Justification if overall objective is not good status by 2015:	Technical infeasibility: insufficient information on the cause of problem		
Protected Area Designation:	None		
Hydro-morphological Designation:	Heavily Modified		
Reason for HMWB designation	Ports & Harbour, Navigation, Flood Protection, Land Reclamation, Recreation		

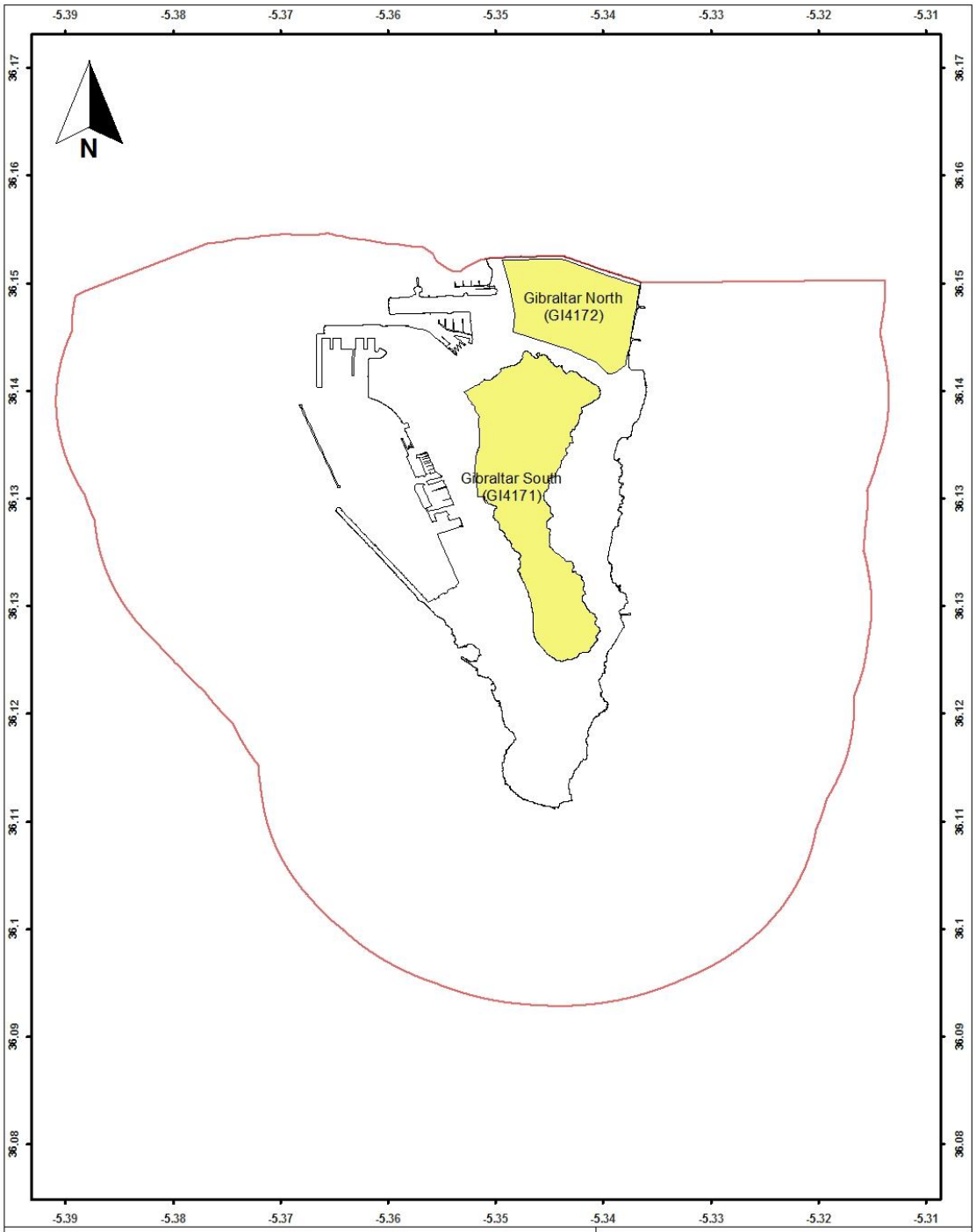
Ecological Potential			
Current Potential (and certainty that status is less than good)		Good (certain)	
Biological Elements			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Phytoplankton	Good	Good	
Benthic Invertebrate	Good	Good	
Supporting Elements			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Dissolved Inorganic Nitrogen	Good	Good	
Dissolved Oxygen	High	High	
Ammonia	Good	Good	
Copper	Good	Good	
Zinc	Good	Good	
Ecological Potential assessment			
Current Potential	**Predicted Potential by 2015**		**Justification for not achieving good status by 2015:**
Good	Good		
Mitigation measures that have defined ecological potential			
Mitigation Measure			*Status*
Dredging and disposal strategy			In place
Vessel management			In place

Chemical Status			
Current Status (and certainty that status is less than good)		Moderate (certain)	
Chemical elements **			
Element	**Current status (and certainty that status is less than good)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Lead	Good	Good	
Mercury	Good	Good	
TBT	Less than good (certain)	Less than good	Technical infeasibility
Di(2-ethylhexyl)phthalate	Good	Good	

** Other priority substances analysed but not detected are listed in Table A3. Apart from those where the analytical detection limit is higher than the environmental quality standard (and where status is therefore uncertain), these substances are all at good status.

B.5 Groundwater

There are two groundwater bodies in the Gibraltar River Basin District.



Key:

- River Basin District
- **Gibraltar coastline**
- Groundwater bodies

Gibraltar Draft River Basin Managemment Plan

Figure B2
Groundwater Bodies in Gibraltar

0 500 1,000 1,500 2,000 Metres

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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

March 2011
27593-B07 WEBSN

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Based Upon Government of Gibraltar survey, updated 2011

Water body tables for groundwater

Waterbody Category and Map Code:	Groundwater		
Waterbody ID and Name:	GI4172 Gibraltar North		
Current Overall Status:	Good		
Status Objective (Overall):	To maintain good status		
Status Objective(s):	To maintain good status		
Justification if overall objective is not good status by 2015:			
Protected Area Designation:	Not designated		
Quantitative Status			
Current Status (and confidence in this assessment)		GOOD High Confidence	
Quantitative Elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Groundwater resource balance	GOOD (high confidence)	GOOD	
Chemical Status			
Current Status (and confidence in this assessment)		GOOD	
Chemical elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
GCA	GOOD (high confidence)	GOOD	
Pressures and Risks			
Pressures	**Risk Category**	**Element against which assessed**	
Diffuse pollution from urban land use	Probably at risk	General Chemical Assessment	
Point source (hydrocarbon spillage)	Probably not at risk	General Chemical Assessment	

Waterbody Category:	Groundwater		
Waterbody ID and Name:	GI4171, Gibraltar South		
Current Overall Status:	Good		
Status Objective (Overall):	To maintain good status		
Status Objective(s):	To maintain good status		
Justification if overall objective is not good status by 2015:			
Protected Area Designation:	Not designated		
Quantitative Status			
Current Status (and confidence in this assessment)		GOOD High Confidence	
Quantitative Elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
Groundwater resource balance	GOOD (high confidence)	GOOD	
Chemical Status			
Current Status (and confidence in this assessment)		GOOD	
Chemical elements			
Element	**Current status (and confidence)**	**Predicted Status by 2015**	**Justification for not achieving good status by 2015:**
GCA	GOOD (high confidence)	GOOD	
Pressures and Risks			
Pressures	**Risk Category**	**Element against which assessed**	
Point source (hydrocarbon spillage)	Probably not at risk	General Chemical Assessment	

C. Actions (Programme of Measures)

C.1 Introduction

This section outlines the actions for managing the identified pressures on water environment and for contributing toward meeting the objectives of the WFD. The actions have been identified for pressures considered to be in some way a potential risk to the water bodies in the Gibraltar River Basin District. Annex G identifies the pressures to the environment and risks on a scale of not at risk, probably not at risk, probably at risk and at risk. Actions are listed for all pressures probably not at risk or greater and represent on the ground activities, many of which are existing regulations and controls to protect the environment.

This section is supported by the assessments undertaken in the following sections of the Plan:

- Annex B, Water Body Status Objectives
- Annex D, Protected Areas
- Annex E, Actions Appraisal
- Annex F, Mechanisms for Actions
- Annex G, Pressures and Risks

The actions are tabulated in the next section, which identifies the pressure, the action that will be taken/is being taken, the geographic location the date for which the action must be completed and the lead organisation responsible for the action. The table also identifies if the action is already in place.

These actions represent the measures identified for the first cycle of river basin management planning. Investigations have also been identified to help identify future actions, where there is currently insufficient information to inform certain measures and to confirm the exact nature of the pressures facing the water environment. Updates to the actions and measures may be implemented within the next cycles of river basin management planning and when further information becomes available from the investigations.

C.2 Actions

We can all individually take action to help protect and improve the water environment. By aiming toward more sustainable use of water in the home and at work, the environmental (carbon) cost of desalinating water can be more efficiently managed, whilst efficient use of water will also help to minimise the volume of wastewater produced and discharged to the sea. Water efficiency in the home can be improved through the use of low flow fixtures such as taps, showers, toilets and washing machines/dishwashers etc. Our behaviour, such as turning off taps when brushing teeth/shaving, using cold water taps when hot water isn't a necessity and washing the car less often, is equally important in saving water and energy use.

Water supply in Gibraltar is provided by AquaGib Ltd under a License Agreement with the Government of Gibraltar issued under the provisions of the Public Health Ordinance. The water company is responsible for treating water to the required standard for drinking purposes.

The Ministry for the Environment is the governmental body responsible for the Water Framework Directive implementation in Gibraltar. Nevertheless there arevarious departments responsible for ongoing actions to maintain environmental quality. These include:

- *The Department of the Environment*: advises on the transposition of EU Directives and management of their requirements. Apart from dealing with EU Directives, the Department is also tasked with monitoring contracts between Government and service providers which affect the general state of the environment including all environmental protection, enforcement and management issues in areas such as waste, wildlife & habitats, and any other issues related to biodiversity/conservation management.
- *The Environmental Agency*: plays an important role in delivering the environmental policies of the Government of Gibraltar, and is also responsible for the enforcement of a number of Environmental and Public Health legislations.
- *Technical Services Department*: provides technical support to the Government and to other Departments in a number of areas, including Highways, Infrastructure, Engineering & Design, Mechanical and Geographic Information Systems.

Other departments in the Government with responsibilities relevant to the protection of the environment include:

- Town Planning (including the Development and Planning Commission)
- Maritime Administration
- Port Authority

The promotion of sustainable development and the use of sustainable drainage systems for managing surface water in both new and existing development will help to reduce the impacts associated with urban run-off.

Table C.1 summarises the pressures on the environment from the different sectors, and the responsibility for maintaining or implementing actions to protect and improve the water environment in Gibraltar.

Table C.1 Table of actions

Pressure	What will happen?	Where will it happen?	Status	Lead organisation and partners
Point source sewage discharge (nutrients, faecal indicator organisms)	No deterioration of sewage discharges	Europa Point (Gibraltar Coastal Waters)	Implemented	Government of Gibraltar, Technical Services Department
Point source sewage discharge (nutrients, faecal indicator organisms)	New sewage treatment facility	Europa Point (Gibraltar Coastal Waters)	Ongoing	Government of Gibraltar
Oil sullage discharge (hydrocarbons, priority substances)	No deterioration, continued compliance with consent for discharge under the Integrated Pollution Prevention Control, under the Pollution Prevention and Control Act 2001. This Act implements the EC Directive 96/61.	North Mole (Gibraltar Coastal Waters)	Implemented	Government of Gibraltar, Environmental Agency Nature Port Reception Facilities Ltd
Combined sewer overflows (nutrients, faecal indicator organisms)	Improvements to surface water connections to reduce flooding, subsequently will reduce sewer spills	Wellington Front	Implemented	Government of Gibraltar, Technical Services Department
Shipping & historical contamination (TBT)	Continued monitoring to ensure ships have the International Anti-Fouling System Certificate before work is undertaken. Continued appropriate disposal of scrappings to hazardous waste facilities	Gibraltar Harbour & Marina Bay	Implemented	GibDock Ltd Government of Gibraltar, Department of Environment
Harbour use (land reclamation, morphological pressure)	Planning applications and regulations to control further land reclamation and shoreline reinforcement. Comply with Town Planning (Environmental Impact Assessment) Regulations 2000 (which implements the EIA Directive and its amendments)	Gibraltar Harbour & Marina Bay	Implemented	Government of Gibraltar, through Town Planning
Harbour use (shipping)	Comply with the relevant licences as required by the Gibraltar Port Authority and Maritime Administration	Gibraltar Harbour & Marina Bay Gibraltar Coastal Waters	Implemented	Port Authority Maritime Administration

Table C.1 (continued) Table of actions

Pressure	What will happen?	Where will it happen?	Status	Lead organisation and partners
Urban land use (ammonia, hydrocarbons)	Planning applications and regulations to control construction and development	Isthmus (Northern Groundwater Body)	Implemented	Government of Gibraltar, Department of Environment / Town planning
Urban land use (ammonia, hydrocarbons)	Groundwater protection advice/ discharge control	Isthmus (Northern Groundwater Body) The Rock (Southern Groundwater Body)	Implemented	Government of Gibraltar, Department of Environment / Town planning
Hydrocarbon spillages	Storage control of hydrocarbons Spill response plans	Isthmus (Northern Groundwater Body) The Rock (Southern Groundwater Body)	Implemented	Government of Gibraltar
Dredging	Compliance with Guidelines for the Assessment of Dredged Material	Gibraltar Harbour & Marina Bay Gibraltar Coastal Waters	Implemented	Government of Gibraltar, Department of Environment
Investigations				
Shipping & historical contamination (TBT)	Investigation to • improve information on water quality, • improve certainty levels in water body status and potential and • improve knowledge on source of contamination	Gibraltar Harbour,	2011 - 2015	Government of Gibraltar, Department of Environment

Table C.1 (continued) Table of actions

Pressure	What will happen?	Where will it happen?	Status	Lead organisation and partners
Protected Areas				
Sewage Discharge at Western Beach emanating from Spain (*E.coli*, faecal streptococci)	Actions required in the adjacent Spanish River Basin District to prevent sewage discharges directly into the Gibraltar River Basin District especially at Western Beach.	Western Beach	Ongoing	Government of Gibraltar
General impacts from human activity	Bathing Water Monitoring and Reporting	Camp Bay, Catalan Bay, Sandy Bay, Eastern Beach, Western Beach	Ongoing	Environmental Agency
Environmental protection	Public awareness campaigns / beach signage	Camp Bay, Catalan Bay, Sandy Bay, Eastern Beach, Western Beach	2015	Environmental Agency
General impacts from human activity	Continued SAC monitoring	Southern Waters of Gibraltar SAC	Ongoing	Government of Gibraltar, Department of Environment
Fishing activities	Government will be introducing the legislation which will regulate fishing activities	Throughout British Gibraltar Territorial Waters	Ongoing	Government of Gibraltar, Sports & leisure Authority

D. Protected Areas

D.1 Introduction

The Water Framework Directive requires under Article 4 that Member States achieve compliance with any standards and objectives for protected areas by 2015, unless otherwise specified in the Community legislation under which the individual protected areas have been established.

Article 6 requires a register of protected areas to be included within the River Basin Management Plan, which shall be kept under review and up to date. Protected areas to be included in the register are:

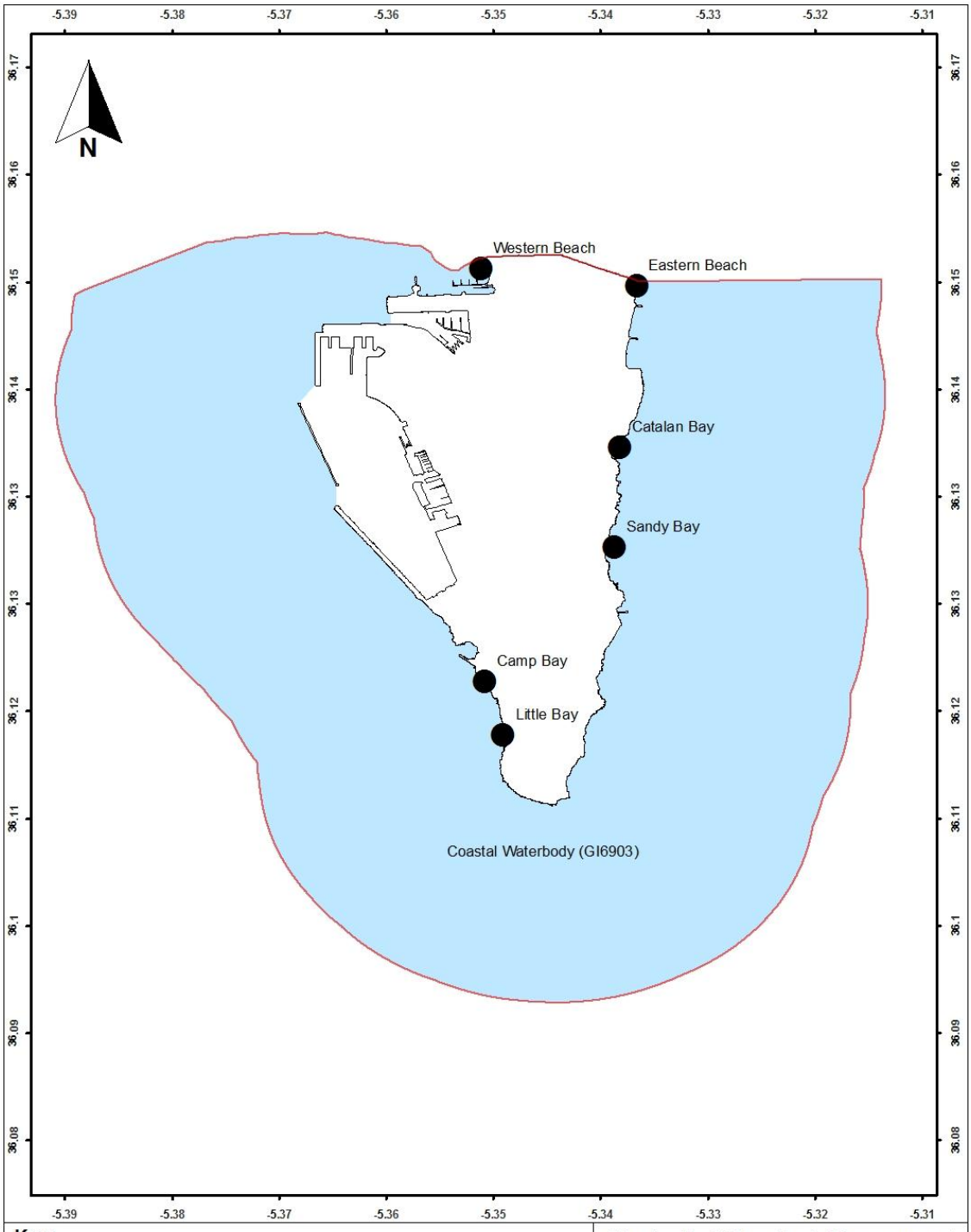
- Drinking Water Protected Areas (all bodies of water used for providing more than 10 m^3 a day on average for human consumption, or serving more than 50 persons);
- Freshwater Fish And Shellfish Areas (designated for the protection of economically significant aquatic species);
- Bathing Waters (designated under Directive 76/160/EEC and 2006/7/EC);
- Nutrient sensitive areas (including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive);
- Habitats Directive Sites (areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites).

In Article 8, the WFD requires Member States to ensure monitoring programmes are established for protected areas, and are supplemented by those specifications contained in Community legislation under which the individual protected areas have been designated.

D.2 Types and Locations of Protected Areas

In the Gibraltar River Basin District there are:

- No drinking water protected areas;
- No areas designated under the Freshwater Fish Directive and no Shellfish Waters;
- Six Bathing Water areas (shown in Figure D.1);
- No nutrient sensitive areas;
- One water dependent site designated under the Habitats Directive (92/43/EEC) and the Commission Decision 2006/613/EC (shown in Figure D.2).



Key:

- River Basin District
- **Gibraltar coastline**
- Bathing Waters
- **Coastal Water Body**

0 500 1,000 1,500 2,000 Metres

Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

Project Path:
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Gibraltar Draft River Basin Managemment Plan

Figure D1
Bathing Waters

March 2011
27593-B09 WEBSN

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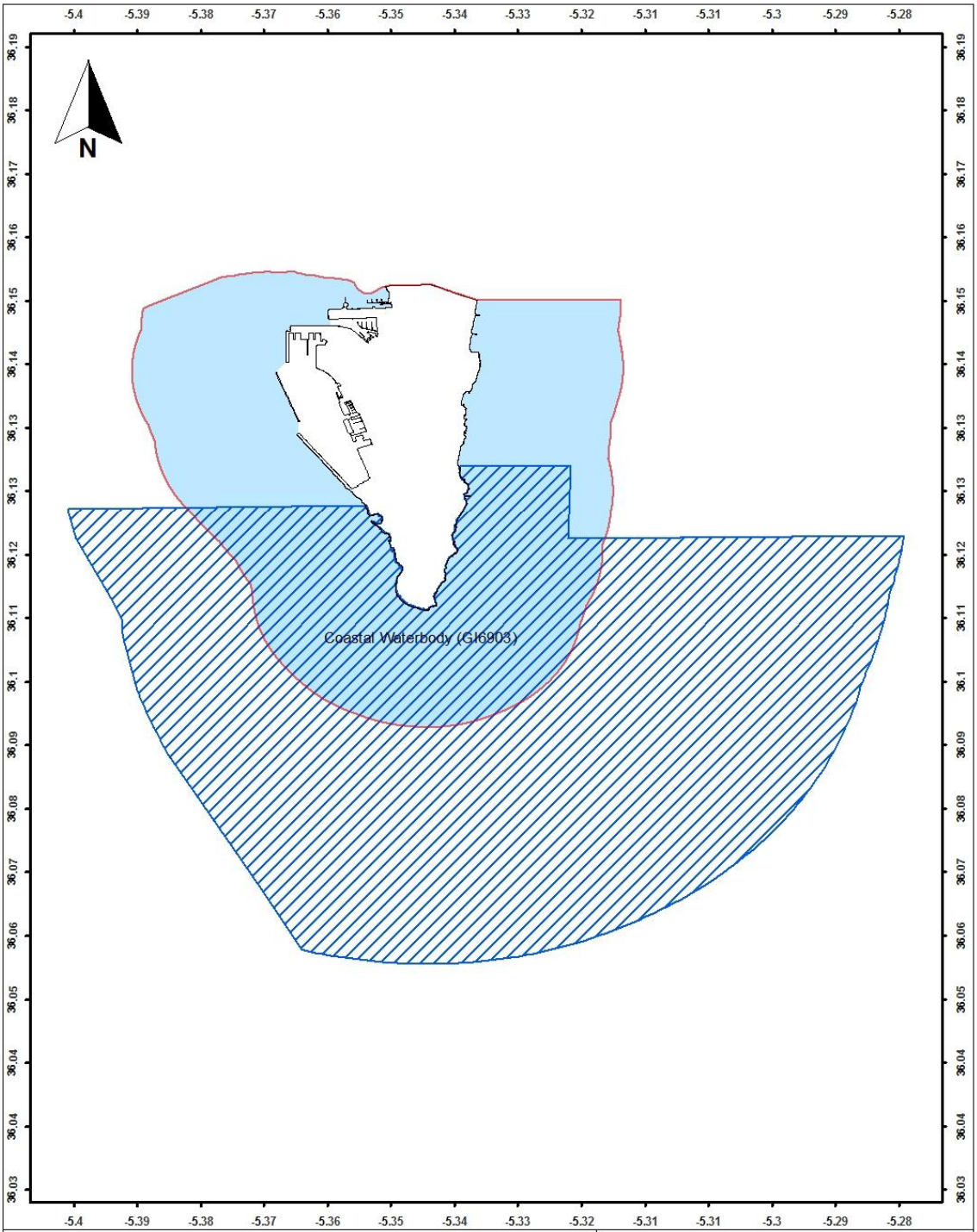
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- Gibraltar coastline
- Special Area of Conservation
- Coastal Water Body

0 500 1,000 1,500 2,000 2,500 3,000 3,500 Metres

Project Path:
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Scale: 1:85,000 @ A4
Geographic Coordinate System - WGS84 Spheroid

Gibraltar Draft River Basin Managemment Plan

Figure D2
Southern Waters Special Area of Conservation (SAC)

June 2011
27593-B10i2 PITKL

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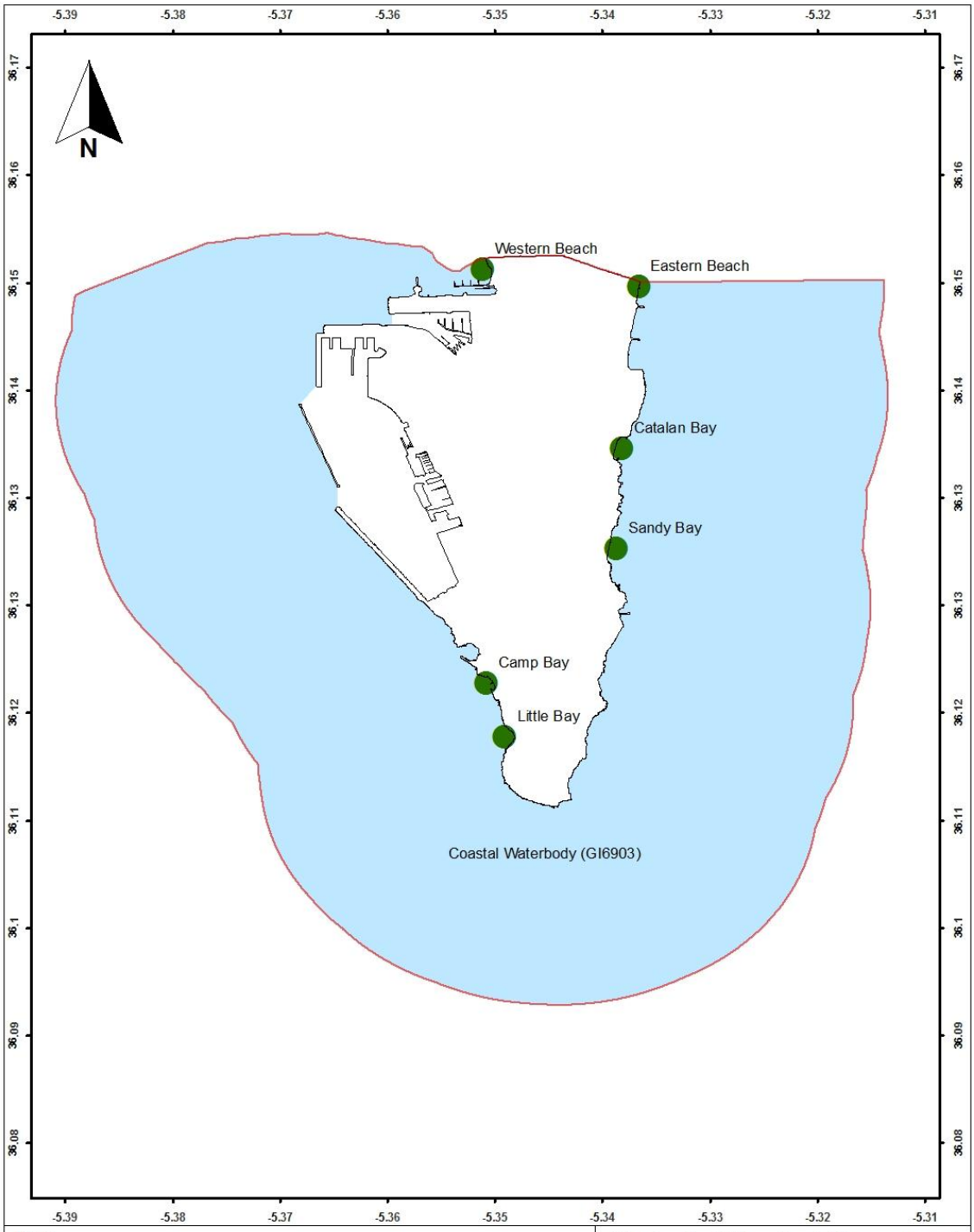
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- Bathing water monitoring locations
- **Coastal Water Body**

0 500 1,000 1,500 2,000 Metres

Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

Project Path:
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Gibraltar Draft River Basin Managemment Plan

Figure D3
Bathing Waters monitoring locations

March 2011
27593-B11 WEBSN

amec

Based Upon Government of Gibraltar survey, updated 2011

D.4.3 Habitats Directive

The EU Birds Directive, together with the EU Habitats Directive, (92/43/EEC) were transposed into Gibraltar law by the Nature Protection Act 1991. Under Commission Decision 2006/613/EC, the Southern Waters of Gibraltar were approved as a Site of Community Importance (SCI) in the Mediterranean bio-geographical region. The marine SCI was later designated as an SAC by the Gibraltar Government following the completion of the Southern Waters of Gibraltar Management Scheme.

The conservation objective of the Southern Waters of Gibraltar is that of ensuring that the status of European features are maintained or achieve favourable conservation status allowing for natural change.

D.5 Compliance and Monitoring Results

D.5.1 Bathing Waters

The Bathing Water areas in Gibraltar are monitored on a weekly basis from the 15th April to 30th October each year. The results for the period 1997 – 2009 are shown at http://www.environmental-agency.gi/environmental_monitoring.htm. Table D.1 below presents the results from 2010, also available on a separate link on the above website, for compliance against the current Directive. Results from 2007 to 2010 are used to assess compliance against the revised Directive, which requires data from the last four bathing seasons to be used in the assessment of quality.

Table D.1 Bathing Water Compliance

Bathing Water	Compliance under current Directive (guideline pass, mandatory pass, fail)	Predicted compliance under new BWD (excellent, good, sufficient, poor)
Camp Bay	Mandatory Pass	Excellent
Catalan Bay	Mandatory Pass	Good
Eastern Beach	Mandatory Pass	Good
Little Bay	Mandatory Pass	Excellent
Sandy Bay	Mandatory Pass	Good
Western Beach	Fail	Poor

D.5.2 Habitats Directive

Monitoring has been taking place to comply with WFD requirements at three points around the coast of Gibraltar and at one location within Gibraltar Harbour. One of the coastal monitoring locations, at Camp Bay, is located within the marine SAC. Taken in isolation the status classification of Site 2 represents Moderate Status, with low confidence that the status is not Good due to detection limits issues for TBT. Monitoring for WFD will continue and will be updated as part of the investigative monitoring phase.

The Southern Water of Gibraltar Management Scheme (2011) states that the specific needs of the Habitats Directive, i.e. monitoring the conservation status of listed habitats and species, is being implemented but needs to be augmented. The monitoring programme covers locally important marine species and communities not listed in the Habitats Directive since these also play a critical role in maintaining the biodiversity and resilience of EU listed features e.g. reefs.

There are two Annex I habitats found in the Southern Waters of Gibraltar: reefs and submerged (or partially submerged) sea caves. These are being monitored as part of the Annex I Habitats Monitoring Programme.

A monitoring programme for marine species listed in Annex II and IV of the Habitats Directive is also being carried out. The results of the 2001-2006 surveillance monitoring period have been published in the '*Habitats Directive Six-yearly Report*'produced by Wildlife Gibraltar (Ltd) for the Government of Gibraltar. The 2007-2012 is currently being drafted.

D.6 Actions (Measures)

All Bathing Waters with the exception of Western Beach are compliant with the mandatory standards of the existing Bathing Waters Directive, and with the requirement to be of 'sufficient' quality set by the revised directive.

The failure at Western Beach has been attributed to a continuous sewage discharge from Spain during 2010. Communication is ongoing between the two Governments to resolve the issue. Continued monitoring will take place until the discharge is controlled and water quality meets the required mandatory standards. Until this point the beach will remain closed.

The Environmental Agency is responsible for the water quality monitoring and reporting of these sites. This will continue as the new directive comes into force, and further information to bathers and a bathing profile for each site has been developed. The actions identified for the Bathing Waters are:

- Continued monitoring
- Bathing water reporting (ongoing)
- Compliance with new standards (by 2015)
- Creation of bathing water profiles (by 2011)
- Beach signage (by 2012)

E. Actions Appraisal and Justifying Objectives

E.1 Introduction

This annex describes the process used to develop WFD objectives for the first cycle of River Basin Management Planning. In certain circumstances (set out in Article 4.4 and 4.5 of the WFD) Member States may deviate from achieving the default objectives (e.g. good status by 2015), allowing for the consideration of other environmental, social and economic priorities alongside water management priorities. This annex presents the justification where required for setting of "alternative objectives".

The assessments of actions (or measures) that have been identified so that the Gibraltar water bodies meet the WFD objectives are also described in this annex. The WFD requires that actions identified in the river basin management plan should be assessed in terms of cost effectiveness and technical feasibility. However, as the only actions identified are for investigative monitoring to identify potential source(s) of pollution, the cost effectiveness of this measure is not required. Any future actions identified once the sources are identified will be assessed in accordance with the guidance developed by Defra under its collaborative research programme.

The requirements for the investigative monitoring are also described within this annex.

E.2 Setting of Objectives

The default environmental objectives set by the WFD are summarised in Table E.1 below.

Table E.1 WFD Objectives

Surface Waters	Groundwater
Prevent deterioration in status for water bodies	Prevent deterioration in the status of groundwater bodies
Aim to achieve good ecological and good surface water chemical status in water bodies by 2015	Aim to achieve good quantitative and good groundwater chemical status2 by 2015 in all those bodies currently at poor status
For water bodies that are designated as artificial or heavily modified, aim to achieve good ecological potential by 2015	Implement actions to reverse any significant and sustained upward trends in pollutant concentrations in groundwater
Comply with objectives and standards for protected areas where relevant	Comply with the objectives and standards for protected areas where relevant
Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.	Prevent or limit the input of pollutants into groundwater

In identifying and setting realistic objectives for Gibraltar's four water bodies, the procedure outlined below has been followed:

- Identify default objectives as set by the WFD;
- Identify and assess pressures and risks of failing to meet default objectives;
- Identification and appraisal of actions needed to meet default objectives;
- Setting of specific objectives for the Gibraltar RBD.

Where water bodies are currently already at Good Status, the default objectives are applied because existing mechanisms are in place to protect the environment that will enable compliance with the no deterioration objective.

For water bodies that are less than good status overall, the objective for the element failing the good status is reviewed. Pressures on the water bodies have been identified and are summarised in Annex G. These are assessed alongside existing mechanisms and actions (summarised in Annex F) that protect the water environment in appraising specific objectives for Gibraltar.

As this is the first cycle of River Basin Planning, there are inherent uncertainties in causes of failure due to the limited amount of monitoring data available. As the River Basin Planning progresses and more monitoring data becomes available, the uncertainties associated with water quality and sources of pollution are expected to decrease. The uncertainties have been taken into account when setting objectives.

The methodology used to set the specific objectives for the Gibraltar RBD is taken from the UK River Basin Management Plans. This approach uses the Common Implementation Strategy (CIS) Guidance Document Number 20 and the River Basin Planning Guidance published by Defra and Welsh Assembly Government in 2006 and 2008.

E.2.1 Surface Water Body Objectives

The classifications of the Gibraltar Coastal Waters and Gibraltar Harbour & Marina Bay are presented in Annex A. The Moderate Potential for the Heavily Modified Water Body results from the failure to meet the Environmental Quality Standard (EQS) for TBT, within the priority substances element of Chemical Status. For the Coastal Waters the certainty that this element is meeting the EQS is low, because the detection limit from the laboratory analysis is above the EQS. In the Gibraltar Harbour, the certainty is high that the levels are higher than the standards, however the source of the contamination is unknown.

All elements that are currently at Good Status are set to meet Good Status in 2015. The overall target of Good Potential for the Heavily Modified Water Body is delayed until 2027, to take account of the uncertainty in both measuring TBT and identifying the source. The decision process for setting these alternative objectives is presented in Figure E.1 below, which is based on the decision tree for the failing element (priority substances) taken from the UK RBMPs. The process also takes into consideration disproportionate cost and technical infeasibility, as recognised in Article 4(4) of the WFD. The high level of certainty that one of the elements is less than good status in the Harbour, results in technical infeasibility (source unknown) as the reason for extending the deadline for meeting Good Potential overall (code C2).

The Coastal Water Body also contains Bathing Waters and the part of the Southern Waters of Gibraltar Special Area of Conservation. The objectives of these protected areas are summarised in Annex D.

The objectives for the surface water bodies are:

- Prevent deterioration in status for water bodies;
- For the Coastal Waters aim to maintain good status;
- For the heavily modified water body, aim to achieve good ecological potential by 2015;
- Comply with objectives and standards for protected areas where relevant; and
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

E.2.2 Groundwater Body Objectives

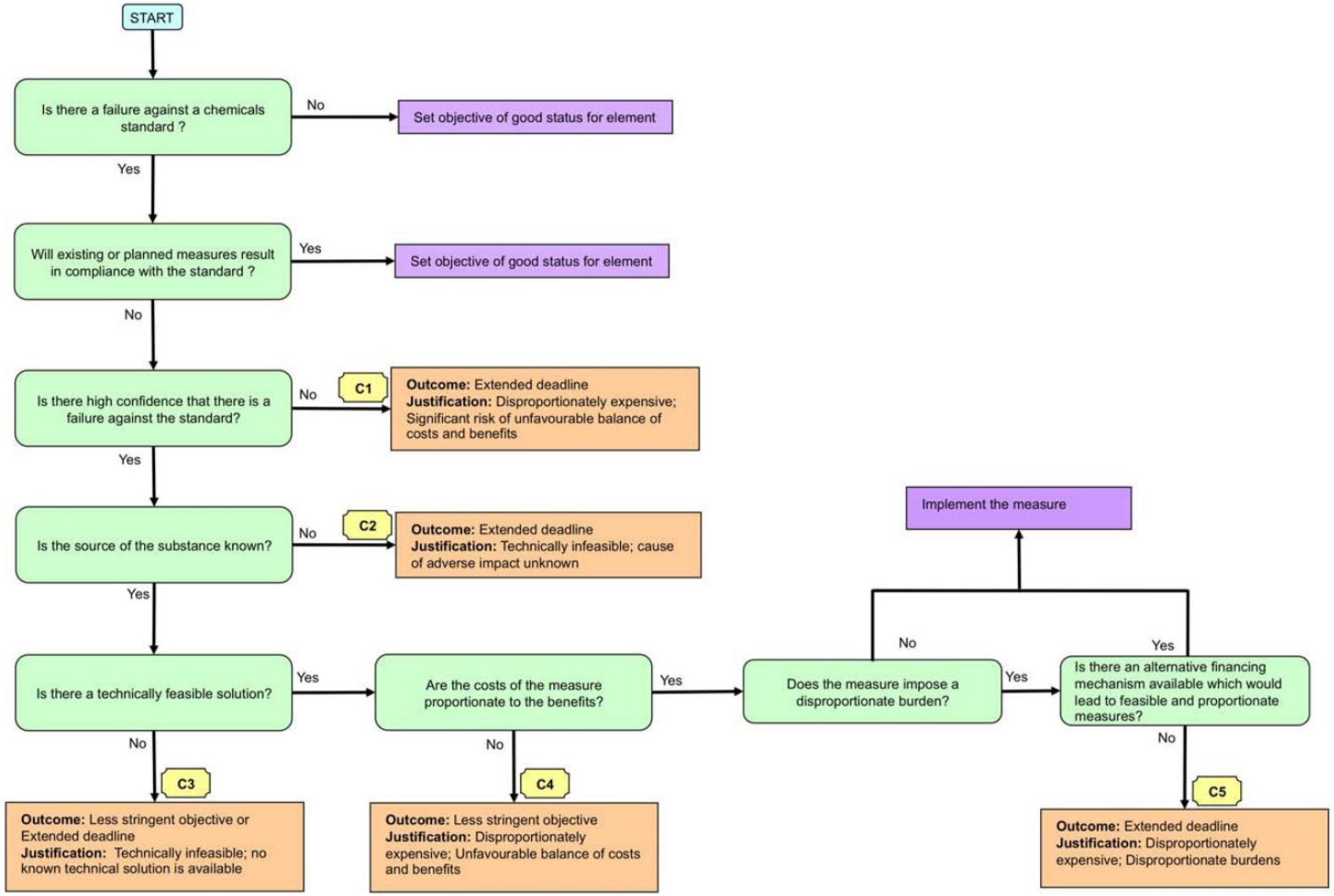
The classification of the two groundwater bodies is presented in Annex A, and pressures identified are summarised in Annex G.

The classification, based on available monitoring data, identifies that the two water bodies are at Good Status overall, with both quantitative and qualitative status being Good.

The default WFD objectives are therefore appropriate, which include the following objectives that are relevant to Gibraltar:

- Prevent deterioration in the status of groundwater bodies;
- Aim to achieve good quantitative and good groundwater chemical status by 2015 in all those bodies currently at poor status; and
- Prevent or limit the input of pollutants into groundwater.

Figure E.1 Decision process for objective setting for Priority Substances



E.3 Actions to meet WFD Objectives

Annex F summarises the existing mechanisms (policy drivers, legislation etc) that operate in Gibraltar for environmental protection. There are many processes and regulations already in place to control most of the pressures facing the water environment in Gibraltar.

Due to the uncertainty regarding the source of contamination with the one element that is less than good status (taking into consideration the level of certainty associated with laboratory detection limits), it is currently difficult to set specific actions that would help to meet default objectives. An extended programme of monitoring is required in order to gather more information on the chemical status of the Gibraltar Harbour waters, and the potential source(s) of contamination.

E.3.1 Investigation Monitoring

Annex G discusses the uncertainty around the source of TBT in the Gibraltar Harbour Waters. Article 8 and Annex V, Section 1.3.3 of the WFD require Investigation Monitoring to inform the Programme of Measures (actions) when the reason for exceeding EQSs is unknown. On this basis it is recommended that the monitoring programme is expanded to comply with the Investigation Monitoring, and should consider:

- Monitoring of TBT in the monthly surveys (currently it is only monitored quarterly);
- Monitoring of two additional sites in Gibraltar Harbour;
- Determining with the laboratories if an improved detection limit can be achieved; and
- Monitoring of sediments for TBT.

E.3.2 Transboundary Cooperation

The protected area objectives for the Western Beach Bathing Water are not currently being met, due to a continuous sewage discharge from the Spanish side of the border, which usually should operate as an emergency overflow only. Continued discussions are being held between the two Governments to resolve this issue.

F. Mechanisms for Actions

F.1 Introduction

Mechanisms for achieving the objectives of the WFD mean policy, legislation and financial tools to deliver the on the ground actions for environmental protection and improvement. Many of the policies and legislative requirements for environmental protection are already in place, and regulations or consents for certain activities already exist. It is important that these mechanisms continue to meet the WFD objective of 'no deterioration'.

Other mechanisms might relate to a less formal approach, such as education and awareness programmes or voluntary initiatives. A broad scale of mechanisms therefore exists or could be introduced if required to contribute to meeting the objectives of the WFD.

This annex summarises the existing mechanisms that are in place for delivering the actions, set out in Annex C. The annex is divided into the following sections:

- Section 1.2 EU Directives
- Section 1.3 Sustainable use of Water
- Section 1.4 Point sources
- Section 1.5 Diffuse sources
- Section 1.6 Physical Modifications
- Section 1.7 Priority Substances
- Section 1.8 Accidental Pollution

F.2 EU Directives

The European directives relevant to the water environment are summarised below. The mechanisms for implementing the directives in Gibraltar are also set out in each section.

F.2.1 Bathing Waters Directive

Directive 76/160/EEC on Bathing Water Quality was introduced to protect public health and set binding standards for designated bathing waters throughout the European Union. It was transposed into local legislation by the Public Health (Quality of Bathing Water) Rules 1992. Water quality has been monitored throughout the bathing season (from April to October) since the implementation of the directive. The results are compared to mandatory and guideline standards.

A new Bathing Water Directive (2006/7/EC) was adopted on the 15th February 2006 and will fully come into force in 2015. There are nevertheless some elements of the revised Bathing Water Directive that have already been implemented. This revised Directive was transposed

into Gibraltar law by the Environment (Quality of Bathing Water) Regulations 2009. Under the new directive bathing sites will be classified into four categories: "excellent," "good," "sufficient" or "poor". The new directive also requires Member States to draw up a management plan for each site to minimise risks to bathers, based on an assessment of the sources of contamination that are likely to affect it. A profile for each bathing water based on the physical, geographical and hydrological characteristics of the bathing water and assessing the risks of pollution is also required and has been produced by the Department of the Environment.

Annex D presents the locations and results of the six Bathing Waters found in the Gibraltar River Basin District.

The Environmental Agency is responsible for the water quality monitoring and reporting of these sites. More information and the water quality results are available on their website (http://www.environmental-agency.gi/environmental_monitoring.htm).

F.2.2 Environmental Impact Assessment Directive

The EIA Directive (85/337/EEC) has been in force since 1985 and applies to a wide range of defined public and private projects. It has been amended by the Directive 97/11/EC, the Directive 2003/35/EC, and the Directive 2009/31/EC. The directive and its amendments set out a process for certain development types to identify and assess the resulting likely significant effects on the environment from the proposals, which are then considered by the competent authority in the decision making process for planning application.

The directive is transposed into under the Town Planning (Environmental Impact Assessment) Regulations 2000. The Government's Environmental Action and Management Plan (http://www.gibraltar.gov.gi/images/stories/PDF/environment/Environmental_Action_and_Management_Plan.pdf) sets out the steps that should be followed to comply with the EIA process in Gibraltar.

F.2.3 Habitats Directive

The Habitats Directive (92/43/EEC) sets out the protection of species and environmental sites and forms the cornerstone of Europe's nature conservation policy. The aims of the directive are to encourage biodiversity, and for the designated sites and species to meet 'favourable conservation status'. Areas designated under the directive are known as Special Areas of Conservation (SACs).

The Southern Waters of Gibraltar have been officially designated as an SAC. This means that the Member State is required to ensure no deterioration of the site, and that any development requires the assessment of significant effects on the site (through an Appropriate Assessment if significant effects are likely).

The requirements of the directive have been transposed locally under the Nature Protection Act 1991 Part IIA. The Southern Waters of Gibraltar Management Scheme summarises the process taken by the Department of the Environment in complying with the directive obligations.

F.2.4 Floods Directive

The EU Floods Directive (2007/60/EC) was published in October 2007 and lays down a framework for the reduction of flood risks to human health, the environment and economic

activity within Member States. It requires Member States to undertake a *preliminary flood risk assessment* for each River Basin District (including associated coastal zones) to identify areas that are considered to be at 'significant' flood risk. The Environment (Assessment and Management of Flood Risks) Regulations 2010 transpose the directive into local legislation.

The Gibraltar Preliminary Flood Risk Assessment is available on the Government website (http://www.gibraltar.gov.gi/images/stories/PDF/environment/Preliminary_Flood_Risk_Assessment_Report.pdf). The Department of the Environment will continue to be consulted on relevant planning applications that may require an assessment of flood risk, to ensure applications comply with the requirements for considering flood risk and climate change.

F.2.5 Marine Strategy Framework Directive

The aim of the Marine Strategy Framework Directive 2008/56/EC is to achieve good environmental status in marine waters by 2020, and to more effectively protect the marine environment. It was introduced in 2008 and its objectives are in parallel to the Water Framework Directive, such that the status and objectives for coastal waters set in the river basin management planning cycle will also comply with the requirements of the MSF directive.

The Marine Strategy Framework Directive established European Marine Regions, for which Member States are required to develop strategies. The Gibraltar Coastal Waters are located within the Western Mediterranean Sea sub-region of the Mediterranean Sea Marine Region. The Marine Strategy Regulations 2011 transpose the directive into local legislation. The Department of Environment of the Government is designated the competent authority for Gibraltar for the purposes of the Directive and of these Regulations and is responsible for the preparation of the Marine Strategy.

F.2.6 Groundwater Directive

In addition to the Water Framework Directive, a Groundwater Daughter Directive (2006/118/EC) was introduced in 2006 to provide further support to the objectives for good status in groundwater. The original Groundwater Directive (80/68/EEC) for protecting groundwater from dangerous substances will be repealed in 2013. The new directive will continue to restrict these substances entering groundwater, applying to either deliberate disposal or accidental spillage.

The Daughter Directive is transposed into law in Gibraltar through the Environment (Protection of Groundwater) Regulations 2009.

F.2.7 Integrated Pollution Prevention and Control Directive

The IPPC Directive (2008/1/EC) is aimed at preventing, reducing and eliminating pollution at source and is aimed at helping industries to operate in a more environmentally sustainable manner. The 2008 directive replaces the former IPPC Directive 96/61/EC. The Pollution Prevention and Control Act 2001 in Gibraltar transposed the 1996 directive.

The Environmental Agency is responsible for regulating activities which fall under the requirements of the Act and the Directive. The Agency's aims under these regulations are to:

- Protect the environment as a whole;
- Promote the use of "clean technology" to minimize waste at source;

- Encourage innovation, by leaving significant responsibility for developing satisfactory solutions to environmental issues with industrial Operators.

Once a permit has been issued, other parts of IPPC come into play. These include compliance monitoring, periodic permit reviews and variations of permit conditions.

F.2.8 Strategic Environmental Assessment Directive

Directive 2001/42/EC requires the environmental effects of a broad range of plans and programmes to be assessed, where significant effects are likely. The plans will be subject to consultation. The directive is transposed into Gibraltar law by the Environment Act 2005.

The aim of the directive is "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development".

The plans that require assessment under this directive are plans and programmes subject to preparation and/or adoption by an authority at national, regional or local level (or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government) and plans or programmes required by legislative, regulatory or administrative provisions.

The River Basin Management Plan therefore falls under the requirement to be assessed under the SEA Directive.

F.3 Efficient and Sustainable Use of Water

The Gibraltar Climate Change Programme sets out how the Government is committed to undertake a number of measures that aim at reducing greenhouse gas emissions. In recognition that the water supply system in Gibraltar is relatively energy intensive, measures have already been identified to control emissions of CO_2 in relation to water supply. These include reducing leakage in the supply system, to reduce wastage and hence save energy from the desalinisation plants; and continuing to use salt water where potable water is not essential.

Whilst there is no direct pressure regarding the availability of water resources, the promotion of sustainable water use will contribute toward the climate change incentives by reducing energy costs in water production.

The Environmental Protection (Energy End-Use Efficiency) Act 2009 requires the Minister for the Environment to publish guidelines for energy savings of 9% by 2016 in Gibraltar. The Act is aimed at the energy industry, however it has been recognised that the water supply system in Gibraltar is particularly energy intensive and therefore any savings in water demand will also translate into energy savings.

Mechanisms could be introduced to encourage water efficiency in households and businesses in Gibraltar, through voluntary routes and education, such as advertisement campaigns (on radio and billboards) or information leaflets, through to larger scale mechanisms – e.g. water audits, or holding an annual water festival.

F.4 Point Sources

Industrial discharge consents are controlled by the Integrated Pollution and Prevention Control Act 2001 the Public Health (Discharges to the Aquatic Environment) Regulations 2004 and the Public Health (Water Framework) (Amendment) Regulations 2010.

The Environmental Action and Management Plan also sets out the policies on pollution to the environment, including the water environment, stating that the Polluter Pays Principle will be enforced and fiscal penalties will be imposed upon those who are responsible for negligent pollution incidents.

Any new development requiring a point source discharge will also have to comply with the IPPC requirements, and potentially be subject to Environmental Impact Assessment, which would be assessed by the Government of Gibraltar.

A new primary sewage treatment works is planned for the main sewage discharge at Europa Point, which will be subject to discharge quality consent conditions, which will be regulated by the Government of Gibraltar.

All discharges to the marine environment are regulated by the Government of Gibraltar via the Department of the Environment.

F.5 Diffuse Sources

Some of the identified diffuse pressures on the marine environment include multiple point sources, such as sewer overflows. As discussed in Section 1.4 above, all outfalls to the marine environment are regulated by the Government of Gibraltar. Mechanisms already in place for reducing spillages from sewer overflows include de-silting of the gully and sewer network. A term maintenance contract, overseen by the Technical Services Department, specifies how many times a year de-silting of gullies should be undertaken. In respect of the sewer network, de-silting occurs as and when required to improve capacity. It is the responsibility of the Technical Services Department of the Government to maintain the sewer network conditions. Improvements are also planned for the network as part of the Wellington Front Flood Alleviation scheme. These improvements are designed to reduce flooding but as a by-product will also improve the capacity of the sewers and therefore reduce the frequency of sewer overflows into the harbour.

The use of sustainable drainage systems, where appropriate, on new developments could help to prevent further capacity problems in the sewer network, by controlling surface water discharges at source. Such systems can provide multiple environmental benefits not only on water quantity but on water quality, aesthetic quality and biodiversity. For example green roofs can be used to control rainwater falling on building roofs, but also contribute toward habitat creation and energy reduction by providing building insulation.

The Environmental Agency is responsible for ensuring new developments comply with Building Regulations and Approved Code of Practice, which includes appropriate control for the discharge of sewage, oils and lubricants.

Shipping movements in and out of the harbour and in the Gibraltar Coastal Waters are regulated by the Port Authority and Maritime Administration. Vessels must be licensed for bunkering in Gibraltar Waters, which is one of the busiest bunkering ports in the Mediterranean. In

November 2002 a Bunkering Code of Practice was introduced and a Bunkering Superintendent appointed to police all operations in the Port. More information is available online at http://www.gibraltarport.com/code_of_practice.cfm. Port Operator Licences are also required for activities within the port, including ancillary provider services, tug services, diving, ferry services, yacht charters, mooring, ship repairs and waste management.

F.6 Physical Modification

The modification of the coastline in the harbour area has been ongoing for much of the recent history of Gibraltar, for the purposes of navigation, flood defence and recreational use. Projects which propose land reclamation for development are required to comply with planning laws including Environmental Impact Assessments. The Government of Gibraltar will consult on any such plans through the Town Planning department and Development and Planning Commission.

Development must also comply with the Development and Flood Risk policies of the Climate Change Programme, which require applicants to demonstrate how the proposed development will be protected from inundation where they are at potential risk of flooding. Consideration is also required of the environmental effect of any coastal defence works that are required, including possible secondary effects elsewhere along the coast as a result of the development of defence works.

Dredging activities must comply with the Guidelines on the Assessment of Dredged Material, and application will be assessed by the Government of Gibraltar. The quality of the dredged material is also assessed to determine the most appropriate disposal method to prevent any detrimental environmental impact.

F.7 Priority Substances

Priority substances must comply with Environmental Quality Standards in order to achieve good status under the Water Framework Directive. There are 33 priority substances (or groups of substances), of which 13 have been identified as priority hazardous substances. Environmental quality standards for these substances are published in the Priority Substance Daughter Directive (2008/105/EC).

The WFD monitoring programme monitors these substances, the results of which have been used in the water quality classification of the water bodies. Monitoring of the Coastal Waters and Gibraltar Harbour will continue to ensure standards continue to be met.

The International Convention on the Control of Harmful Anti-fouling Systems on Ships came into force in September 2008, and prohibits the use of harmful organotins in anti-fouling paints used on ships, including TBT. The Convention also establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems. All ships and yachts entering Gibraltar waters must be certificated to demonstrate that they comply with the Convention. The Gibraltar Port Authority and Maritime Administration are responsible for ensuring all vessels are compliant and certified. Furthermore, any vessel entering the shipyards in the harbour will be required by the ship yard operator to produce certification.

F.8 Accidental Pollution

The busy shipping activity in the Port of Gibraltar means that there is a potential risk of pollution from oil spills. Gibraltar has a regularly exercised Gibraltar Oil Pollution Plan and Associate Member of Oil Spill Response Ltd of Southampton. The Environmental Agency plays a central role together with the Fire and Port Departments in co-ordinating and executing the oil spill response plan for dealing with such incidents.

G. Pressures and Risks

G.1 Introduction

It is important to identify which activities within a River Basin District (RBD) could lead to pressures on the water environment and potentially impact the 'good status' classification. The WFD requires the management of risk to the environment caused by human activity and pressures. The consideration of pressures and risks helps to build up an evidence base that can justify the objectives and the actions to deliver them.

Pressures and impacts have been identified previously within the Article 5 Initial Characterisation report, and in the Significant Water Management Issues report from 2008. This section reviews and updates the current pressures from human activity in Gibraltar facing the water environment.

Pressures that continue to exist in the Gibraltar RBD are listed below:

- Point source discharges (e.g. Sewage outfalls and industrial discharges)
- Diffuse pollution (including shipping)
- Abstraction
- Physical modifications (Reclamation, urban development)
- Transboundary impacts
- Climate change

Climate change issues are discussed separately in Annex H.

G.2 Pressures on Coastal Water Bodies

Table G.1 shows all pressures identified and are further discussed below the table in detail to provide some background.

Table G.1 Pressures within the Coastal Environment

Water Body	Details	Location	Type of pressure
Coastal Waters	Oil sullage plant	North Mole	Point source discharge
Coastal Waters	Desalination Plant	North Mole	Point source discharge
Coastal Waters	MoD Desalination Plant	Camp Bay	Point source discharge
Coastal Waters	Combined Sewer Overflows	South of Little Bay, Catalan Bay, Eastern Beach	Point source discharge
Coastal Waters	Raw Sewerage	Europa Point	Point source discharge
Coastal Waters	Desalination Plant	Governor's Beach	Point source discharge
Coastal Waters	Dockyard discharge	South Mole	Point source discharge
Coastal Waters	Contamination from shipping	Outer Harbour, Gibraltar Bay	Diffuse discharge
Harbour & Marina Bay	Contamination from shipping	Main Harbour	Diffuse discharge
Harbour & Marina Bay	Combined Sewer Overflows	Main Harbour	Diffuse discharge
Coastal Waters	Desalinisation Plant	North Mole	Abstraction
Coastal Waters	Reverse Osmosis Plant	Little Bay	Abstraction
Coastal Waters	Swimming Pool	Camp Bay	Abstraction
Coastal Waters	MoD Desalinisation Plant	Camp Bay	Abstraction
Coastal Waters	Deposition of dredgings	Harbour Moles and Airport	Morphological pressure
Coastal Waters	Manipulation of sediment regime	Gibraltar Bay	Morphological pressure
Harbour & Marina Bay	Shoreline reinforcement	Main Harbour	Morphological pressure
Harbour & Marina Bay	Construction / land claim	Main Harbour	Morphological pressure
Coastal Waters	Sewer overflow	Western Beach	Transboundary issue

G.2.1 Point Sources

The urban environment contains various point source pollution issues, for example from sewage discharges or industrial processes. The assessment of existing point sources has been updated with the most recent information where available and are summarised below. The assessment has identified that currently only the Coastal Water Body is subjected to potential point source pollution.

A key potential source of pollution to coastal waters is the untreated sewage effluent derived from the population of 30,000 and currently discharged into the coastal water body at Europa Point, at the southern tip of Gibraltar. However, the coastal wasters off Europa Point are classified as areas of high natural dispersion, therefore primary treatment represents an adequate

solution and the Government is currently in discussions regarding a potential sewage treatment plant. The fact that the Bathing Waters around southern Gibraltar comply with the mandatory bacteriological standards within the EC Bathing Water Directive would indicate that the bacteriological impacts from the effluent discharge are minimal and demonstrate that there has been no non-compliance associated with the sewage discharge.

Other significant point source discharges to coastal waters include discharges from the oil sullage plant located along the North Mole Road, within the North Mole area, north of the harbour area but within the Coastal Water Body. However the discharges are compliant with consent conditions and do not contribute to any failed standards in the Coastal Water Body.

Discharges from the desalinisation plants are located along the North Mole of the harbour, at Little Bay and at Governor's Beach, where saline water is disposed of from the plants.

The information on point sources indicates that the Coastal Water Body is **probably not at risk** of pollution from point sources, as the discharges from the point sources have not exceeded discharge conditions or caused failures in the water quality monitoring.

G.2.2 Diffuse Sources

Diffuse pollution sources can arise from a wide range of activities associated primarily with land use, but can also arise from numerous or unspecified point sources over a wide-spread area. A summary of the diffuse sources and the water bodies at risk is presented below.

There are discharges from combined sewer overflows (CSOs) and storm drain outlets, largely confined to the harbour area but some also located in the Coastal Waters. They operate during times of heavy rainfall, discharging a mixture of rainfall and untreated sewage to ease capacity issues in the sewerage system. There are five CSOs that discharge to the harbour, and one that discharges to Marina Bay. Due to the limited circulation of current in the harbour area and Marina Bay there is a reduction in dispersion in comparison to the open waters of the Coastal Water Body. Although the first year of monitoring from within the harbour indicates that nutrients and biological elements are currently meeting WFD objectives, the limited duration of monitoring should be taken into account.

There are potential diffuse sources of pollutants from shipping and yachting from antifouling paints such as TBT. Historically TBT was used in antifouling paint, although the use of paints with TBT in was banned in 2008 by the International Convention on the Control of Antifouling on Ships. The Convention also states that any TBT antifouling paint must be covered up with non-TBT based paint; therefore ships may still have undercoats on their hulls that contain TBT. Paint chippings from boatyards, if discharged directly into the harbour or from untreated drainage from shipyards, can potentially lead to pollution of elements such as TBT if still present on bottom layers of antifouling paint.

Due to the history of shipping and boatyards in and around the Bay there is also a potential for the sediments on the seabed to contain contaminants including TBT, from settlement of any debris from ships' hulls. Any disturbance of sediments from ship movements or strong currents could potentially release TBT into the waters.

The monitoring of both the Coastal Waters (outside the harbour) and Gibraltar Harbour since July 2009 has indicated that TBT levels potentially exceed the guidance standards. In some results for the Coastal Waters the limit of detection is not reached (which is higher than the standard for the annual average). It can be noted also that levels in the Coastal Waters have

decreased over the surveillance monitoring period. It is therefore concluded that the Coastal Water Body is **probably not at risk** from diffuse sources. As there is potential for elements to be released from disturbed sediments or from shipping activities in the harbour the Heavily Modified Water Body (Gibraltar Harbour and Marina Bay) is **at risk** from diffuse sources of pollution.

G.2.3 Abstraction

The water supply for Gibraltar is supplied by a dual system, entirely from sea water. Desalinated water is used for drinking supplies, with a separate distribution system of sea water used for sanitary purposes. Intakes for the supply system are located in the Coastal Waters and the Gibraltar Harbour. Saline water from the desalinisation process is returned to the coastal waters.

In terms of quantity therefore, much of the volume abstracted is returned to the environment. The proportion consumed is considered to be a very small percentage of the available resource, and therefore the status classification of the water bodies is considered to be **not at risk** from abstraction pressures.

G.2.4 Morphological Pressures

The physical alteration of a coastline due to land reclamation, flood defences, dredging, harbour use, navigation and shoreline reinforcement can lead to damage of coastal habitats.

Specific pressures on coastal morphology are evident in the Gibraltar Harbour and Marina Bay arising from land reclamation and the construction of flood defences (shoreline reinforcement). The original natural coastline of Gibraltar in the harbour area is now some way from the current shoreline of the harbour. The land reclamation has been essential in order to provide the required harbour area for navigation and to allow the growth of Gibraltar town, as limited land is available due to the topography of the Rock.

Dredging is regulated by the Port Authority and the Department of the Environment. Guidelines on the Assessment of Dredged Material have been prepared by the Government of Gibraltar, which are adopted from the London Convention 1972 and the 1996 Protocol, that is, the disposal of dredged material, and modified accordingly by the Department of the Environment, Government of Gibraltar. Dredging does not often occur in the Gibraltar waters but the last dredging event was in 2009 and took place on the outer edge of the North Mole.

It is considered that the Gibraltar Harbour area is **probably at risk** as the morphological pressures from navigation, land reclamation and shoreline reinforcement are likely to cause deterioration from high status (hydro-) morphology to a lower status class.

Other parts of the coast not included within the Harbour area are considered to be **not at risk**.

G.2.5 Transboundary Issues

The location of a Spanish sewage discharge point which services the Spanish town La Linea De la Conception in the area of Western Beach means that there is a risk of failing to meet Good Status and Bathing Water Directive objectives at this location. The standards for Bathing Waters have been exceeded during the latter part of 2010 due to overflows from this discharge.

The Western beach is therefore **at risk** from transboundary issues and the sewerage point source coming from Spain. This matter is currently being discussed between the respective Governments.

G.3 Pressures on Groundwater

Table G.2 lists the potential pressures on the two groundwater bodies.

Table G.2 Pressures on the Groundwater Environment

Water Body	Details	Location	Type of pressure
Southern Groundwater Body	Historic spillages	Comcen Cave Pool	Point source
Northern Groundwater Body	Anthropogenic pollution	Airport	Point sources
Northern Groundwater Body	Urban land use	Airport and cemetery	Diffuse sources
Northern Groundwater Body	Saline Intrusion	Airport	Diffuse sources

G.3.1 Point Sources

Historical spillages of hydrocarbons have been reported to occur to the southern groundwater body, and hydrogeological studies have previously reported the presence of hydrocarbons in the region of Comcen Cave Pool, as a result of a broken pipeline in the 1970s (E.P Wright *et al.* 1994). The monitoring borehole locations with recent data in and available for use in the groundwater classification are further north from this point, but these do not show any failure against standards for the General Chemical Assessment. Based on the available data of groundwater quality and of potential point sources, the Southern Groundwater Body is therefore considered to be **probably not at risk** from point sources. Further investigations and monitoring may be necessary to confirm if the whole of the groundwater body is at Good Status.

For the northern groundwater body, there are potential point sources of pollution from the Airport and presence of fuel tanks and hydrocarbons. However, the monitoring data used for the classification does not show any standards being exceeded in the northern groundwater quality. The Northern Groundwater Body is therefore considered **probably not at risk** from point sources associated with the Airport activities.

G.3.2 Diffuse Sources

The Northern Groundwater Body is primarily covered by the airport runway and buildings, the cemetery and some housing development. One monitoring point in the Northern Groundwater Body, located adjacent to the Isthmus Cemetery, exceeds the ammonia threshold and could reflect contamination from the burial ground or leaking sewers. The Northern Groundwater

Body (isthmus sands) is considered **probably at risk** as the area of urban land use suggests diffuse sources are probable.

In the Northern Groundwater Body, up to 12% of the total recharge had been abstracted in the past for human consumption and other purposes. Saline intrusion has occurred in the past but since groundwater abstraction stopped (2009), there is no current risk and the Northern groundwater body is likely to recover. There is no risk therefore associated with diffuse pollution from saline intrusion.

The southern groundwater body (bedrock groundwater body) is currently considered as not at risk of failing to achieve good status because of diffuse (urban) pressures. This is primarily due to the topography of the rock itself which does not allow urban development. Oil contamination issues are discussed above under point sources.

G.3.3 Summary

A summary of the pressures affecting each water body are presented below:

Table G3 Summary of pressures

Type of pressure	Specific Pressure	Water Body	Risk
Point Source	Sewage	Coastal Water Body	Probably Not at Risk
	Industrial Discharges	Coastal Water Body	Probably Not at Risk
Diffuse Source	Sewer overflows	Heavily Modified Water Body	Probably At Risk
	Shipping & historical contamination	Coastal Water Body	At Risk
	Shipping & historical contamination	Heavily Modified Water Body	At Risk
Abstraction	Intake	Coastal Water Body	Not At Risk
	Intake	Heavily Modified Water Body	Not At Risk
Morphological Pressure	Harbour use	Heavily Modified Water Body	At Risk
Transboundary Issues	Sewage from Spain	Coastal Water Body	At Risk
Point Sources	Hydrocarbon spillages	Groundwater Bodies (N&S)	Probably Not at Risk
Diffuse Sources	Urban Land Use	Northern Groundwater Body	Probably At Risk

G.4 Other Pressures

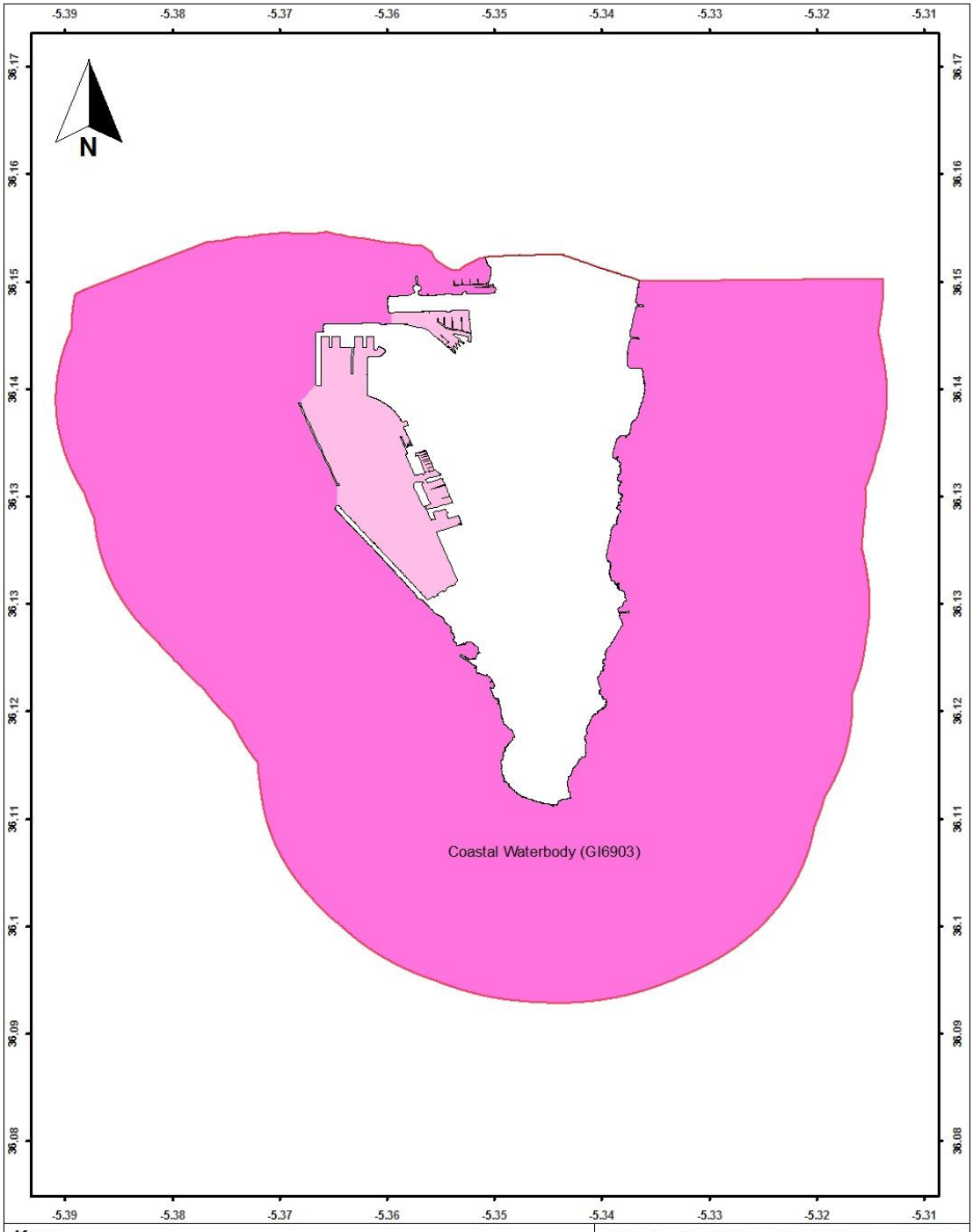
The impact of other pressures on coastal waters that were listed in the Initial Characterisation report cannot be readily assessed due to a lack of data to confidently link cause and effect. Further work is needed on these pressures to sufficiently characterise them and determine whether they are having an impact on the coastal water ecology.

- Discharge of fuel from damaged pipes

- Fuel spillage from bunkering activities
- Over fishing (illegal spear fishing and illegal fishing with nets)
- Miscellaneous waste discharges from shipping operations
- Disturbance due to recreational activities (speedboats, jet skis, etc.)

G.5 Mapped Outputs

The figures of the current view of risk for the pressures described above are presented on the following pages, which show water bodies are at risk of failing the Water Framework Directive objectives in 2015. These assessments do not reflect the current quality or status of a water body, rather the risk that they may fail objectives as a result of pressures acting on them.



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Waterbody - Probably not at risk**
- Heavily Modified Water Body - Not at risk

Project Path:
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0 500 1,000 1,500 2,000 Metres

Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

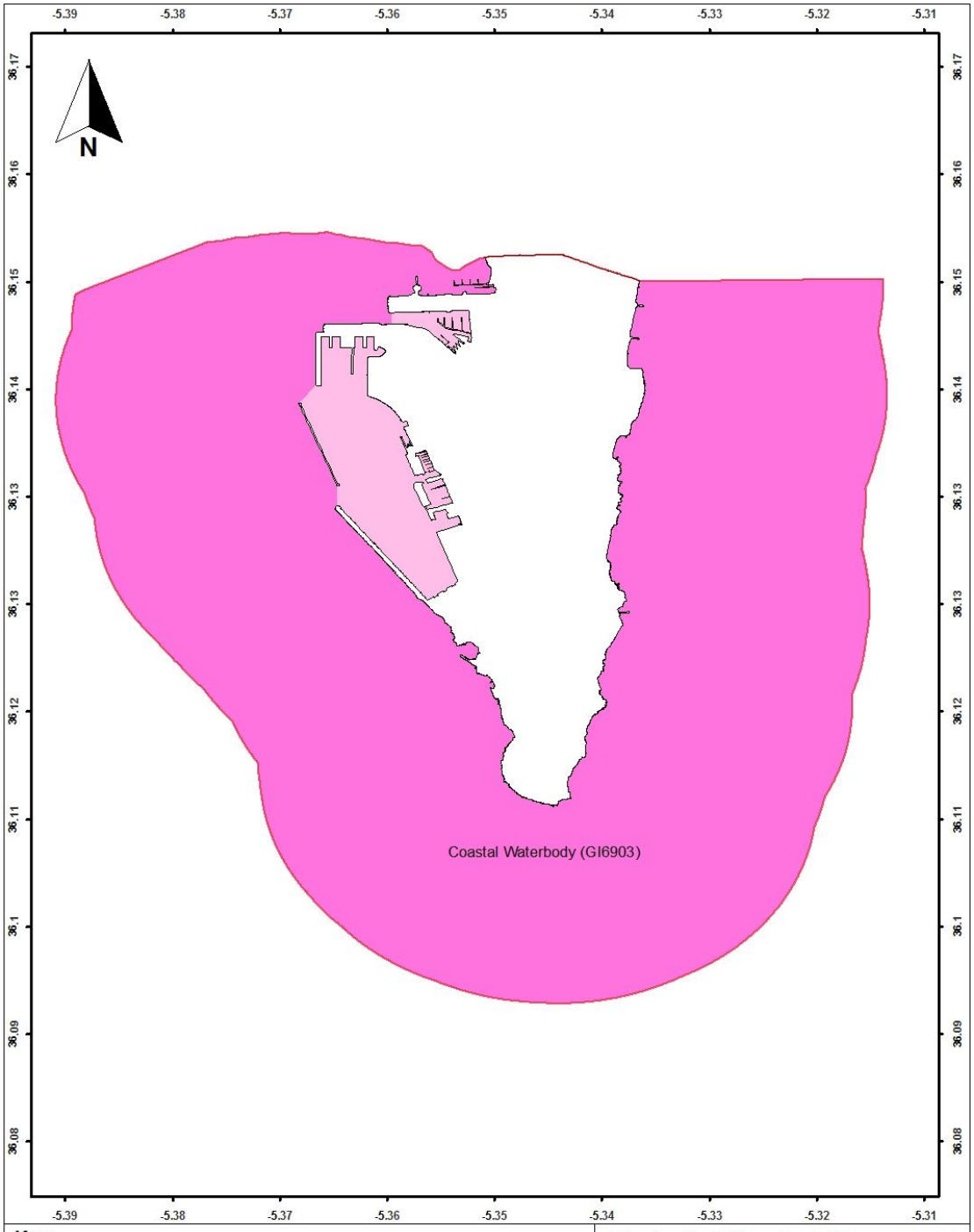
Gibraltar Draft River Basin Managemment Plan

Figure G1
Point source pressures on Coastal Water Bodies, nutrients/faecal indicator organisms (sewerage)

March 2011
27593-B13 WEBSN

amec

Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Waterbody - Probably not at risk**
- **Heavily Modified Water Body - Not at risk**

0 500 1,000 1,500 2,000 Metres

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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

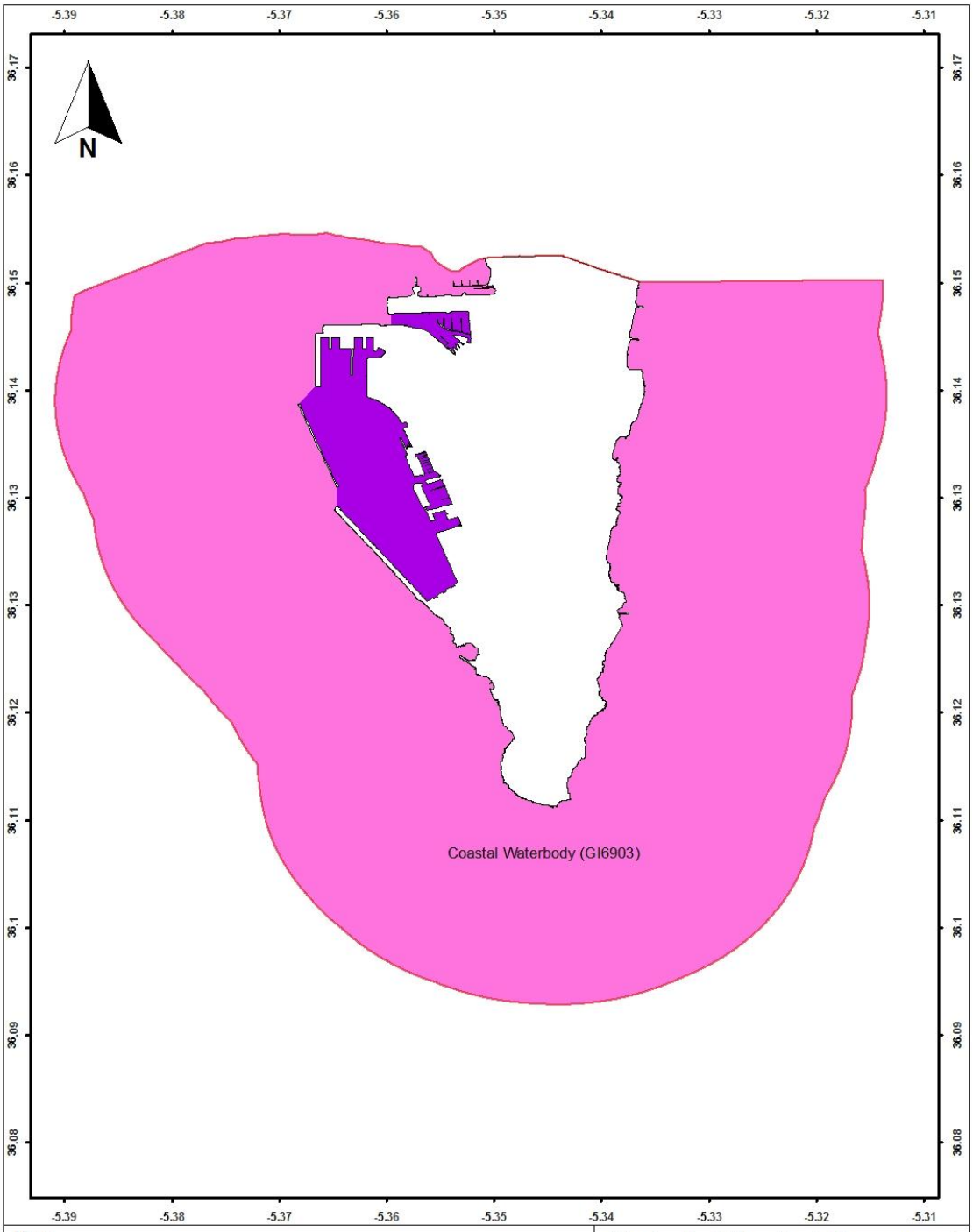
Gibraltar Draft River Basin Managemment Plan

Figure G2
Point source pressures on Coastal Water Bodies, hydrocarbons (industry)

March 2011
27593-B14 WEBSN

amec

Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Waterbody - Probably Not At risk**
- **Heavily Modified Water Body - At risk**

0 500 1,000 1,500 2,000 Metres

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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

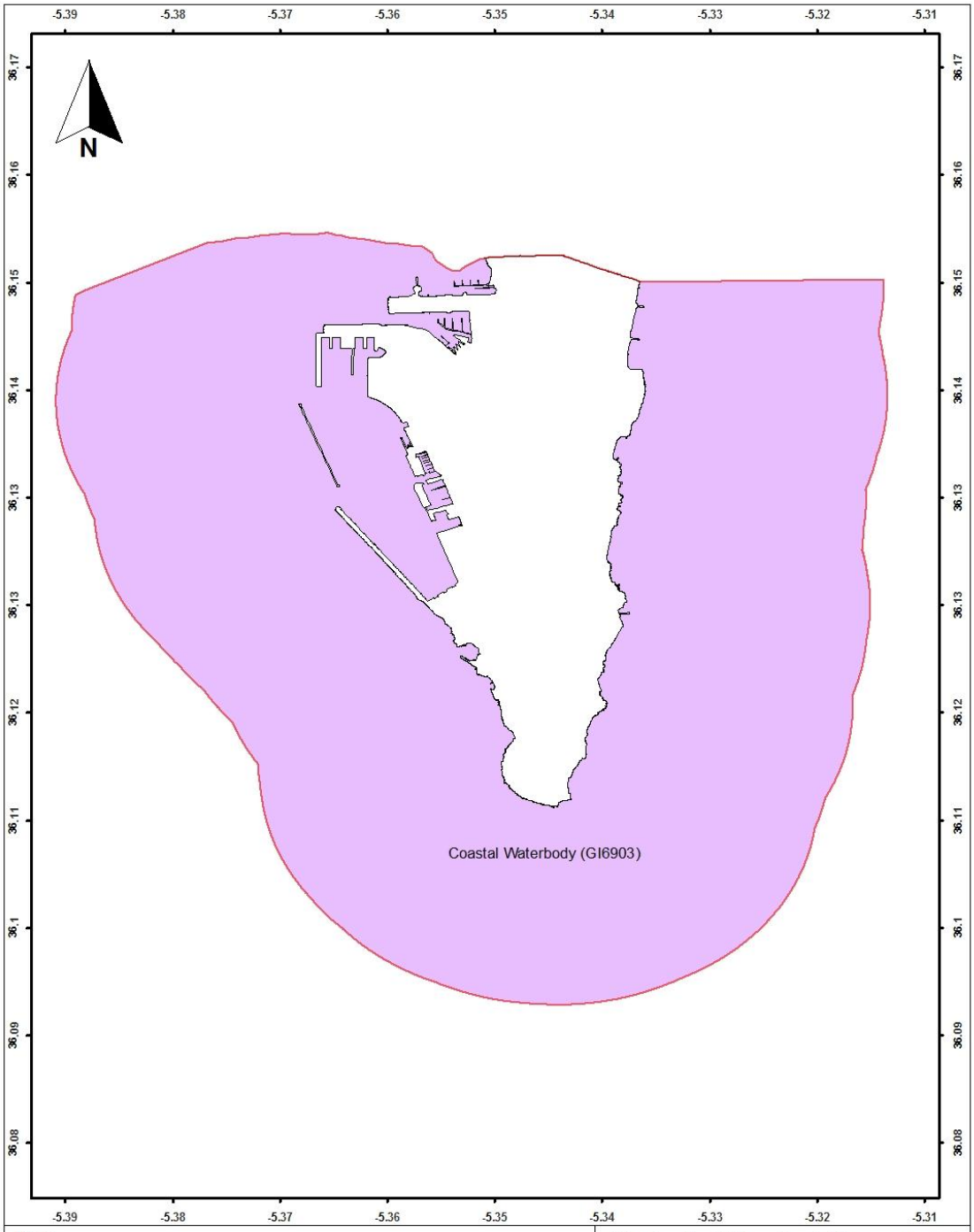
Gibraltar Draft River Basin Managemment Plan

Figure G3
Diffuse source pressures on Coastal Water Bodies, tributyltin

July 2011
27593-B15 PITKL

amec

Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Waterbody - Probably at risk**
- **Heavily Modified Water Body - Probably at risk**

Gibraltar Draft River Basin Managemment Plan

Figure G4
Diffuse source pressures on Coastal Water Bodies, nutrients/faecal indicator organisms (sewerage)

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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

March 2011
27593-B16 WEBSN

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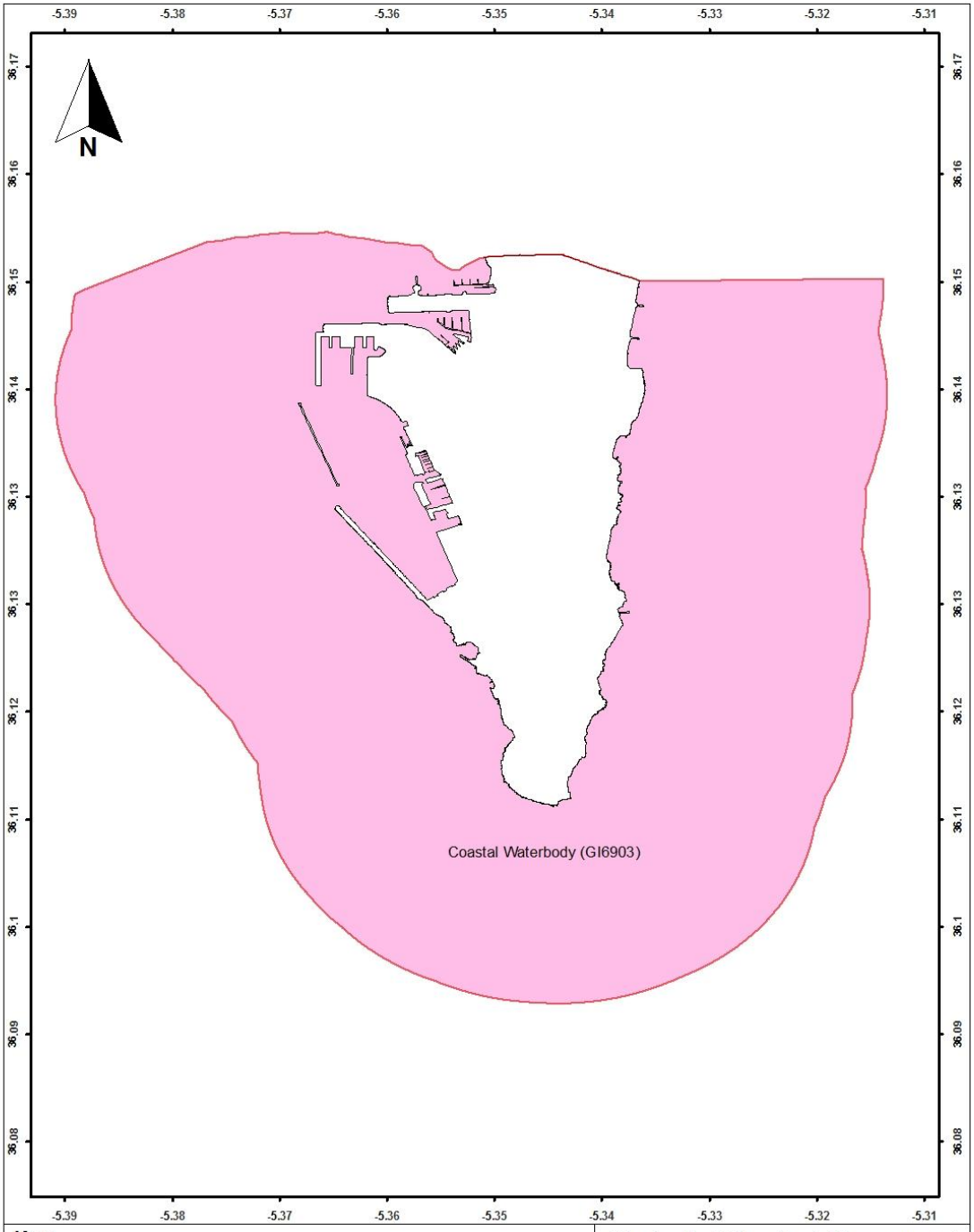
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Water Body - Not at risk**
- **Heavily Modified Water Body - Not at risk**

Gibraltar Draft River Basin Managemment Plan

Figure G5
Abstraction pressures on Coastal Water Bodies

Project Path:
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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

March 2011
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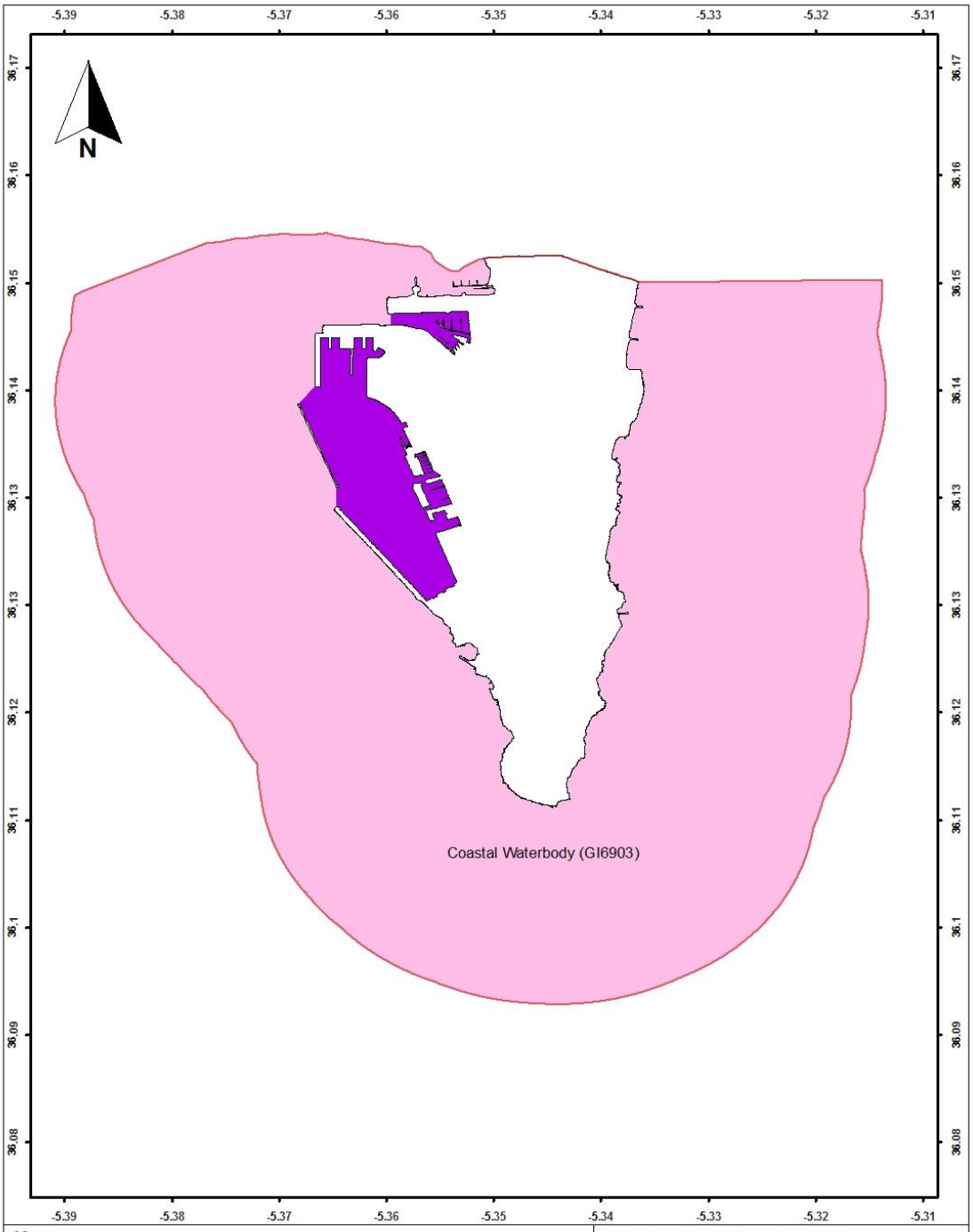
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Water Body - Not at risk**
- **Heavily Modified Water Body - At risk**

Gibraltar Draft River Basin Managemment Plan

Figure G6
Morphological pressures on Coastal Water Bodies

Project Path:
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Geographic Coordinate System - WGS84 Spheroid

March 2011
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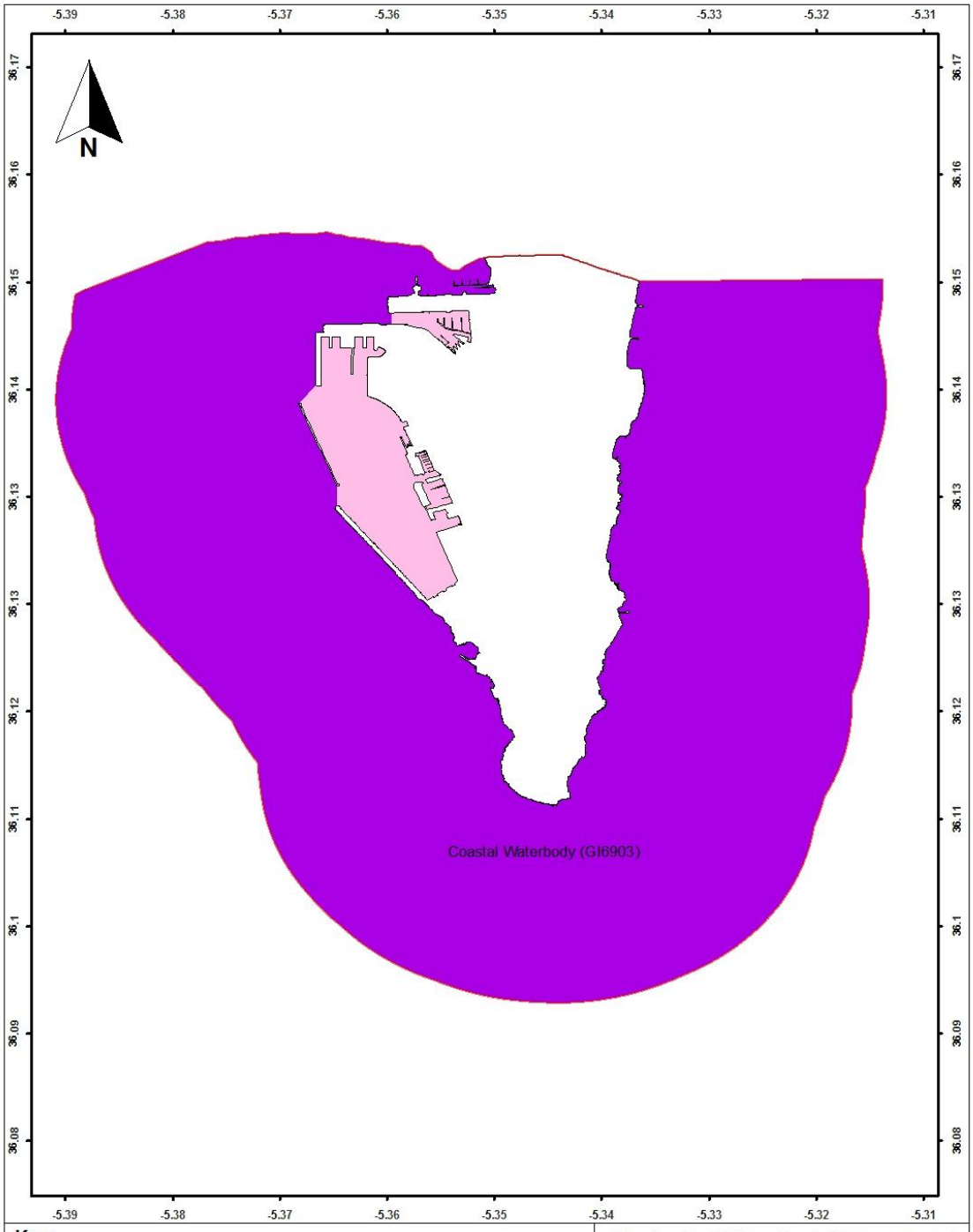
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar coastline**
- **Coastal Water Body - At risk**
- **Heavily Modified Water Body - Not at risk**

Gibraltar Draft River Basin Managemment Plan

Figure G7
Transboundary issues, sewerage

Project Path:
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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

March 2011
27593-B19 WEBSN

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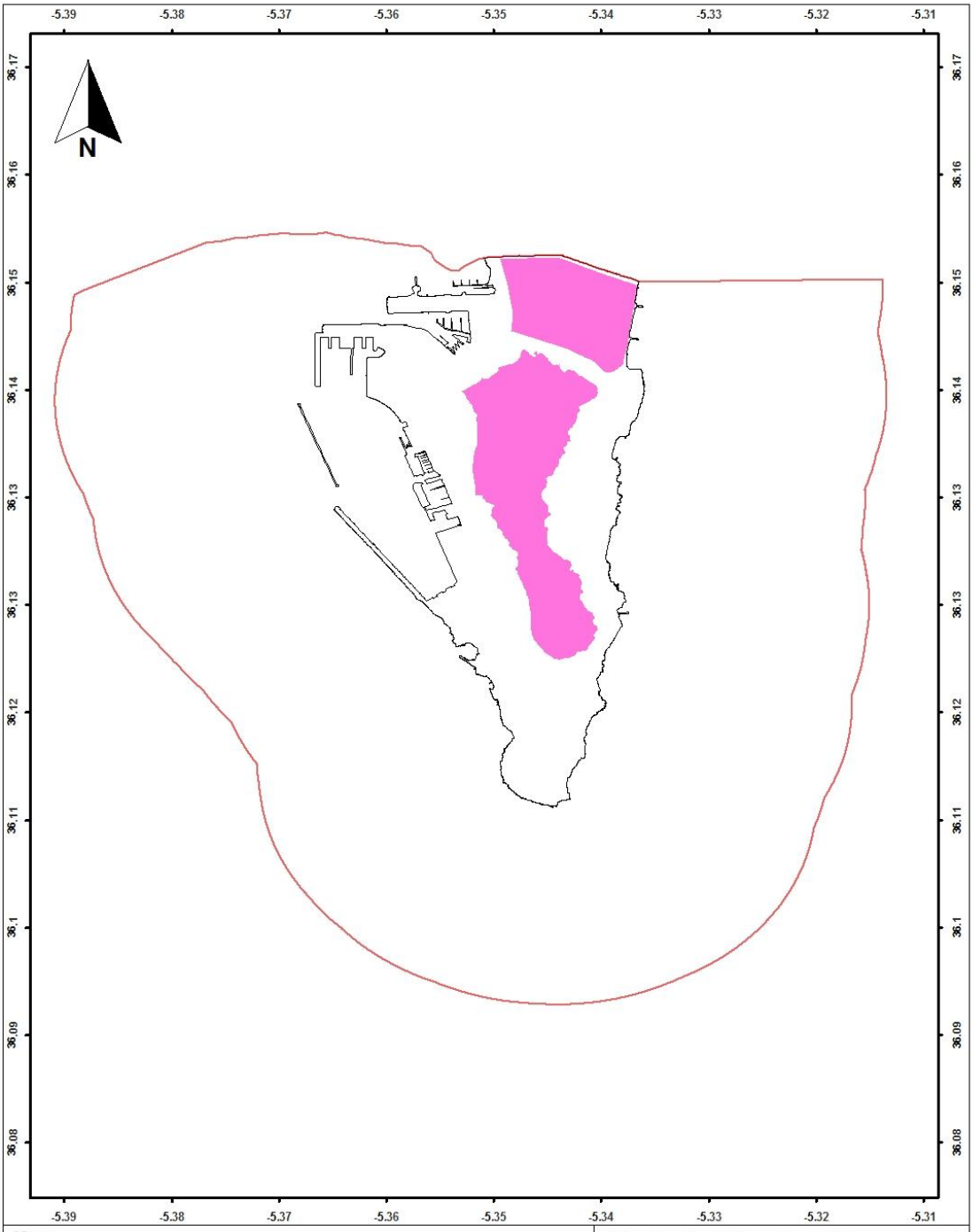
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar Coastline**
- Groundwater Bodies - Probably not at risk

Gibraltar Draft River Basin Managemment Plan

Figrue G8
Point source pressures on Groundwater, hydrocarbons

Project Path:
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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

March 2011
27593-B20 WEBSN

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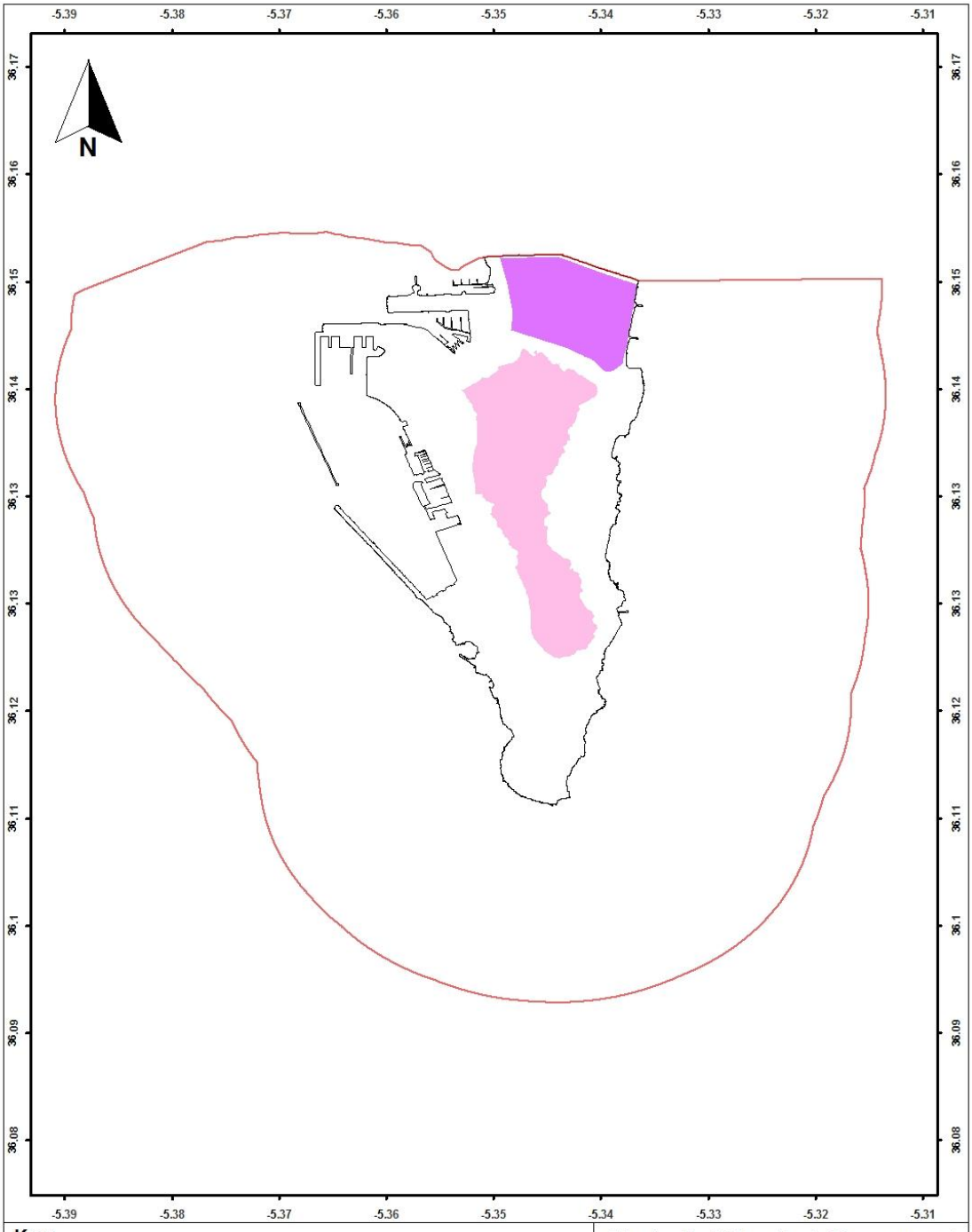
Based Upon Government of Gibraltar survey, updated 2011



Key:

- River Basin District
- **Gibraltar Coastline**

Groundwater Bodies

- Northern GWB - Probably at risk
- Southern GWB - Not at risk

0 500 1,000 1,500 2,000 Metres

Project Path:
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Scale: 1:50000 @ A4
Geographic Coordinate System - WGS84 Spheroid

Gibraltar Draft River Basin Managemment Plan

Figure G9
Diffuse source pressures on Groundwater, ammonia

March 2011
27593-B21 WEBSN

amec

Based Upon Government of Gibraltar survey, updated 2011

H. Climate Change

H.1 Introduction

The water environment is particularly vulnerable to the effects of climate change. It is already possible to observe trends in climatic factors that are having impacts on the water environment, as a result of global warming.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concluded that:

- *The climate has changed over the past century.*
- *The balance of evidence suggests a discernible human influence on global climate.*
- *The climate is expected to continue to change in the future.*
- *There are still many uncertainties.*

The predicted effects of climate change in the Western Mediterranean are expected to consist of a rise in temperatures, lower levels of rainfall, and a change in the intensity and distribution of the rainfall leading to a subsequent increase in floods.

The effects of climate change in the region of Gibraltar are expected to create a greater degree of unpredictability of extreme weather events, ranging from wetter winters, drier and hotter summers and heat waves. Episodes such as drought are not expected to affect the human population in Gibraltar, as the potable drinking water source is from desalination of seawater, however flora and fauna could be affected by lower rainfall. Sea-level rise and increases in sea temperature are also predicted, which could affect marine and coastal ecosystems including the abundance and distribution of phytoplankton and predators.

Climate change will inevitably affect the conditions and pressures that the Water Framework Directive seeks to manage in the water environment. Climate change impacts may not be strongly felt during the first river basin management cycle up to 2015 and may not be easily distinguishable from normal climatic variations. However, decisions and investments made during this period may have a lifetime that extends for many decades. Over this extended period, towards the end of cycle two (to 2021) and through cycle three (to 2027), the climate in Gibraltar could change significantly. Therefore, if climate change is not considered now, this could result in poor investment decisions in terms of actions and limit the extent to which Water Framework Directive objectives are achieved.

In April 2009 the European Commission presented a White Paper on adapting to climate change which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change. The White Paper highlights the need "to promote strategies which increase the resilience to climate change of health, property and the productive functions of land, inter alia by improving the management of water resources and ecosystems."

The accompanying Policy paper on Water, Coasts and Marine issues provides an in-depth analysis of the role of water and ecosystems in the transmission of potential climate change impacts to the economy and society. As part of the actions included in the White Paper a Guidance document on adaptation to climate change in water management was adopted in December 2009 by Water Directors of EU Member States to ensure that the River Basin Management Plans (RBMP) are climate-proofed.

It is a requirement of the first River Basin Management Planning cycle to screen the likely effects of climate change on the pressures identified under the characterisation (Article 5) step of the river basin management process. The European Commission also states that, 'In the second planning cycle, climate change impacts should be taken fully into account'. The European Commission recommendation is primarily in relation to climate change adaptation (rather than mitigation) which is the main thrust of this annex.

H.2 Approach to Dealing with Climate Change

The Government of Gibraltar has prepared a Climate Change Programme (2008) as part of its commitments under the Kyoto Protocol. Gibraltar has collective EU obligations under this Protocol that are enacted through EU environmental directives. In addition to these, the Government has signed up to Kyoto in a more direct manner by having the UK's ratification of the Protocol extended to Gibraltar.

The Gibraltar Climate Change Programme (GCCP) has been prepared in consultation with the Climate Change Forum, a technical advisory group created by the Government that presents an exchange of views and information, so that appropriate decisions may be made using the relevant technical and scientific foundations. Through the Programme, the Government strives to achieve a balance between accommodating the requirement for development whilst preserving the natural environment through promotion of sustainable development in Gibraltar.

The programme assesses ways in which Gibraltar can realistically cut down its emissions of greenhouse gases, conserve energy and protect and enhance the natural environment and is based on a number of basic broad principles which include:

- *Adoption of a balanced partnership approach, encouraging all sectors of the community to play their part;*
- *Focus on flexible and cost effective policy options which are able to work together to form an integrated package; and*
- *Taking a longer term view by looking at targets beyond the EU's Kyoto commitment period and monitoring the need for Gibraltar to adapt to possible impacts of climate change.*

The GCCP presents the following policies to tackle the effects of climate change:

- Land Use Policy
- Soil Protection Policy
- Energy Conservation Policy
- Transport and traffic management policy

- Policy on the promotion of environmental education and awareness
- Policy on waste management
- Development and flood risk.

The first cycle of River Basin Planning process in Gibraltar should consider the following in relation to climate change:

- Consider if climate change could change the risk levels of not meeting WFD objectives from identified pressures on the water environment;
- Consider climate change impacts when identifying and appraising actions/measures (and if necessary propose appropriate adaptation of actions);
- Consider if the monitoring programme can be used to improve the understanding of climate change trends; and
- Consider the likely contribution of actions to future climate change through their impact on emissions of greenhouse gases, and propose appropriate mitigation where necessary.

This annex provides a qualitative assessment of climate change impacts on the pressures, actions and achievement of Water Framework Directive objectives in the River Basin Management Plan.

H.3 Summary of Climate Change Impacts

The predicted effects of climate change in the Western Mediterranean are described in the Introduction section. The best estimates for sea-level rise due to ocean expansion and glacier melt by the end of the century (compared to 1989 - 1999 levels) have narrowed to 28 - 58 cm as opposed to 9 - 88 cm quoted in the previous Climate Change 2001: Third Assessment Report. Current research shows that the central value of 0.48m that is currently being adopted by the Technical Services Department is within the updated predictions of the Climate Change 2007: IPCC Fourth Assessment Report, and in the light of the available evidence the value of 0.48m is considered a reasonable figure to apply to Gibraltar.

Lower average rainfall is not expected to affect the water resources for Gibraltar, which are entirely from sea water; however flora and fauna may be affected by lower rainfall.

Further to the summary above, climate change impacts on lower river flows in summer and subsequent decreased discharge of freshwater from Spain into the Bay will affect the sea temperature, salinity, CO_2, nitrate and phosphate concentrations within the marine environment. This will in turn have a knock on effect on marine flora and fauna as well as the supporting terrestrial populations. Furthermore, higher temperatures will dry soils and increase salinization and generate a higher incidence of wind blown soil erosion.

H.4 The impact of climate change on identified pressures

Annex G describes the identified pressures on the coastal water bodies and groundwater bodies in the Gibraltar River Basin District. This section assesses the impacts of climate change on

those pressures and on the associated risk level that the pressure could impact on WFD objectives. It should be recognised that there is a high degree of uncertainty surrounding the exact effects that climate change will have on the environment, therefore a qualitative scale is used to determine if climate change will have a very low, low, medium, high or very high impact on the risk level, or no change.

H.4.1 Point Sources: Sewage Discharge

Currently sewage is discharged from Gibraltar at Europa Point into an area of high natural dispersion. There have been no reported failures at Bathing Waters in the south of Gibraltar nearest to the discharge point, indicating that the discharge is not currently affecting water quality status objectives. The effects of climate change likely to affect the sewage discharge include the increased storminess / rainfall intensity and increased water temperature, which could affect the volume of sewage disposed and the quality/chemical reactions of the sewage. Population growth within Gibraltar in the future will also result in increased levels of sewage.

It is proposed to introduce a primary treatment for sewage to further improve the quality of sewage discharged into the coastal waters and the design of the works would also need to address potential climate change effects and future population levels. The potential effect of climate change on this point source pressure is therefore considered to be **very low.**

H.4.2 Point Sources: Industrial Discharges

It has been identified that the coastal waters are currently probably not at risk from industrial discharges, relating to primarily discharges from the oil sullage plan from the North Mole of the harbour, as the quality of discharge complies with regulations. The impacts of climate change such as changes to rainfall patterns and sea temperature are not expected to change the level of risk associated with this pressure on the water environment. Rises in sea level could potentially impact on the ability to discharge, depending on the level of the current discharge location. Adaptation to this change could be relatively easy to achieve however, by changing the discharge height.

The climate change impacts on this pressure are considered to be **low.**

H.4.3 Diffuse Sources: Shipping & Historical Contamination

The main risk to the Coastal Waters including Gibraltar Harbour & Marina Bay arises from diffuse pollution from shipping and historical contamination. There is currently insufficient information to know the exact source of the contamination with regard to TBT in the harbour, but investigative monitoring is proposed to provide more information on the source and to inform future measures. Climate change impacts such as changes in sea temperature, salinity and sea chemistry (CO^2, nutrients etc) could potentially affect the behaviour of TBT in the marine environment. However, due to the uncertainty regarding the source of the pollutant as well as how its behaviour might react to climate change impacts, it is not possible to assess the impacts of climate change on this pressure.

H.4.4 Diffuse Sources: Combined Sewer Overflows

Overflows from the sewerage system have been identified as a diffuse pressure on water quality in Gibraltar Harbour & Marina Bay, as in combination the discharges could lead to a risk of failing WFD objectives. The risk level from sewerage overflows could potentially increase as a

result of climate change and from increasing population. Although average rainfall values are predicted to fall, the frequency and intensity of rainstorms is predicted to increase. With increased intensity, there may be an increase in the need for outfalls from combined sewer overflows, to prevent capacity issues in the sewerage system. The increased frequency of spills from overflows could therefore potentially impact on both nutrients and biological elements. As discussed above however, the construction of a new treatment works might increase the capacity of the sewerage system and reduce the need for frequent spills. Until this is in place, improvements in the risks associated with sewage overflows cannot be guaranteed.

Changes in sea temperature and salinity levels could potentially affect the reaction of sewerage discharges in the water environment, and the ability of biological elements to react to sewerage. Sea level rise could also potentially affect the ability of overflows to perform during high tides that coincide with heavy rainfall, as many of the overflows are submerged within the harbour.

Climate change is predicted to have a **medium/high** impact on the risks from sewer overflows on meeting WFD objectives.

H.4.5 Abstraction

Abstraction pressures from the seawater intakes used for public water supply are not considered to be a risk to meeting WFD objectives, due to the proportion of supply used against the resource availability. Climate change impacts are not expected to change this risk level – **no risk.**

H.4.6 Morphological Pressure

Extensive physical modifications are present in Gibraltar Harbour and Marina Bay, and have been ongoing for much of the history of development in Gibraltar. The modifications include development of the harbour for the port and navigation, land reclamation for necessary development and economic growth, and shoreline reinforcement for flood defences. The pressures from these land uses are likely to increase in the future, as further reclamation might be required to facilitate growth. For example, Gibraltar might experience increased tourism as a result of increasing summer temperatures. Development in response to this may increase the pressure on the coastal water bodies and the harbour. Sea level rise could lead to increased flood risk, however the flood defences in the harbour have recently been repaired and built to a level higher than predicted sea level rise.

Climate change is predicted to have a **medium** impact on the risks from physical modifications on meeting WFD objectives.

H.4.7 Point sources: Hydrocarbon spillage

Historical spillages have been recorded in the Southern Groundwater Body; however the current water quality indicates that WFD objectives are being met. The impacts of climate change, which could affect the water table levels and water temperature in the groundwater, are not considered to impact on the potential for spillages or leaks into groundwater – **no change.**

H.4.8 Diffuse Sources: Urban Land Use

The development of land in the Isthmus area in the future could potentially increase pressure on the groundwater quality in the Northern Groundwater Body. The airport terminal is currently

being redeveloped to accommodate increased passenger numbers, and a new access road to Gibraltar is being constructed beneath the runway. Such development could potentially increase the risk of pollution from leaks or accidental spillages during construction, or from the introduction of new pathways into the aquifer. Rising sea levels could also potentially increase the salinity levels within the groundwater, due to anticipated connectivity between groundwater levels and sea levels.

Increases in temperature and reduced average rainfall are anticipated to dry soils and increase soil erosion. This could potentially affect the behaviour of certain mineral reactions within the soil, identified as potential contaminants of the groundwater from the cemetery.

Climate change is predicted to have a **medium** impact on the risks from urban land use on meeting WFD objectives in the Northern Groundwater Body.

H.5 The ability of measures to perform under future climate change

The measures identified include investigative monitoring to identify potential source(s) of contamination causing failure to reach standards for TBT. It is unlikely that climate change will impact on this measure.

H.6 Climate Change Adaptation Strategies

Successful adaptation to the impacts of climate change on water will be dependant on effective national and European water regulations such as the EU Integrated Marine Policy (and its environmental pillar, the Marine Strategy Framework Directive) as well as integration of water management into other sectoral policies such as energy policies. The Recommendation concerning Integrated Coastal Zone Management in Europe and the newly reformed Common Fisheries Policy will also have to factor in and address adaptation as a priority.

Measures that have already been implemented in Gibraltar to help reduce CO_2 emissions include:

- *An ongoing modernisation programme of the fresh water distribution system that will result in leakage reduction. Since most of Gibraltar's potable water is produced by desalination, any leakage reduction will result in a saving in energy.*
- *Encouragement of waste reduction and introduction of further recycling, aimed at reducing the amount of municipal waste going to landfill, thereby reducing amounts of methane and other greenhouse gases arising from this practise.*
- *The recent introduction of a new modern bus transport system. School children can already travel free to and from school thus reducing dependence on parents having to drive them to school in private vehicles.*
- *The continued use of seawater instead of fresh water for the conveyance of sewage and for other purposes such as fire fighting e.g. where the use of potable water is not essential. Since most of Gibraltar's potable water is produced by desalination this measure results in a considerable saving in energy.*

The Gibraltar Climate Change Programme includes advice on water efficiency that should be implemented within households and business users, such as fixing dripping taps, carrying out water audits and use of water saving devices such as dual flush toilets etc. A coordinated approach to improving water efficiency from the Government and the water company, AquaGib, could also be developed to further promote water savings that would result in reduced carbon costs associated with supply production.

I. Designating Heavily Modified Water Bodies

I.1 Introduction

The WFD recognises that in some water bodies it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation, recreation, water storage and flood protection. The physical modification on a water body may have been physically modified to provide valuable social and economic benefits. Article 4(3) of the WFD therefore states that water bodies may be designated as artificial or heavily modified if the modifications cannot be removed without having a major negative effect on the use of the water body and the social and economic benefits. Artificial and heavily modified water bodies (AWB/HMWBs) have to achieve an alternative objective of "good ecological potential" (GEP). The objective of GEP is similar to good status but takes into account the constraints imposed by the social and/or economic uses.

This Annex formalises the designation process of the Heavily Modified Water Body in the Gibraltar River Basin District, which was provisionally designated within the Article 5 Initial Characterisation Report (Entec, UK Ltd, 2005). No artificial water bodies have been identified in Gibraltar.

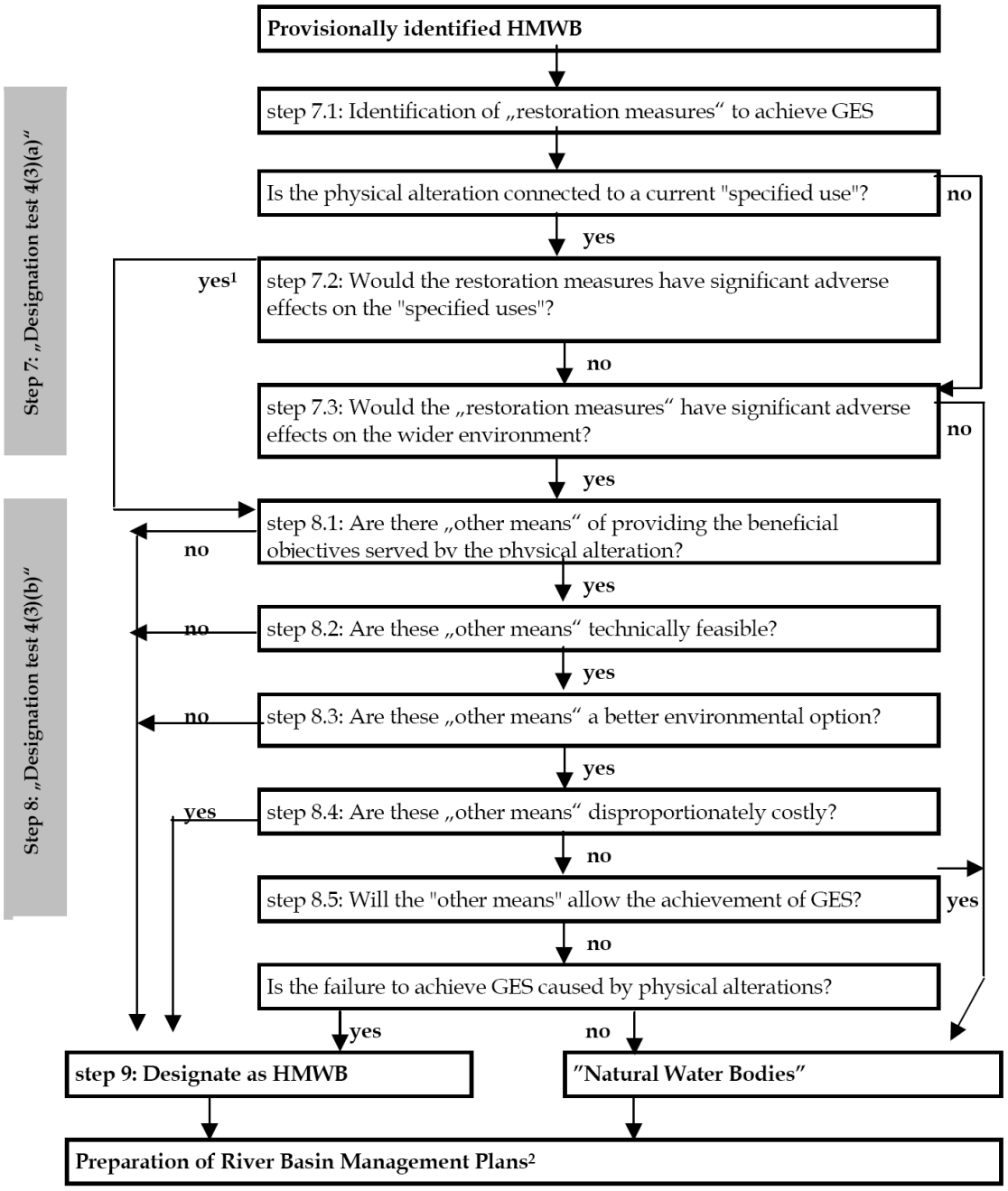
I.2 Designation Process

The Common Implementation Strategy (CIS) of the Water Framework Directive Guidance Document number 4, 2003, has been prepared for the “Identification and Designation of Heavily Modified and Artificial Water Bodies”. This guidance was used to identify such water bodies in the Gibraltar RBD.

During the Initial Characterisation of the Gibraltar RBD, for Article 5 of the WFD, the initial steps 1 to 6 from the CIS guidance No. 4 had been followed to provisionally identify the harbour and marina area as being a heavily modified water body (HMWB). There were no artificial water bodies (AWB) identified in Gibraltar.

Steps 7 to 9 of the CIS guidance take the designation further, so that a water body can be officially designated in review of the latest available information. A breakdown of these steps is presented in Figure I.1 below, as taken from the guidance document.

Figure I.1 Steps leading to the designation of a heavily modified water body



The harbour and marine area are predominantly used for navigation, recreation and flood protection, with the reclaimed land and man made harbour moles obviously modifying the hydro-morphological characteristics of the water body, which makes the designation process relatively straight forward. Nevertheless, the processes in Figure I.1 have been followed to document the designation process.

I.3 Designation of the Harbour HMWB

Although the Article 5 report provisionally identified the harbour and marina area as being a HMWB, the previous Article 8 report distinguished the harbour and northern marina as two separate water bodies. Following the Article 5 report and review of the available data, pressures and risks, it has been concluded that the two areas will form one water body as they face similar issues and pressures. The WFD states that water bodies may each be grouped for monitoring purposes as long as the monitoring of sufficient indicative or representative water bodies in the sub-groups of surface water or groundwater bodies provides for an acceptable level of confidence and precision in the results of monitoring, and in particular the classification of water body status. The monitoring location within the harbour has been taken to be representative of the whole HMWB including the marina area.

The uses of the HMWB are:

- Port and navigation
- Marina and recreation
- Flood protection
- Land reclamation.

Port and navigation has been identified as the predominant use and reason that the water body contains physical modifications that have changed the hydromorphological characteristics of the water body. The assessment for designated the water body as heavily modified reviews if the restoration measures would compromise the benefits of the port and navigation or the marina by considering:

- If the physical structures for harbour use can be removed/replaced;
- Dredging activities; and
- Vessel movement.

The assessment of land reclamation and flood protection considers:

- If structures for land reclamation can be removed/replaces
- If flood defences can be realigned.

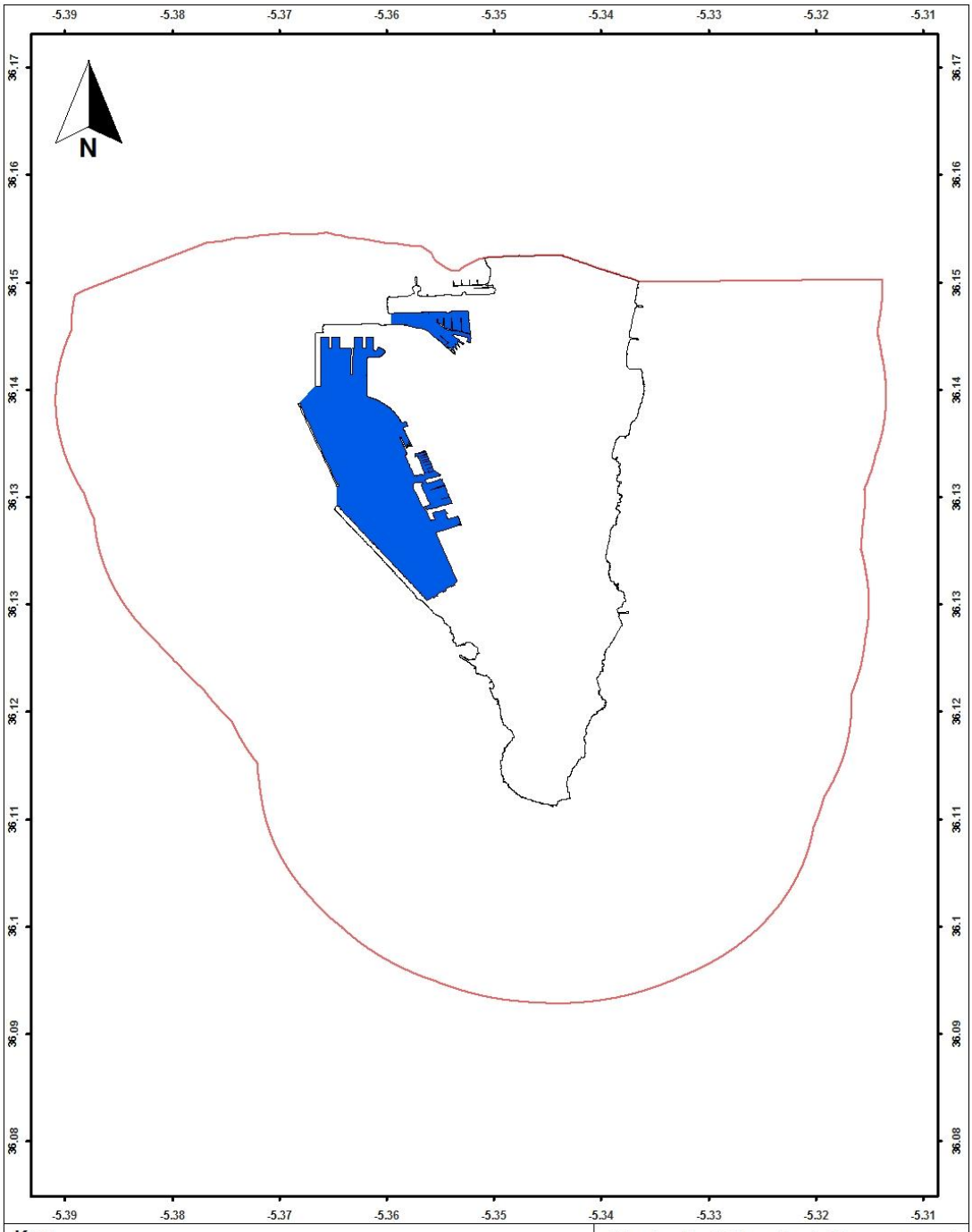
Table I.1 below presents the formal qualitative designation by considering if restoration measures could be implemented to remove the structures that have caused the water body to be heavily modified and contribute to good ecological status, and if they would significantly affect the environment.

Table I.1 Designation of HMWB

Step 7.1 Identification of "Restoration Measure" to achieve GES	Step 7.2 Can measure be implemented without significant impact on use?	Step 7.3 Can measure be implemented without significant impact on wider environment?	Step 8.1 Are there other means of providing the beneficial objectives served by the physical alteration	Step 9 Designate as HMWB
Replacement of hard bank reinforcement with soft engineering solution	No, would affect navigation use including port facilities, recreation and flood protection	No, significant environmental impacts would occur	No, harbour walls and land reclamation required for continuing development and operation of Gibraltar and for navigational purposes.	
Managed realignment of flood defences	No, would affect the protection of the majority of the urban area	No, would affect the protection of the majority of the urban area	No, harbour walls required for continuing flood protection of the urban and commercial areas.	
Modify structure or reclamation	No, would affect navigation use including port facilities, recreation & flood protection	No	No, marinas required for recreational and navigational purpose	Physical alteration & land reclamation cannot be restored without affecting the use of the harbour and the wider environment Water body therefore designated as HMWB Draft RBMP to review mitigation measures required to help maintain Good Ecological Potential
Preserve and restore where possible historic aquatic habitat	Where possible marine habitats can be preserved but cannot be restored	No, habitats cannot be fully restored without compromising the use of the harbour		
Preserve and where possible enhance ecological value of marginal aquatic habitat	Yes	Yes		
Avoid the need to dredge	In Place	In Place. Dredging is rarely required, but is controlled by the Port Authority who consult with the Department of Environment. Dredging is avoided where possible, Dredged material is monitored to inform disposal option.		
Vessel management	In Place	In Place. Vessel certification to comply with TBT convention, monitoring by DoE,		

I.4 Results

Figure I.2 identifies the boundaries of the HMWB as designated using the CIS Guidance steps.



Based Upon Government of Gibraltar survey, updated 2011

J. Planning Review

J.1 Introduction

A central part of river basin planning is to review existing policies and plans already in place for protecting the environment. This annex provides an illustrative overview of relevant policies and methods that aim to protect and enhance the environment, as a start to aligning these processes with the aims and objectives of the Water Framework Directive.

The plans discussed in this annex are not exhaustive and this document should be seen as a living document in which future guidance and plans will also align with aims of delivering sustainable water management, whilst considering economic and social issues. By considering relevant parallel policies, the WFD also aims to ensure that both public bodies, private organisations and individuals work together for a sustainable future.

This section focuses on the following key spatial planning processes:

- Urban land use planning;
- Flood risk and coastal erosion management; and
- Marine planning.

J.2 Urban Land Use Planning

The Gibraltar Development Plan was approved in 2009 by the Government of Gibraltar and is intended to guide land use planning over the next 10 years. It constitutes a Planning Scheme as provided for by section 5 of the Town Planning Act 1999.

The Plan is divided into the following four sections:

- General policies;
- Area specific policies and proposals;
- The Old Town Plan; and
- The Old Town Design Guide.

The policies and proposals are interrelated and based upon strategic principles surrounding population/housing, tourism, employment, transport, shopping, quality of life and the environment. The latter of these principles is to:

Recognise the special character of Gibraltar's natural, built and cultural environment as a valuable resource and to ensure that this is not significantly adversely affected by new development.

It is recognises within the Plan that there is a delicate balance between the preserving the significant areas of environmental importance in Gibraltar, including the Upper Rock, and the

need for development from the densely populated urban area and the high daily influx of tourists. Some of the general policies on the environment and where the water environment is relevant are listed below:

- **Policy ENV1 – Effect on the Environment.** The effect on the environment of development proposals shall be a prime consideration in determining applications.
- **Policy ENV2 – Environmental Impact Assessments.** Applications for development proposals that are likely to have a significant impact on the environment by virtue of the nature of the proposed development and its proposed location, must be accompanied by an environmental impact assessment.
- **Policy ENV 6 – Development and Flood Risk.** Planning permission for development in areas considered to be at risk will only be granted where the applicant can demonstrate that the proposed development will be adequately protected from inundation. Any protective measures required must not have an unacceptable effect on the environment, including possible secondary effects elsewhere on the coastline arising from the proposed protection measures.
- **Policy ENV7 – Air and Water Quality.** Planning permission will only be granted for development proposals that could potentially have a significant adverse effect on air or water quality if it can be demonstrated, to the satisfaction of the competent authority, that appropriate mitigation measures can be implemented to minimise such effects.
- **Policy ENV8 – Protection of Water Quality in the Vicinity of Sea Water Intakes.** Proposals in the vicinity of sweater intakes, existing or future, will need to take particular account of the need to ensure that there is no adverse effect on sea water quality.
- **Policy ENV11 –** Biodiversity
- **Policy ENV14 –** Sites of Ecological Value.
- **Policy ENV15 –** Sites of Community Importance / Special Areas of Conservation

J.3 Flood Risk and Coastal Erosion Management

J.3.1 EU Floods Directive

The EU Floods Directive (Directive 2007/60/EC) has been linked to the Water Framework Directive both in terms of scale (WFD River Basin Districts are the level at which risks must be assessed) and timing, requiring flood risk assessments to be reviewed periodically in conjunction with River Basin Management Plans. The WFD has a broad aim to contribute to 'mitigating the effects of floods and droughts', in addition to its primary focus on achieving good ecological status and preventing deterioration of existing status classifications. The EU Common Implementation Strategy for the Water Framework Directive also supports the implementation of the Floods Directive, through a separate working group.

The Floods Directive can be viewed as the means by which the EU hopes to achieve the effective consideration of floods in parallel with the WFD river basin planning process. A

Preliminary Flood Risk Assessment has been prepared for the Gibraltar River Basin District, as required by Articles 4 and 5 of the Floods Directive.

J.3.2 Other planning processes

Section J.2 above summarizes the land use plans for Gibraltar which include policies for development and flood risk.

Furthermore, the Gibraltar Climate Change Programme states that:

Where development is proposed in areas considered to be at risk, the applicant will need to demonstrate how the proposed development shall be protected from inundation. Consideration will need to be given to the environmental effect of any coastal defence works that are required, including possible secondary effects elsewhere along the coast.

J.4 Marine Planning

The Marine Strategy Framework Directive (2008/56/EC) came into force in 2008 and aims to achieve Good Environmental Status in Europe's seas by 2020. A Commission Decision was made in September 2010 outlining the criteria for achieving Good Environmental Status (2010/477/EU).

The promotion of Integrated Coastal Zone Management (ICZM) is also being rolled out by the Commission following a number of demonstration projects. These ICZMs should include national strategies to improve the overall planning, management, sustainability and quality of coastal zones.

Marine nature conservation is currently governed by the Nature Protection Act 1991 and the Marine Reserve Regulations 1995. The Government will be introducing new legislation which regulates fishing activities amongst a range of other issues that can impact on the marine environment.

The Government of Gibraltar has also produced the Southern Waters of Gibraltar Management Scheme to enable the Relevant Authorities to carry out their responsibilities and functions with regards the nature conservation features for which the Southern Waters of Gibraltar European Marine Site has been designated. The Scheme presents a summary of issues affecting the Special Area of Conservation and how these issues are and will continue to be managed.

J.5 Other Actions Plans

The Government of Gibraltar's intention is to create a sustainable future in which present and future generations can enjoy a rich, diverse & healthy environment in Gibraltar and therefore has established an Environment Charter. The Charter contains a set of commitments, which Government strives to achieve as the result of a series of guiding principles. An Environmental Action and Management Plan has been developed by Government to guide the implementation of the Environment Charter. It establishes general policy goals, specific actions and measures, and in this way mirrors the objectives of the WFD.

K. Cost Recovery of Water Services

K.1 Water Services

The Article 9 of the WFD requires Member States to ensure the implementation of the principle of cost recovery of water services including financial, environmental and resource costs. The Directive also stipulates that water pricing has to provide an incentive for the rational water use by 2010. Furthermore, the Programme of Measures under the RBMP also needs to include steps planned to ensure the compliance with the principle of cost recovery if relevant.

According to the WFD, water services include water abstraction, impoundment, storage, treatment and distribution as well as collection, treatment and discharge of wastewater. Water services, therefore, cover public and private water supply and wastewater collection and treatment.

The statutory duties for the provision of water lie with the Government of Gibraltar which contracted the provision of some water services to AquaGib Limited for a thirty year period in 1991. While all the assets associated with water supply (including desalination plants and reservoirs) are owned by and are statutorily vested in the Government, the responsibility for maintenance and development of assets lies with AquaGib. In particular, AquaGib holds responsibility for potable water production and distribution, sea (salt) water supply and distribution and sewage pumping while the Government of Gibraltar is responsible for the operation and maintenance of the distribution (sewer network) system. There are no wastewater treatment services in Gibraltar. In addition, the Ministry of Defence (Gibraltar) also provides water and sewage services. The Ministry of Defence produces, stores and distributes potable and sea water supplies to the garrison population in Gibraltar as well as operating its own network of sewers and sewage pumping stations, which all ultimately discharge to the Government of Gibraltar trunk sewer.

In the case of the housing developments, it is the developer who bears the costs of all new water infrastructure, which are then passed on to the users.

K.2 Financial Costs of Providing Water Services

K.2.1 Financial Costs of Water Services

The financial costs of water services, including capital and O&M costs, typically are associated with the costs of supply, e.g. water abstraction, treatment and distribution costs.

In Gibraltar, AquaGib is operating on a contract at the end of which all the assets managed by the water company (including any additional ones) revert back to the control of the Gibraltar government. Therefore, the capital costs paid by AquaGib have been assumed to represent the bulk of the annual contribution to the overall cost of capital. Other elements of financial costs include depreciation, administrative costs (including to other organisations with a role in the control of water use), and taxes and subsidies.

The financial costs are collected by AquaGib, and presented in the Table K.1 below, the most significant of which are payroll and energy and fuel costs. Overall, the cost of potable water is £0.448 per 100 litres.

Table K.1 Financial Costs (Operating and Capital Costs) of AquaGib in 2009/2010

	Potable Water	Sea Water	Sewage Pumping	Totals
Operating costs	**£5,625,248**	**£1,771,739**	**£989,815**	**£8,386,802**
of which...				
Payroll	£2,736,322	£1,008,634	£573,617	**£4,318,573**
Energy and fuel costs	£1,370,395	£82,516	£57,978	**£1,510,889**
Purchases of materials etc.	£699,130	£202,799	£135,141	**£1,037,070**
Repairs and maintenance costs	£61,103	£27,045	£46,201	**£134,349**
Other operating costs	£758,298	£450,745	£176,878	**£1,385,921**
Capital costs	**£448,182**	**£317,692**	**£125,239**	**£891,113**

Administrative costs, which include the costs of billing customers, are met by AquaGib and included in the operating costs.

It should be noted, however, that the AquaGib costs of sewage pumping that are presented in the table above do not reflect the entirety of the costs associated with sewage collection and discharge since AquaGib does not hold responsibility for the maintenance of the sewer network. Such general maintenance of the distribution (sewer network) system and associated costs are attributed to the Technical Service Department (TSD) of the Gibraltar Government. There is no set budget for the maintenance and the costs change on a yearly basis (e.g. due to more or less maintenance as a result of faults, etc.). No information could be obtained on the financial costs of provisioning water services by the Ministry of Defence (Gibraltar).

No information was obtained on subsidies to water services, and therefore they have not been included in the estimates of cost recovery.

K.2.2 Water Services Charges and Revenues

All potable water use is metered, and charges include a standing monthly fee and a volumetric charge. While the standing charge has been constant since 2005, volumetric charge has increased by more than 18% since 2005.

A two-tier volumetric charge for potable water is applied to domestic water users, who pay one rate for the first 4,500 litres used each month, and a higher rate for volumes above this level. The design of such a charge incorporates the incentive properties that allow affecting large water consumers while respecting the basic needs for potable water. According to the information on potable water use in 2009/2010 by different sectors, domestic use accounted for more than 60% of water supply followed by commercial and industrial uses. Industrial and all other users are charged for potable water based on a single volumetric rate.

The trends in potable water charges that aim to cover the costs of potable water production, storage and distribution between 2004 and 2010 are presented in the table below.

Table K.2 Trends in Potable Water Prices

		2004		2005		2008		2010	
		£/ 100 litres	**standing charge per month**	**£/ 100 litres**	**standing charge per month**	**£/ 100 litres**	**standing charge per month**	**£/ 100 litres**	**standing charge per month**
A	Shipping	£0.50	0	£0.58	0	£0.667	0	£0.690	0
B	Hospitals and schools	£0.50	£4.00	£0.58	£5.00	£0.667	£5.00	£0.690	£5.00
C	Hotels	£0.35	£4.00	£0.41	£5.00	£0.471	£5.00	£0.487	£5.00
D	Domestic	£0.18	£1.50	£0.21	£3.00	£0.241	£3.00	£0.249	£3.00
		£0.45		£0.52		£0.598		£0.619	
E	Swimming pools	£1.00	£4.00	£1.16	£5.00	£1.334	£5.00	£1.381	£5.00
F	Industrial	£0.40	£4.00	£0.46	£6.00	£0.529	£6.00	£0.548	£6.00
G	Government and MoD	£0.50	£4.00	£0.58	£5.00	£0.667	£5.00	£0.690	£5.00
H	Commercial	£0.40	£4.00	£0.46	£6.00	£0.529	£6.00	£0.548	£6.00
I	Fountain	n/a	n/a	£0.145	0	£0.166	0	£0.172	0

AquaGib bills all consumers of potable water, collects and retains the revenues from the application of the potable water tariffs. However, no data on revenues could be provided for the years 2008/2009 and 2009/2010 by AquaGib in addition to the 2004/2005 data presented in the characterization report. Instead, the levels of cost recovery per different sectors were estimated using 2008 year charges (please refer to the next sections).

The costs associated with seawater and sewage pumping services that AquaGib provides, on the other hand, are recovered through separate fees paid by the Government (that come from a specific vote provided by Government) (see the Table K.3).

Table K.3 Payments to AquaGib by the Government of Gibraltar for sewage pumping services

Year	Total Costs (Sewage pumping)	Total Costs (Seawater pumping, storage and distribution)
2003	£876,931	
2004	£917,621	
2005	£973,899	
2006	£1,114,062	
2007	£1,217,582	
2008	£1,257,846	
2009	£1,456,619	
2010	£1,530,681	
2011		~£1,700,000

No information was obtained on the yearly ad-hoc costs of operation and maintenance of the distribution (sewer network) system by the Government or on the costs and revenue sources of provisioning water services by the Ministry of Defence (Gibraltar).

K.2.3 Cost Recovery by Water Service

The lack of the data on the water company's revenues from potable water distribution in 2009/2010 precludes the update of cost recovery ratio calculations. In 2004, the calculated cost recovery ratio for potable water supply was 107%, the lowest in comparison to sea water and sewage pumping.

The AquaGib costs of sewage and sea water pumping are covered through the payments from the Government. The cost recovery ratio for sewage pumping was 142% and 134% in 2004 and 2009/2010 respectively. The cost recovery ratio for sea water pumping was 139% in 2004.

In 2004, the calculated overall cost recovery ratio was 118% and with sewage pumping featuring the highest cost-recovery ratio (142%).

In addition to the services provided by AquaGib, the Government of Gibraltar incurs financial costs of operating and maintaining the distribution (sewer network) systems which are covered from the budget.

K.2.4 Cost Recovery by Water User

Each water user pays a standing charge and a volumetric charge (based on the quantity of potable water with which they are supplied) which constitute a mechanism for the cost recovery, i.e. the charges comprise the revenues of water companies.

In accordance to the WFD all water users need to provide "an adequate" contribution to the costs of water services including financial and environmental and resource costs. The table

below provides a summary on the financial costs and assesses these on a per cubic metre of water supplied basis.

Table K.4 Financial Costs and Costs per Cubic Meter, 2009/2010

	Potable water	Sea water	Sewage pumping	Totals
Operating costs	£5,625,248	£1,771,739	£989,815	£8,386,802
Capital costs	£448,182	£317,692	£125,239	£891,113
Volume of water supplied m^3	1,356,641	1,761,388		
Costs per cubic metre	£4.48	£1.19		

This indicates that the average cost of supplying potable water is the highest per cubic metre, which would fit with expectations given the high costs of desalinating the water. Costs for supplying sea water are lower, as these relate only to abstraction and maintenance of the distribution system. Costs for sewage pumping per cubic metre are not assessed as there are no new data on sewage pumping volumes in 2009/2010.

The volumetric charges imposed on each user group (2008) are then compared to the average costs per cubic metre. The average cost of production is an appropriate estimate of the costs of supply to all sectors, as the abstraction and treatment requirements do not differ by sector (please see Table K.5).

Table K.5 Volumetric Charges and Level of Cost Recovery by Sector for potable water, 2004

		Volumetric charge (per m^3)	Volume supplied	Above/ below level required for cost recovery
A	Shipping	£6.67	39777	Above
B	Hospitals and schools	£6.67	37497	Above
C	Hotels	£4.71	56236	Above
D	Domestic	£2.41	553453	Below
		£5.98	289002	Above
E	Swimming pools	£13.34	5590	Above
F	Industrial	£5.29	91183	Above
G	Government and MoD	£6.67	65784	Above
H	Commercial	£5.29	218118	Above
I	Fountain	£1.66	1	Below

According to the information presented above, in the majority of cases, the sector pays more than the average cost of production. Domestic (basic volume) water use rates are the exception to this, along with the water supply to the fountain.

The WFD requires "an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services" by 2010. As demonstrated by the calculations, it is possible to say that while households pay slightly lower than the average cost of production of potable water, industry as a whole does pay slightly more than costs per cubic metre. It is therefore concluded that each sector makes an adequate contribution.

Recovery of the costs of supply of sea water and collection and discharge of wastewater cannot be calculated by sector as the revenues from different sectors are not known. AquaGib obtains a separate fee for sea water supplies and sewage pumping from the Government with the cost recovery ratios in 2004 being 139% and 142% respectively. Therefore, in aggregate the costs of these services are recovered. However, as AquaGib receives the payment from the Government rather than end users, it is impossible to assess the contribution of different sectors to the recovery of financial costs. Similarly, as the costs of operating and maintaining the distribution (sewer network) systems are covered by the Government directly relative contribution of different sectors to the costs of this service cannot be assessed.

K.3 Environmental and Resource Costs of Providing Water Services

In addition to financial costs of water services, the associated environmental and resource costs also need to be covered.

While the definitions of environmental and resource costs are not provided in the WFD and some debates are still ongoing on interpretation and possible quantitative/monetary approaches, the UK definition is further used. In particular, environmental costs are defined as residual environmental damage costs after the current mitigation costs. The resource costs, on the other hand, reflect current and future water availability (in terms of quantity and quality). In the context of the WFD both these costs occur only when the status of water bodies is below good.

In Gibraltar, environmental and resource costs are related to the nature (and impact) of water abstraction and supply as well as of wastewater discharge.

K.3.1 Resource costs

Resource costs are typically related to the depletion of water sources; as the majority of the water is taken from the sea, the impact of the abstraction on the water body is not noticeable. Furthermore, according to the AquaGib information there has been no groundwater abstraction since July 2009 – all water was abstracted and desalinated from the sea. While sea water desalination is likely to have some adverse environmental impacts, in particular associated with additional energy use and CO_2 discharges, resources costs attributed to water services in Gibraltar are likely to be negligible or none at all.

K.3.2 Environmental costs

On the other hand, different water services in Gibraltar potentially may give raise to some environmental costs.

First of all, there could be some potential adverse environmental effects associated with the discharge of untreated sewage (e.g. nutrients). In addition to the damage to environment, this could also affect the amenity of bathers swimming around the coast, or cause additional costs of treating potable water as a result of pollution to the salt water. In practice, wastewater discharge occurs to the sea into an area of high natural dispersion, which would not be acceptable if there were negative environmental impacts. It can be, therefore, expected that the environmental costs associated with wastewater discharge in Gibraltar are negligible.

Secondly, adverse environmental impacts could be associated with sea water desalination, including, in particular, costs of CO_2 emissions and other damage costs associated with additional energy use.

In particular, sea and brackish water desalination is one of the most carbon intensive water supply options with treatment of seawater claimed to be twice as energy intensive as treatment of brackish water. According to the Environment Agency scientific report on GHG emissions of water supply options (Environment Agency, 2008), carbon emissions associated with desalination (using reverse osmosis and nano-filtration) were 2.2 to 3.4 tonnes of CO_2e per Ml or 2.2 to 3.4 kg of CO_2e per m^3 (for the schemes assessed). Overall, the carbon footprint of seawater desalination was estimated at 2.99 tonnes of CO_2e per Ml (or 2.99 kg of CO_2e per m^3). These estimates, however, include both capital and operational carbon costs of desalination plants. Capital carbon costs cover the carbon embodied in materials, emissions associated with manufacture and construction as well as construction energy usage. Operational carbon costs, on the other hand cover the energy involved in operation of the plant based on power supply (electricity conversion factor of 0.43 kgCO2e per kWh quoted by Defra [Defra, 2007]). It should be noted, however, that in the case of desalination plant, operational carbon emissions constitute a major proportion of total emissions (the split is about 95% opex and 5% capex[1], i.e. opex emissions were 2.88 kg of CO_2e per m^3).

Using 2.88 kg of CO_2e per m^3 as an indicative figure, the carbon emissions associated with potable water supply in Gibraltar in 2009/2010 can be calculated. In particular, in 2009/2010 1,356,641 m^3 of potable water were supplied resulting in 3,907 tonnes of CO_2e emissions.

The latest valuation of the cost of carbon (Department of Energy and Climate Change, 2009) for non-traded sectors (non EU Emissions Trading Scheme) could be used to assess these emissions in monetary terms. The central estimate for the social costs of CO_2 is £52/t for 2010 (this, however, increases over time).

[1] Total capex emissions were estimated at 8529 tonnes of CO_2e while total opex emissions were 747,684 tonnes of CO_2e or 12,461 tonnes of CO_2e per year[1].

Table K.6 Estimated annual costs of carbon (2010 prices) for seawater desalination

CO2 emitted (t) per year	Cost per tonne (£)	Total cost (£)
3,907	52	203,164

Therefore, any measures that result in a reduction of potable water production and supply from seawater desalination would result in energy saving and hence carbon emission reduction. In particular, according to the Climate Change Programme for Gibraltar (2005), an ongoing modernisation programme of all fresh water distribution system will result in leakage reduction. Furthermore, it is noted that the continued use of seawater instead of fresh water (the ratio is about 1.5:1) where it is not essential such as for fire fighting is contributing to energy savings. In particular, sea water is used for fire fighting and toilet flushing representing a considerable reduction in the requirements for desalination and the consequent CO_2 emissions if potable water were to be used for such purposes.

In addition to the damage associated with carbon emissions, energy use is associated with some further external (damage) costs including, for instance, damage (such as impacts on health, crops etc) associated with other air pollutants (NO_x, SO_2, NMVOCs, PM_{10}, NH_3) and other non-environmental social costs for non-fossil electricity-generating technologies. The EEA[2] estimate that the external (damage) costs of costs associated with energy production which are not reflected in electricity prices but which society must bear ranges from 1.8-5.9 Eurocent/kWh (2005 prices) or 1.5-5.1 pence/kWh. The external costs of electricity production have fallen considerably between 1990 and 2005 in almost all Member States. Since 2005, it is reasonable to assume as electricity prices continue to better represent the social cost of electricity and that the upper range might again fall slightly. In absence of better data, the 2005 range could still be used but it is acknowledged that the high end may be an overestimate. It should be noted, however, that the external cost of electricity also takes into consideration climate change damage costs associated with emissions of CO_2. Therefore, using the range in addition to the carbon cost estimated above would result in a doublecounting.

[2] EN35 External costs of electricity production http://www.eea.europa.eu/data-and-maps/indicators/en35-external-costs-of-electricity-production-1

L. Consultation and Engagement

L.1 Introduction

The WFD requires consultation to be undertaken on the draft River Basin Management Plans before final publication. In the final plan, this section will be updated with a summary of the organisations and authorities that were consulted on the plan, and whether a response was received.

L.2 Consultation Processes

Table L.5 Consultation (by June 2011)

Organisation	Contact	Response Received
Aquagib	Derek Cano	Minor comments on report
Environmental Agency	Francis Martin	Minor comments on report
Chief Technical Officer	Michael Gil	Minor comments on report

M. Competent Authorities

M.1 Introduction

This annex presents the contact details and responsibilities of the competent authorities for river basin planning within Gibraltar, in the context of planning for environmental and coastal water quality protection.

M.2 Details and Responsibilities of Competent Authorities

Table M.1 Competent Authorities

Name and Address	Legal Status	Responsibilities
Government of Gibraltar, Ministry for the Environment, Department of the Environment Duke of Kent House, Line Wall Road, Gibraltar	Governmental Body, part of the Crown	Primarily responsible for implementation of the River Basin Management Plan in line with Article 13 of the Water Framework Directive. The Department of the Environment advises on the transposition of EU Directives, and is also responsible for monitoring contracts between Government and service providers which affect the general state of the environment.
Environmental Agency 37 Town Range, Gibraltar	Formed in July 1995 from the Environmental Health Department	Responsible to the Minister for the Environment and plays an important role in delivering the environmental policies of the Government of Gibraltar. The Agency is also responsible for the enforcement of a number of Environmental and Public Health legislations and for environmental monitoring.

M.3 Contact Details

Primary point of contact: - Stephen Warr, Environment Officer, Department of Environment

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