

# TECHNICAL PROPOSAL

## I. Background

The CORINE Land Cover project is intended to provide consistent localized geographical information on the land cover of Bulgaria. And it full its purpose for 20 years. The CLC information on land cover and land cover changes is directly used for determining and implementing environment policy in Bulgaria and we use other data (on climate, DTM, soil, etc.) we make complex assessments (e.g. mapping erosion risks).

Bulgaria took part in the CORINE Land Cover 1990, 2000 and 2006 projects and admittedly will join in CORINE Land Cover 2012 project.

CORINE Land Cover Bulgaria 1990, CORINE Land Cover Bulgaria 2000 as well as CORINE Land Cover Bulgaria 2006 were carried out by the Executive Environment Agency (ExEA) at the Ministry of Environment and Water and implemented by national teams elected after tender procedures.

- CLC 1990 – GEOPLANPROECT, Bulgarian Academy of Science and CADR&D Centre PROGRESS;
- CLC 2000 – a team of academic experts and private company “DATECS” Ltd.;
- CLC 2006 - only a team of academic experts

CLC Bulgaria is the first complete land cover database, comprising the whole country territory. It is also the first large digital database on national level in GIS ARC/INFO format and is compatible to the other CLC databases produced in the European countries. It seems to be an invaluable tool for environmental management, statistics, planning and conservation activities.

For implementation the aims of GIO Land monitoring 2011 - 2013 our country will accomplish the following tasks:

1. Development of Corine Land Cover Changes 2006-2012 and Corine Land Cover 2012 databases;
2. Verification of the 5 HRLs (high resolution layers): (**imperviousness, forest areas, agricultural areas** (permanent grassland), **wetlands** and **water bodies**);
3. Enhancement of the 5 HRLs;
4. Dissemination and archiving.

## II. Specific country conditions

### Previous CLC inventories:

<b>Surface area:</b>	110993.6 km <sup>2</sup>
<b>Projection system:</b>	National projection System 1970 (for in)
<b>Number of sheets at the scale of 1:100 000:</b>	117 sheets (40 km x 40 km)
<b>Number of Basic Working Units:</b>	117 CLC2000; 68 CLC2006
<b>Satellite/sensors:</b>	Landsat 5 TM, Landsat 7 ETM+, SPOT 4, SPOT 5, IRS P6.
<b>Number of scenes covering the state:</b>	<ul style="list-style-type: none"><li>• <b>CLC 1990</b> – 12 Landsat 5;</li><li>• <b>IMAGE2000</b> – 12 Landsat 7 ETM+;</li></ul>

	<ul style="list-style-type: none"> <li>• <b>IMAGE20006:</b> 12 Landsat 7 ETM+; 35 SPOT 4 HR VIR1; 24 SPOT 5 HR G1; 19 IRS-P6 LISS III</li> </ul>
<b>Acquisition period of the satellite data:</b>	CLC1990: 1989 – 1, 1991 – 1, 1992 -10; CLC2000: 2000 – 1, 2001 – 11; CLC2006: 2005 – 5; 2006 – 64; 2007 - 7

Main ancillary data used:

Aerial photographs (georeferenced and/or orthorectified) at scale from 1:5 000 and 1:40 000;  
 Digital topographic maps at scales 1:5 000; 1:25 000; 1:50 000; 1:100 000 and 1:200 000;  
 Digital city and thematic maps;  
 Vegetation map at scale 1:600 000;  
 Tourist maps at scale 1:50 000;  
 National statistical data.

CORINE Land Cover Bulgaria digital data base:

CLC 1990: 60 Megabytes, more than 60 000 polygons  
 CLC 2000: over 110 Megabytes more than 52 000 polygons  
 CLC change 1990–2000: 7 Megabytes and 2670 polygons  
 CLC1990 revised: 51 629  
 CLC change 1990 – 2000: x Megabytes and x polygons;  
 CLC 2006: over 110 Megabytes, more than 52 000 polygons;  
 CLC change 2000–2006: 7 Megabytes and 2 670 polygons.

**Methodology to be applied (change mapping first, generalization, etc.)**

The data bases are in GIS ARC/Info format:

- Minimal mapping area: 25 ha;
- Minimal width of linear features: 100 m;
- Scale: 1:100 000;
- Minimum width of polygons:  $\geq 100$  m;
- 3<sup>rd</sup> level of CLC nomenclature: from 44 CORINE classes in Bulgaria has presented 36 represented in Bulgaria;
- Mapping only real change;
- Computer aided interpretation (in working units)

Detection and mapping of land cover change is done by computer-assisted interpretation of satellite images and all available additional data.

***Specific conditions related to the National Projection “System 1970”***

The so-called Civil cartographic “System 1970” is a non-standard one and the mathematical projection system parameters (different for the 4 Zones/parts of the country) is still considered a State secret. Consequently all ancillary map data to be

used during the Project implementation are in this projection system. Here is the short story of the National CLC teams efforts to overcome this problem:

- For the implementation of CLC2000 Project a national database for the 4 Zones was prepared in System 1970 by Bulgarian Academy of Sciences experts in a close collaboration with GISAT Ltd. Company;
- The manual Basic Working Units edge matching and 4 Zones data sets combination and transformation were developed using custom designed software and WGS'84, Geographic coordinates;
- In CLC2006 all Project tasks were performed in UTM35 WGS84 projection system and the final (delivered and accepted) databases were re-transformed in the National 1970 System. The CLC 2012 Project implementation will follow the same approach.

Another specific condition is related to military airports. They were coded as class 3.2.1 (Natural grassland) in CLC 1990, 2000 and 2006. For the CLC 2012 a new approach will be discussed with the Military Geographic Service and appropriate decision will be made to repair the CLC2012 and the CLC2006-2012 Chang database.

### **Basic input material (existing databases) used in CLC production and verification and enhancement of the HRLs**

- 1) For the previous projects, the following input products have been submitted:
  - Satellite images for the year 2000 from the American satellite Landsat 7 ETM+ (database IMAGE2000) in the 4 zones of the National coordinate system 1970;
  - Satellite images for the year 2006 submitted by EEA in the LAMBERT AZIMUTHAL coordinate system – database IMAGE2006;
- 2) For the upcoming project -
  - IRS-P6/Resourecosat: VNIR + SWIR – Coverage one;
  - Rapideye VNIR + SWIR – Coverage two;
- 3) Digital data concerning the territory of Bulgaria;
- 4) Topographic maps in digital format (1:100 000; 1:50 000 and 1:25 000);
- 5) Thematic maps;
- 6) Orthophoto and geo-referenced satellite images.
- 7) Satellite images with high resolution: GoogleEarth; QwickBird; IKONOS; EROS-B; SPOT 4 and 5; IRS\_P6.
- 8) Statistics.

### **Connections with other projects**

#### **Project NATURA 2000**

Natura 2000 European network in particular Bulgaria - composed of protected areas designed to provide long-term survival of the most valuable and threatened species and habitats in Europe (Bulgaria) in accordance with key international agreements on environmental protection and biodiversity. The project results will be used for

verification and enhancement of the HRLs - especially in imperviousness, wetland and permanent grassland.

### Training needs

Based on the experience from our participation in the previous 3 projects, we consider necessary addition CLC 2012 training organized by EEA or other representation of the Technical Team. We welcome the opportunity granted by the EEA - Technical Team and think the training will contribute to raising the quality of the final products.

### III. The production process and related tasks

#### Overview of the production process (list of tasks that will be performed)

The tasks that will be undertaken by the country:

1. Verification of the 5 HRLs (high resolution layers) - (WT1):
  - 1.1 Verification of **imperviousness**;
  - 2.2 Verification of **forest areas**;
  - 3.3 Verification of **agricultural areas** (permanent grassland);
  - 4.4 Verification of **wetland**;
  - 5.5 Verification of **water bodies**
2. Enhancement specified in Item 1 - of the 5 HRLs - (WT2);
3. Corine land cover changes 2006 – 2012 and Corine land cover map 2012 – (WT3);
4. Dissemination and archiving – (WT4).

National CLC 2012 project will be carried out in accordance with basic standard (uniform) CLC 2012 Project, as listed in Reference documents.

Tasks **WT1**, **WT2** and **WT3** will be performed by outside contractors - selected by competition under national legislation the country.

#### Timeline of the production

	2012												2013												2014																		
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12							
	Q1			Q2			Q3			Q4			Q5			Q6			Q7			Q8			Q9																		
WT1																																											
WT2																																											
WT3																																											
WT4																																											

#### Expected delivery dates

1. Verification of the 5 HRLs (high resolution layers): (**imperviousness, forest areas, agricultural areas** (permanent grassland), **wetlands** and **water bodies**) – 15/02/2013
2. Enhancement of the 5 HRLs – 31/03/2013

3. Corine land cover changes 2006 – 2012 and Corine land cover map 2012 – 31/01/2014

4. Dissemination and archiving – 31/03/2014

### **Details of the production system chosen**

The details of the production system will be written after the selection of contractor - elected under the laws of the Republic of Bulgaria. The potential competitors must be equipped with modern equipment for processing high-resolution images and GIS systems, suitable for carrying out inspection and process improvement. Corine Land Cover: preparation of data; classification and interpretation; generalization; vectorisation; thematic accuracy assessment; metadata, etc.

### **Data sources to be used (satellite data, ancillary data, etc.)**

- 1) 1) IMAGE2000 Database(both in coordinate system 1970 and UTM WGS84) containing 12 Landsat 7 ETM+ full scenes;
- 2) IMAGE2006 Database System (ETRF89-LAEA and UTM WGS84)  
IRS P6-III (24 scenes);  
SPOT 4 (35 scenes);  
SPOT 5 (19 scenes).
- 3) IRS-P6/Resourecesat: VNIR + SWIR
- 4) Digital data concerning the territory of Bulgaria - Settlements, water body (rivers, lakes), areas occupied by forests, soils, roads, biodiversity.
- 5) Topographic maps in digital format (1:100 000; 1:50 000 and 1:25 000).
- 6) Thematic maps.
- 7) Orthophoto and geo-referenced satellite images.
- 8) Satellite images with very high resolution (VHR): GoogleEarth; QwickBird; IKONOS; EROS-B; SPOT 4 and 5; KFA1000.
- 9) National Statistics.
- 10) BANSIC – georeferenced Land Cover database of the Ministry of Agriculture and Food.
- 11) Aerial and Satellite (2006 and 2008-2010) Orthophotos of the Ministry of Agriculture and Food (Land Parcel Identification System raster database).

## **Quality assurance procedures to be applied**

The work will be performed through 4 main tasks in compliance with the standard CLC 2012 procedure. In each task the National obligation (commitments) are and will be carried out presented as working tasks (WT).

### **WT 1. Verification of the 5 HRLs (high resolution layers): (imperviousness, forest areas, grassland, wetland and water**

#### Quality assurance/quality control and meta data

The quality control work will ensure validation of the different steps of the update, further used as input to a subsequence working step.

The national team will be responsible for the performance of the quality control.

1. Each processing step of the update, i.e. topological correction, geometric adjustment, thematic correction, and change detection will be followed by a number of checks to ensure consistency in the LC database. The checks will be recorded as part of the production meta-information;
2. The overall responsibility of QA/QC relies on the technical project manager and national project manager (ExEA). The technical teams (TT) will assess thematic and geometrical quality control all along the projects;
3. The national team will collect the necessary metadata to documents the different steps and products of the project.

Verification will be carried out on the intermediate products at full resolution (20m x 20m, in UTM35, WGS'84 projection).

The Technical team will be perform verification of randomly selected samples covering 5% of the area, using guidelines of EEA. The following reference materials will be available:

- Ground survey data
- Topographic maps
- Forest inventory vector maps.
- Aerial CIR, orthophotos where available.

### **WT 2. Enhancement of products (HRLs)**

The data content will be improved on the basis of the findings of the verification task. Enhancement of the products will have to make in order to improve the intermediate HRLs based on the results of the verification. Enhancement shall be carried out on the intermediate products at full resolution (20m x 20m, in national projection), based on existing reference data ( topographic maps, thematic maps, aerial photography or others).

All enhancements will be done for the full resolution datasets (20m x 20m, in UTM35 WGS'84 projection). Improvements will be done combining automatic processes and manual interactive processes.

### **WT 3. Corine land cover changes 2006 – 2012 and Corine land cover map 2012**

The task will include:

### **WP 3.1 Corine land cover changes 2006 – 2012**

- Change detection and mapping using computer assisted image interpretation based on image to image comparison between IMAGE2006 (based on SPOT/IRS data) and IMAGE2012 (based on IRS/P6/Resourecesat –VNIR + SWIR);
- Land cover change mapping;
- Metadata providing;
- Carry out national validation procedure.

The objective of this task will be mapping of all land cover changes from 5 ha the standard 44 CLC classes (36 for Bulgaria), including metadata according to INSPIRE specification. Carried out by local expertise using existing ancillary data when required and with the overall thematic accuracy more than >85 % (similar as CLC2006). The existing expertise will be used whenever possible.

During change detection and mapping, the National CLC2012 team will apply similar method as CLC2006 land cover change mapping (according to the reference guide IMAGE2000 and CLC2000 Products and Methods, EUR 21757 EN).

This service will be provided directly (via public tendering) by ExEA in behind of MOEW name, who are the authorities in charge of the national Corine land cover program.

The data base of Corine Land Cover change mapping 2006 – 2012 will be delivered in January 2014, vector data, WGS'84 format (including metadata).

In the event that mistakes are found in CLC 2006, a revised version will be produced and delivered - Corine Land Cover 2006 – revised.

### **WT 3.2 Corine land cover mapping 2012**

The objective will be to produce a Corine land cover map of the year 2012 and will include:

- Integrate/unify CLC2006 with CLC2006-2012 changes;
- Generalize polygons to 25 ha mapping criteria;
- Create a seamless vector database;
- Metadata providing.

CLC 2012 data base will be done by integrating land cover changes 2006 – 2012 in the CLC2006 map without re-mapping completely CLC2012 and will be responsibility of the Technical team (subcontractor).

The data base of Corine Land Cover mapping 2012 will be delivering in January 2014, vector data, WGS'84 format (including metadata). (see table in Annex 2).

### **WT 3.3 Corine land cover 2006 – revised**

If necessary will be provided - Revised Corine Land Cover 2006. The data base of Revised Corine Land Cover 2006 will be delivering in January 2014, vector data, WGS'84 format.

## **WT 4. Dissemination**

The results of the project CLC 2012 will be available on the Internet, according to the requirements of the INSPIRE Directive. Metadata description of the datasets will be prepared and web services will be developed with regards to the relevant implementing rules and technical guidance documents prepared and published by the European Commission. The project results will be disseminated in accordance with the principles of the Shared Environmental Information System for Europe (SEIS) initiative and will serve as basis for the pan-European component of the GMES land monitoring service. We will prepare a summary report on the activities of the distribution national products (Bulgaria) and details relating to easy access, viewing and downloading of data.

### ***IV. Deliverables and reporting***

The deliverables produced at national level are:

#### **1. Verification reports of the 5 HR layers**

In pursuance of the objectives of this task will focus on identifying systematic classification errors that are eligible for improvement / increase in random samples to be carried out by visual inspection of selected samples with existing reference data. – **31/01/2013**

#### **2. Enhanced HR layers (5 layers)**

For the enhancement task, the data content will be improved on the basis of the findings of the verification task. All enhancements will be done for the full resolution datasets (20m x 20m, in national projection). It is requested to specify which improvements shall be done through automatic processes and/or manual interactive processes. Datasets will be delivered together with a summary report – **31/03/2013**

#### **3. Corine land cover changes 2006-2012; Corine land cover 2012 geo-spatial datasets and Revised Corine land cover 2006, as defined in the technical guideline**

CLC changes is understood as a geo-spatial dataset of all changes in land cover of at least 5 ha based on the updated technical guidelines for 2012. The analysis of the changes between the years 2006 and 2012 will be based on visual image comparison. The dataset will contain polygons with a minimum mapping area of 5 ha. Status and a minimum feature width of 100 m. CLC 2012 will integrate the data of land cover changes 2006-2012 with the land cover dataset from the year 2006 (CLC 2006). The dataset will contain polygons with a minimum mapping unit of 25 ha and a minimum feature width of 100 m. The Revised version CLC2066 will be produced and delivered - in case of drastic mistakes. Datasets shall be delivered together with a CLC2012 final report; template to be provided by EEA – **31/01/2014**

**4. Report on "in-situ data"** will describe access listing data access points (e.g. URLs to geo-portals), discover, view and download services, including INSPIRE-compliant metadata as well as summary information on operational status and sustainability – **31/12/2012**.



**5. Dissemination the services:** will be available online according to the INSPIRE guidance for performance of services. The summary report will be on dissemination activities for the national products with details concerning discovery, view and download services shall be included – **31.03/2014**.

**6. Progress reports** (2 summary reports regarding the progress of the action, according to article I.5.2 of Grant Agreement: November 2012 and November 2013).

6.1 **First progress reports** – (November 2012 – March 2013).

6.2 **Second progress reports** – (April – June 2013).

6.3 **Third progress reports** - (July – September 2013).

**7. Interim technical implementation report** (together with interim financial statement, according to Annex V to Grant Agreement). Interim report - after completion of the CLC2006 tasks at the end of October 2013 (containing status of work, problems encountered/solution adopted, financial aspects of work carried out, etc.).

**8. Final technical implementation report** (together with final financial statement, according to Annex V to Grant Agreement) of EEA. Final report - after completion of the verification of the HR layers – no earlier than January 2014 (containing status of work, problems encountered/solution adopted, financial aspects of the work carried out, etc.).

Final data deliverables will be submitted to the Reportnet CDR (Central Data Repository).

### **Proposed delivery plan**

#### ***Pre-term delivery plan***

<b>№</b>	<b>Products and Reports</b>	<b>Pre-term delivery</b>
1	Verification reports of the 5 HR layers	15.02.2013
2	Enhanced HR layers (5 layers)	31.03.2013
3	Corine land cover changes 2006-2012 and Corine land cover 2012 geo-spatial datasets, as defined in the technical guideline	31.12.2013
4	Report on "in-situ data"	31.12.2012
5	Dissemination the services	01.03.2014
6.1	First progress reports	31.12.2012
6.2	Second progress reports	31.03.2013
6.3	Third progress reports	30.06.2013
7	Interim technical implementation report	30.09.2013
8	Final technical implementation report	1.03.2014

## **V. Project organization**

### **Project management**

The Bulgarian Executive Environmental Agency (ExEA – Bulgaria) as NRC will be the responsible National Authority Body for project contracting and implementation.

For the Project control and monitoring a ExEA will be organized. This activities will be organized, coordinated and managed by the as NRC.

It is expected that quarterly progress meetings – accompanied by reports will be organized during the entire life of the project.

The ExEA will be in regular contact with the European CLC2012 Technical Team through the National Focal Point.

The main tasks to be performed will be as:

- Organize the national tender;
- Monitor the national implementation of the project (elaborate the national specifications of the project, ensure the liaison between the National and the CLC – EEA Team, monitor the work of the national team, etc.);
- Carry out overall Project QA/QC;
- Fulfill the regular reporting obligation to the EEA;
- Maintain contacts with the CLC -Theam overall management.

### **Progress meetings**

Progress meetings will be scheduled for later stage.

### **Project implementation**

The national team will carry out the activities envisaged above and will be responsible for:

- The Land Cover interpretation by using the satellite images and CLC change detection;
- Collection of the necessary meta-data to document the different steps and products the project;
- Validation of national CLC2012 and database of changes;
- Data delivery to the EEA (CDR) in WGS84;
- Conduct of the national project, budget, time –table;
- Participation in verification missions, organized and undertaken by the EEA (with Technical Team);
- Performing QC/QA during the different steps of project implementation (with Technical Team);
- Progress reports delivering to the NSC.

### **Available infrastructure**

According to the national legislation a national tender procedure will be launched and National team will by nominated. The previous experience of the member of National team in respect to CLC1990, CLC2000 or/and CLC2006 as well as related with participation in the following projects will be requirement:

- Project “CLC 1990” for Bulgaria (1991 – 1993);
- Project MARS-MERA for Bulgaria (1996 – 1997);
- Project “CLC 2000” for Bulgaria
- Project “CLC 2006” for Bulgaria

- National GIS Projects.

Planned number of photo interpreters will be at least 5, as most of the them were participants in CLC 2000/ CLC 2006 and others similar projects.

The National team will report to the ExEA on the ongoing work, the timetable, the budget spent, the coordination of the different production bodies, data dissemination, the contracting of different tasks, and problems that may occur.

### **QA/QC at national level along projects phases**

The control will be exercised by both the Project leader of the National team and by the National Referent Centre (ExEA - Bulgaria).

The NRC as main part of National Team will also perform QA/QC for at only 5% of all national activities. The results of each review, including recommendations for improvements (if needed), will be documented and including into Progress reports.

### **Staff allocation per task (management, QA/QC, HRL verification, HRL enhancement, CLC production, QA/QC, dissemination, etc.).**

ExEA as a National Project Coordinator will participate directly in the following activities:

- General project management - as the national coordinator;
- Contacts and accountability to the EEA;
- Current and final control over the project;
- Distribution of products and archiving.

ExEA will also participate in the final phase of operations QA / QC - before delivery of the products of the EEA.

Does not provide for payment of a staff by the ExEA.

<b>Staff (ExEA) allocation per task</b>	
<b>Task</b>	<b>Staff allocation</b>
Management	2
QA/QC	
Verification	
HRL enhancement	
CLC production	
QA/QC	1
Dissemination	1

 Subcontractors

Activities to be carried out by the technical team (TT, subcontractor) in the present moment can not be described. The same applies to the staff of the TT.

## **VI. Time schedule**

Planned duration of the action

The project will last 24 months from the date of signing the grant agreement until March 31, 2014.

Detailed per quarter of a year, at least and detailed per task

			Grant Agreement	National Contract	<i>in-situ</i> Report	WT1	WT2	WT3	WT4
2012	1	Q1	31.01.2012						
	2								
	3		01.08.2012	31.08.2012					
	4	Q2		31.08.2012	01.04.2012				
	5								
	6								
	7	Q3							
	8								
	9			30.10.2012					
	10	Q4				01.11.2012	01.11.2013	01.11.2013	
	11								
	12				31.12.2012				
2013	1	Q5				15.02.2013			
	2								
	3						31.03.2013		
	4	Q6							
	5								
	6								
	7	Q7							
	8								
	9								
	10	Q8							
	11								
	12								
2014	1	Q9						31.01.2014	31.03.2014
	2								
	3								01.03.2014
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								

The proposed limits in the table are preliminary and depend on the date of signing the Agreement between the ExEA and winning contest Public Procurement Act, and the dates of final publication of the data required ESA.

**The number of man-days exceeds that of the EEA, but actually they do not exceed the specified limit.** Due to uncertainties over timescales that do not depend on us now.

## VII. In-situ data

In-situ data will be provided and maintained by Bulgaria through ExEA. Potential Bulgarian contribution to pan-European component will be collection and exchange of data; co-ordination activities; accompanying measures for cross-border activities and networks.

The GMES In-situ Component will rely on a large number of facilities, instruments and services, owned and operated at national level in Bulgaria. In-situ infrastructure will provide data for the monitoring of the country surface - forests, water bodies, wetland and biodiversity (Table 1 in Annex 1) and will contribute to the production of the land cover layers via “bottom-up” approach.

## **VIII. Contacts**

### **National competent authority**

#### **ExEA – NRC/NSC**

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- 3) Büttner G, B Kosztra, G. Maucha and R. Pataki, Development of methodology to eliminate contradictions between CLC-Change1990-2000 and CLC-Change2000-2006, EEA/ETC SIA Working document.
- 4) EEA Project Implementation Plan, GMES Land Fast Track Service 2006-2008, 16.11.2006.
- 5) Regulation (EU) No 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth Monitoring Programme (GMES) and its initial operations (2011 to 2013).
- 6) European Commission Decision C(2011)1514 of 9 March 2011, the GMES Work Programme 2011.
- 7) Technical guidance:
  - 7.1) CORINE Land Cover Technical Guide – Addendum 2000, EEA. 2000;
  - 7.2) EEA: I&CLC2000 Technical Guidelines, 2002;
  - 7.3) Büttner, G., Kosztra, B. 2007. CLC2006 Technical Guidelines;
  - 7.4) Büttner, G., Kosztra, B: Manual of CLC Changes (ETC-SIA, 2011);
  - 7.5) Feranec, J., Büttner, G., Jaffrain, G., 2006. CORINE Land Cover nomenclature – Illustrated guide;
  - 7.6) Soukup, T: Guidelines for CLC2006 delivery (same as in CLC2006).

## **ABBREVIATIONS USED:**

CLC – Corine Land Cover

ExEA Bulgaria – Bulgarian Executive Environmental Agency

EEA – European Environment Agency

NC – National contribution

NCoor. – National coordinator

NRC – National Referent Center

NFP – National Focal Point

**NT – Bulgarian National Team**

PCP – Primary Contact Point

PL – Project leader of national Team

TG – Technical Guidelines

**TT - Technical Team (subcontracted/performer)**

WT - Work tasks

WT1 - Verification of the 5 HRLs;

WT2 – Enhancement of the 5 HRLs;

WT3 - Corine land cover changes 2006–2012 and Corine land cover map 2012;

WT4 - Dissemination and archiving