

Part Two

Nomenclature: illustrations

Part two - nomenclature illustrations

Part 1 of this guide should be consulted in order to understand the logic behind the CORINE land cover nomenclature, and the procedures for locating, delineating and identifying land cover units during the satellite image interpretation phase.

Part 2 reflects the structure of the CORINE land cover nomenclature, which provides a conceptual framework for understanding the different types of land cover. For each item of the nomenclature the guide includes a satellite image, delineation of a unit on the image, an example of a document (ancillary or additional documentation) which will help delineate and identify the unit, and a short commentary on the three illustrations. The illustrations used here have been provided by the various national teams taking part in the project. The CORINE land cover central team would like all the teams to send it further examples of land cover in the format used here.

Photointerpretation keys

Photointerpretation keys are a tool with which to describe the appearance of the various categories of land cover on satellite images. These variables enable the photointerpreter to make comparable descriptions of units from the 44 items of the nomenclature and thus facilitate the interpretation work. Each unit appearing on a satellite image can be described using the following variables.

Variables

Variables

Precision of contours: nature of the boundary between two units

Options

Sharp
Blurred
Angular
Regular

Colour/hue: depending on vegetation density, slope, orientation

All colours
Variations:
- Light
- Dark
- Pale
- Variable

Size: indication of the most frequent surface area of units in the category

Small: less than 1 km²
Medium: between 1 and 5 km²
Large: more than 5 km²

Texture: arrangement of different tones on the image. Texture is defined by the configuration of the which are too small to be seen individually. Texture must not be confused with detail. Texture expresses the average size of the constituent elements of the image.

Fine: < 50 m
Medium: 50 to 250 m
Coarse: > 250 m
Smooth
Visible texture

Structure: spatial organization of the constituent element of the image, described solely in terms of their spatial properties.

Homogeneous
Linear

Structure expresses 'breaks' in average pixel values. Cellular

Irregular
Speckled
Spaghetti

Spatial distribution: indication of the geographical distribution of units in the satellite image as a whole

Longitudinal
Dispersed
Regular
Irregular
Sporadic
Erratic
Concentrated
Grouped
Variable

Location: description of the normal physiographic positions of the category within an overall landscape. an urban area

Example: port area near

1. Artificiel surfaces

2. Agricultural areas

3. Forests and semi-natural areas

4. Wetlands

5. Water bodies

1. Artificiel surfaces

1.1. Urban fabric

1.2. Industrial, commercial and transport units

1.3. Mine, dump and construction sites

1.4. Artificial non-agricultural vegetaded areas

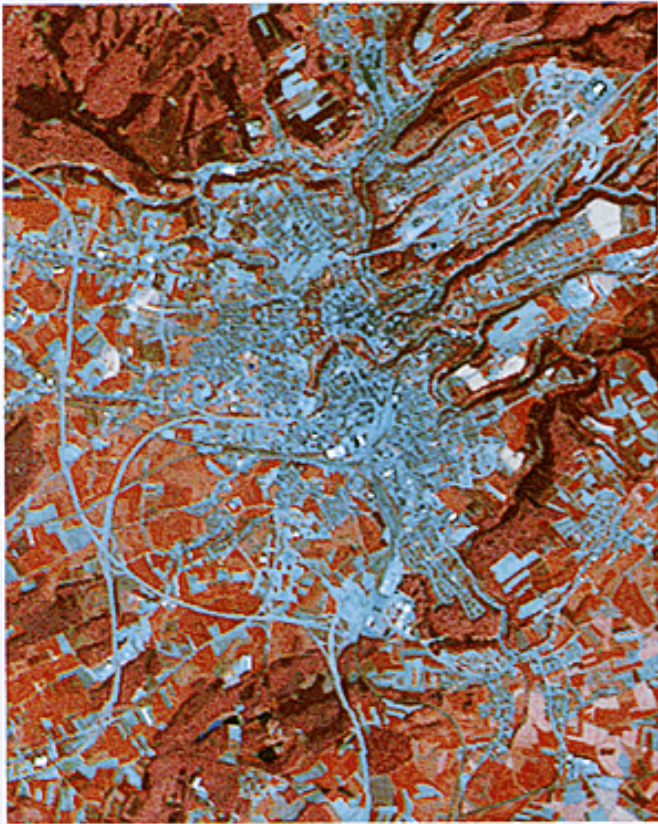
1.1. Urban fabric

1.1.1. Continuous urban fabric

1.1.2. Discontinuous urban fabric

1.1.1. Continuous urban fabric

Most of the land is covered by structures and the transport network. Buildings, roads and artificially surfaced areas cover more than 80% of the total surface. Non-linear areas of vegetation and bare soil are exceptional.



1.1.1. Luxembourg/Area: Luxembourg City
Landsat TM 4.3.2. 1:100 000, August 1989

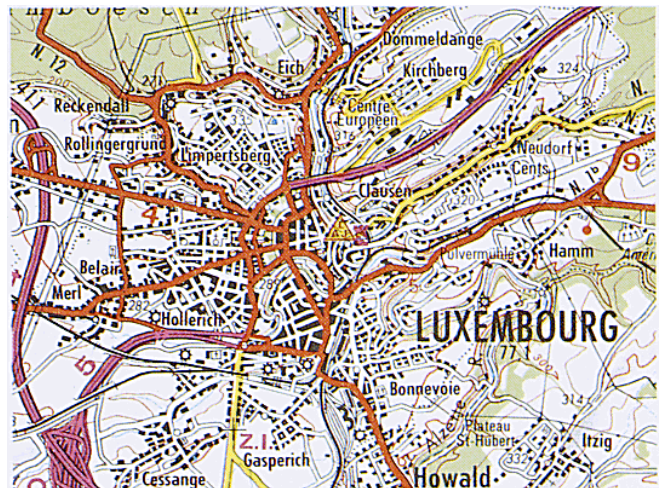
Interpretation

Continuous urban fabric appears blue or a darkish bluegrey on satellite images. Centres of urban districts can easily be identified on satellite images by reference to topographic maps.

In some cases, distinguishing between continuous urban fabric and discontinuous urban fabric can be difficult. The boundary can be set principally by determining the presence and quantity of vegetation.

If an urban district is crossed by a river or road less than 100 m wide, such features are ignored. The area is classified a single unit.

In the case of linear urban construction, even where the constructions situated on either side of the road and the road itself are only 75 m wide, and provided that the total surface area exceeds 25 ha, the area is as continuous urban fabric (or discontinuous urban fabric if the areas are not adjacent).



Topographic and tourist map (scale 1:100 000)

1.1.2. Discontinuous urban fabric

Most of the land is covered by structures. Buildings, roads and artificially surfaced areas are associated with vegetated areas and bare soil, which occupy discontinuous but significant surfaces.



Belgium/Area: Brasschaat
Landsat TM 4.5.3 1:100 000, May 1989

Interpretation

Discontinuous urban fabric comprises residential areas around the edge of urban district centres, and certain urban districts in rural areas.

These units consist of blocks of flats, individual houses, gardens, streets and parks, each of these elements having a surface area of less than 25 ha.

This type of land cover can be distinguished from continuous urban fabric by the presence of non-impermeabilized surfaces: gardens, parks, planted areas and non-surfaced public areas.

Buildings, roads and artificially surfaced areas cover between 50 and 80% of the total surface area of the unit.

The illustration shows the complex delineation of residential areas under tree cover.

This item of the nomenclature does not include scattered agricultural habitation (comprising agricultural building or shelters) or scattered main and secondary residences in natural or agricultural areas.



Aerial photograph, natural colors

1.2. Industrial, commercial and transport units

1.2.1. Industrial or commercial units

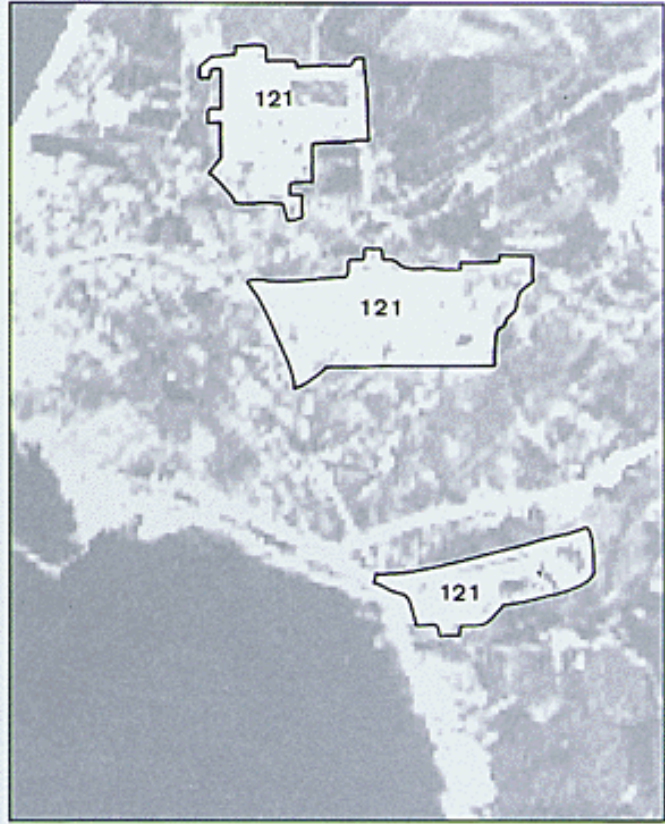
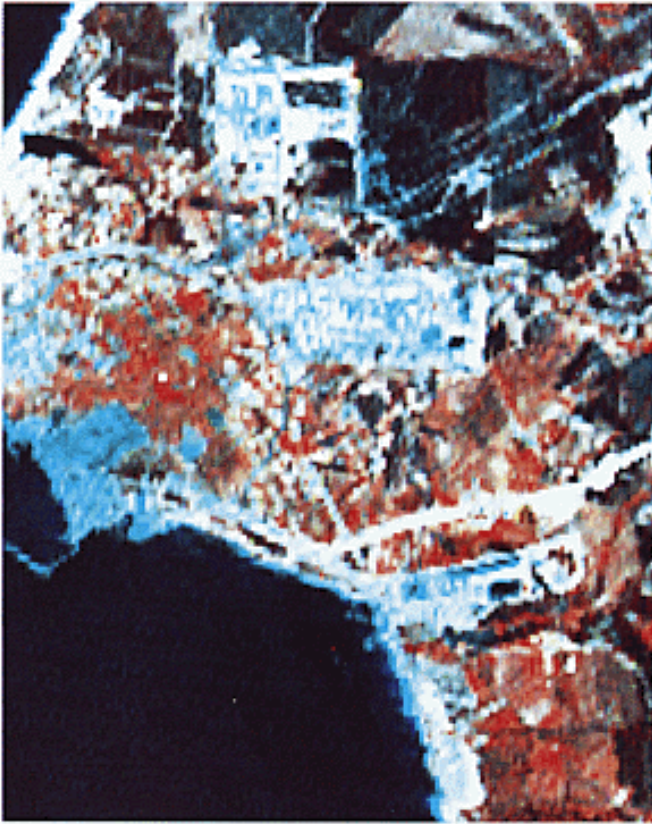
1.2.2. Road and rail networks and associated land

1.2.3. Port areas

1.2.4. Airports

1.2.1. Industrial or commercial units

Artificially surfaced areas (cement, asphalt, tarmacadam, or stabilised, e.g. beaten earth) without vegetation occupy most of the area, which also contains buildings and/or vegetation,



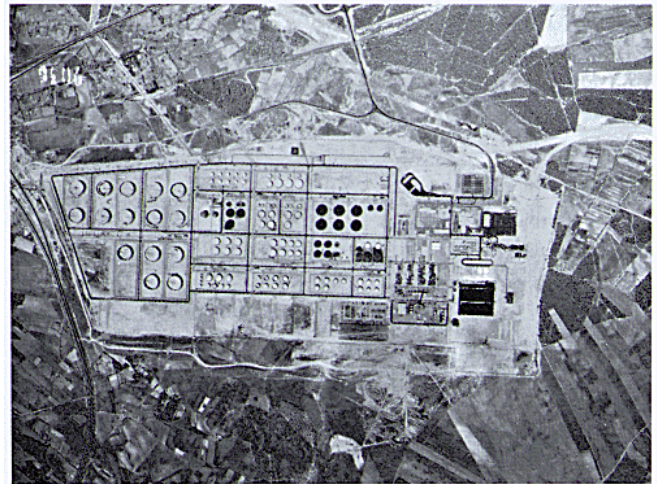
Portugal/Area: Sines
Landsat MSS 7.5.4 1:100 000, August 1985

Interpretation

This category of land cover is identified mainly with the aid of topographic maps or aerial photographs. It is possible to detect and delineate new industrial sites not yet included on topographic maps by comparing their texture and structure with areas of this type which already appear on the maps. Typically, the texture will be heterogeneous (mixture of large buildings, car parks, sheds, etc.). Areas under 1.2.1. represent entire industrial or commercial complexes, including access roads, landscaped areas, car parks, etc. Very large dump sites (> 25 ha) are not included in this category.

Industrial or commercial units located in continuous or discontinuous urban fabric are taken into account only if they are clearly distinguishable from residential areas (industrial complex with a surface area greater than 25 ha with associated spaces: car parks, storage areas, etc.).

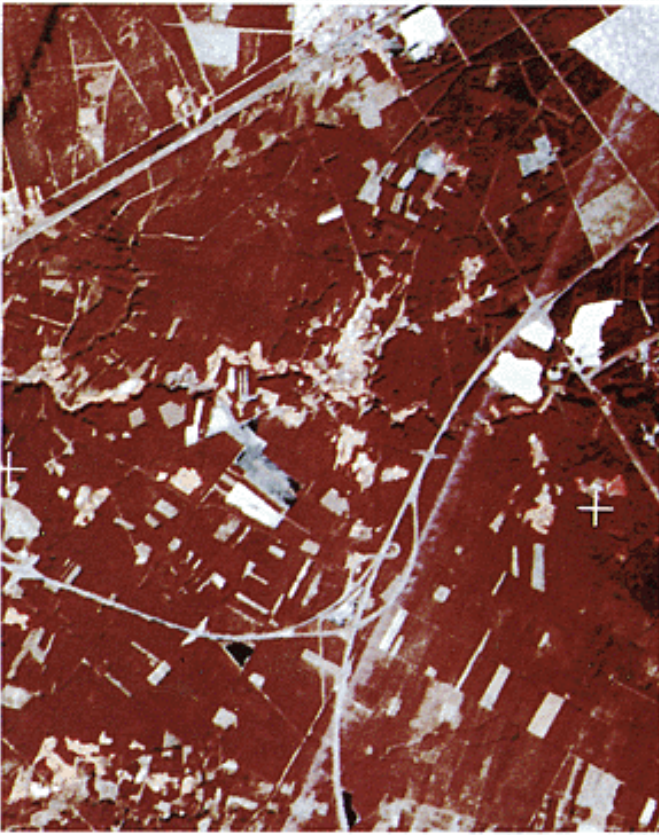
Sanatoriums, spa facilities, hospitals, rest homes, military bases, educational establishments, university sites, commercial centres bordering on or outside urban districts are associated with this category, as are associated surfaces such as car parks, sports grounds, wasteland, etc., with a surface area of less than 25 ha. The category also includes major industrial livestock rearing facilities, waste water treatment plants, cement fish farming ponds. Large greenhouse surfaces are not included under this heading.



Panchromatic aerial photograph

1.2.2. Road and rail networks and associated land

Motorways and railways, including associated installations (stations, platforms, embankments). Minimum width for inclusion: 100 m.



1.2.2. France/Area: Arcachon
SPOT 3.2.1 1:100 000, March 1989

Interpretation

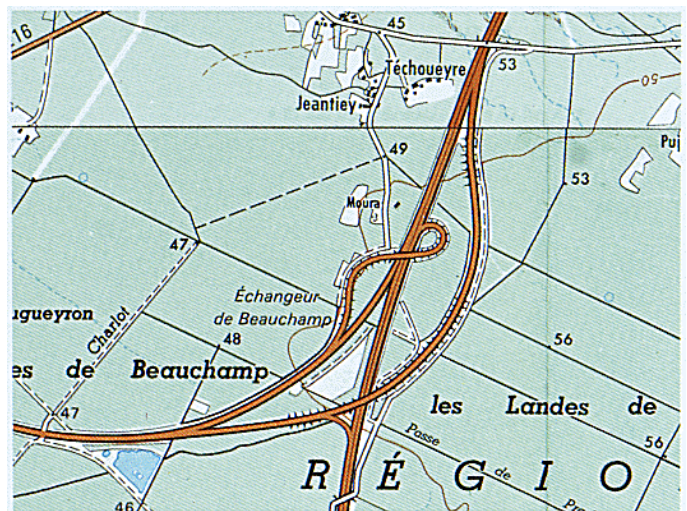
The mapped surface must measure at least 25 ha and have a width of at least 100 m. Most transport infrastructure in Europe is less than 100 m wide.

Category 1.2.2 is composed mainly of large road intersections with associated infrastructure and planted areas, and large marshalling yards.

Aerial photographs provide particularly useful ancillary data here. Networks less than 100 m wide in industrial complexes and urban areas will be classified as 'industrial unit' or 'urban fabric', accordingly.

The aim should always be to trace a continuous line, ignoring breaks caused by the regeneration of vegetation. Account should be taken of any fire breaks along railway tracks.

Very high tension electric lines over low vegetation are not to be taken into account



Topographic (scale 1:50 000)

1.2.3. Port areas

Infrastructure of port areas, including quays, dockyards and marinas.



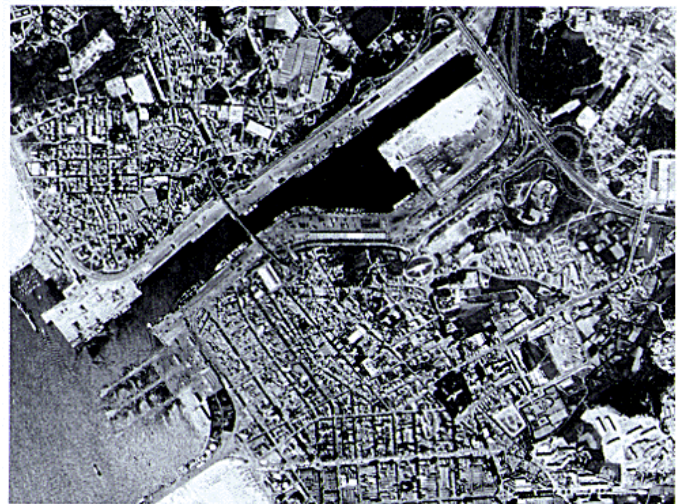
1.2.3. Portugal/Area: Porto
Landsat TM 4.5.3. 1:100 000, July 1987

Interpretation

In delineating heading 1.2.3 account must be taken of the geographical location (proximity of the sea or a waterway). Use of topographic maps and aerial photographs is highly recommended. Port area include port infrastructure in the strict sense (quays, sheds, warehouses). Industrial and commercial units located in immediate proximity should be singled out only if they cover more than 25 ha and are clearly identifiable on the documents used in the project: satellite images, topographic maps, aerial photographs.

Dykes and associated spaces are to be considered only if they measure 100 m or more across. Inland and marine basins are not normally included in the surface area of built-up port areas, though where dykes and built-up port installations (maritime terminal, warehouse quays) are less than 100 m wide and/or occupy less than 25 ha, the surface area of the basins (fresh or salt water) delineated by the dykes is to be included in the calculation of the 25 ha.

Marinas should not be classified under 1.4.2.



Panchromatic aerial photograph

1.2.4. Airports

Airport installations: runways, buildings and associated land.



1.2.4. Great Britain/Area: Bedford
Landsat TM 4.5.3.. 1:100 000

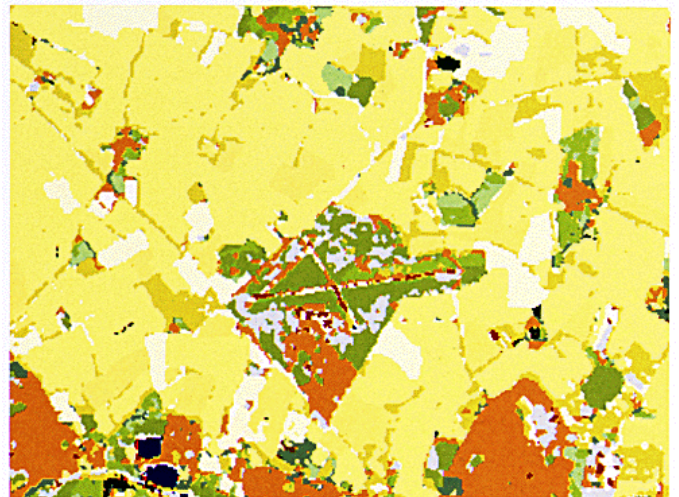
Interpretation

Artificial runways **surrounded by** grassed areas are easily distinguishable on the satellite image.

Buildings (offices, terminal buildings, hangars, workshops, warehouses, storage tanks, car parks), grassed areas and associated spaces are included in the airport surface area. Heliports are also included in this category if they cover at least 25 ha.

Wooded and **agricultural areas** close to airport infrastructure with a surface area greater than 25 ha should be identified, except for a 100 m strip around the visible infrastructure.

In very many cases, airport territory indicated on the ground by a fence or a path will appear on large-scale topographic maps (1:25000 and 1:50000).



Automatic classification

1.3. Mine, dump and construction sites

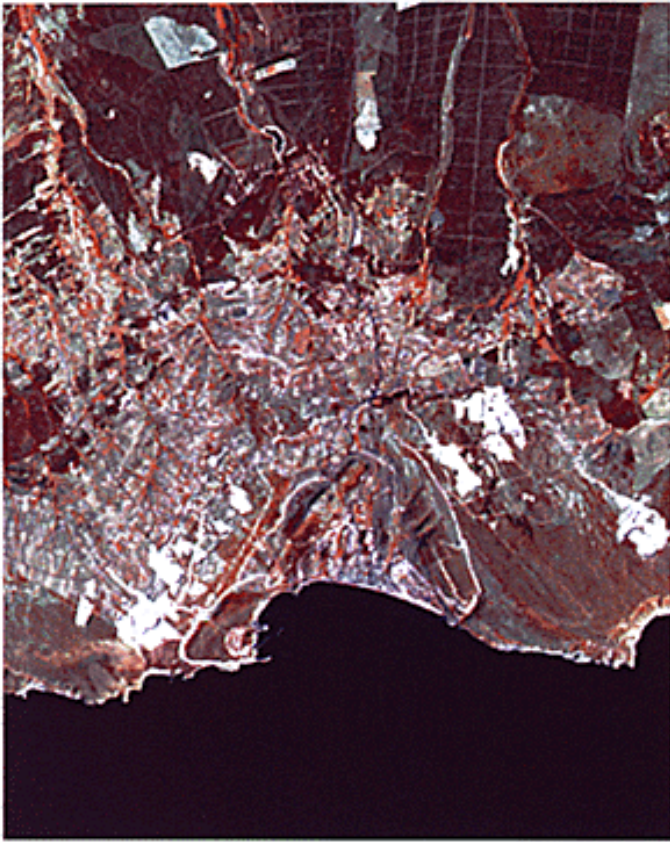
1.3.1 Mineral extraction sites

1.3.2. Dump sites

1.3.3. Construction sites

1.3.1. Mineral extraction sites

Areas with open-pit extraction of construction material (sandpits, quarries) or other minerals (open-cast mines). Includes flooded gravel pits, except for river-bed extraction.



1.3.1. Portugal/Area: Sesimbra
Landsat TM 4.5.3. 1:100 000, August 1985

Interpretation

Quarries are easily recognisable on satellite images (white patches) because they contrast with their surroundings. The same is true for working gravel pits. For open-cast mines, the difference with item 1.3.2 (dump sites) is not always obvious. In such cases, ancillary data will be needed to remove any doubt.

Disused open-cast mines, quarries, sandpits, slate quarries and gravel pits (not filled with water) are included in this category. However, ruins do not come under this heading.

Sites being worked or only recently abandoned, with no trace of vegetation, come under this heading. Where vegetal colonisation is visible, sites are classified under the appropriate vegetal cover category.

This heading includes buildings and associated industrial infrastructure (e.g. cement factories) and small water bodies of less than 25 ha created by mining.



Panchromatic aerial photograph

1.3.2. Dump sites

Public, industrial or mine dump sites.



1.3.2. Luxembourg/Area: Differdange
Landsat TM 4.3.2. 1:100 000, August 1989

Interpretation

Dump sites are very difficult to recognise on satellite images as their spectral signature varies. Only by their structure and their typical round shape can the photointerpreter locate dump sites near large towns and major industrial areas. Colonisation by different types of vegetation can make interpretation even more complex. Examination of aerial photographs and/or a visit to the site will often be necessary.

Dump sites of less than 25 ha located next to manufacturing industries (e.g. sawmills) should be classified under 1.2.1 (industrial and commercial units).



Topographic map (scale 1:20 000)

1.3.3. Construction sites

Spaces under construction development, soil or bedrock excavations, earthworks.



1.3.3. Belgium/Area: Antwerp
Landsat TM 4.5.3. 1:100 000, May 1989

Interpretation

This example shows that construction sites of more than 25 ha are easily identifiable on satellite images. However, confusion is possible with quarries or mineral extraction sites, in which case aerial photographs will remove any doubts.

Construction sites of more than 25 ha in and around urban districts should be singled out from continuous or discontinuous urban fabric. Dams and motorways under construction are included under this heading. However, agricultural land works (soil improvement, drainage, reallocation of land) are not considered to be construction sites.



Topographic map (scale 1:50 000)

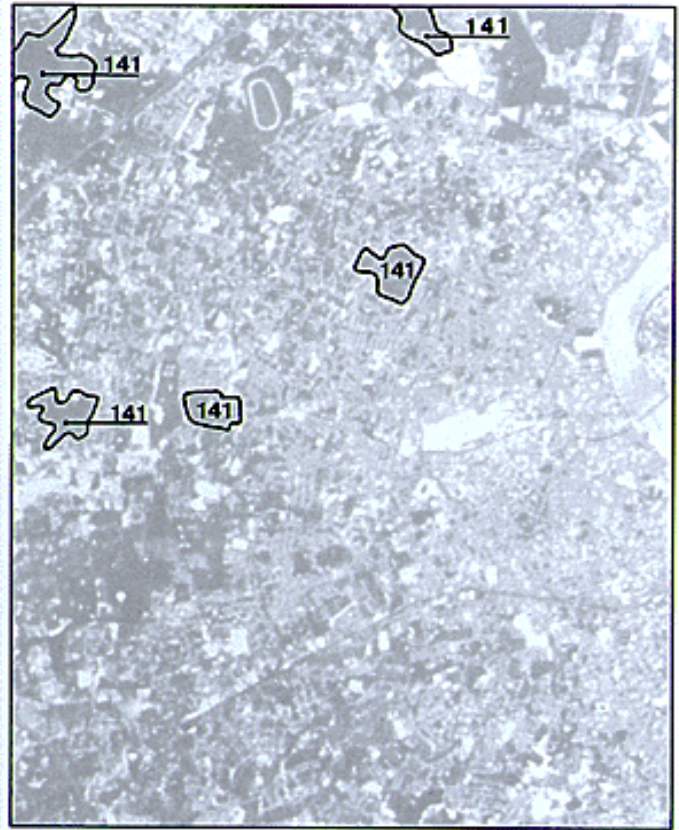
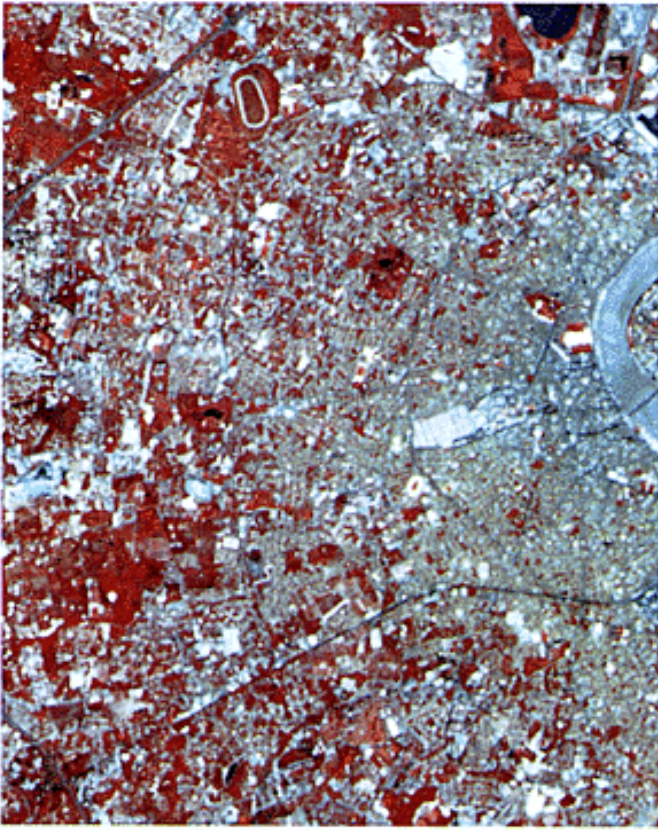
1.4. Artificial non-agricultural vegetated areas

1.4.1. Green urban areas

1.4.2. Sport and leisure facilities

1.4.1. Green urban areas

Areas with vegetation within the urban fabric, including parks, cemeteries with vegetation, and mansions and their ground.



1.4.1. France/Area: Bordeaux
SPOT XS 3.2.1., July 1987

Interpretation

This category covers a wide variety of surfaces : public parks, private green areas, cemeteries with vegetation, covering an area of more than 25 ha. Topographic maps and aerial photographs may be consulted to identify and delineate these surfaces.

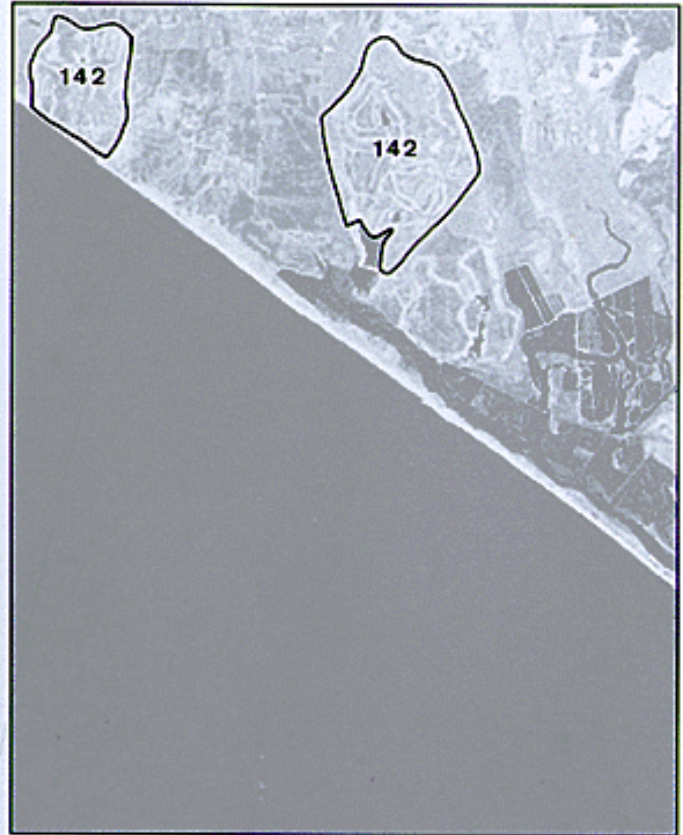
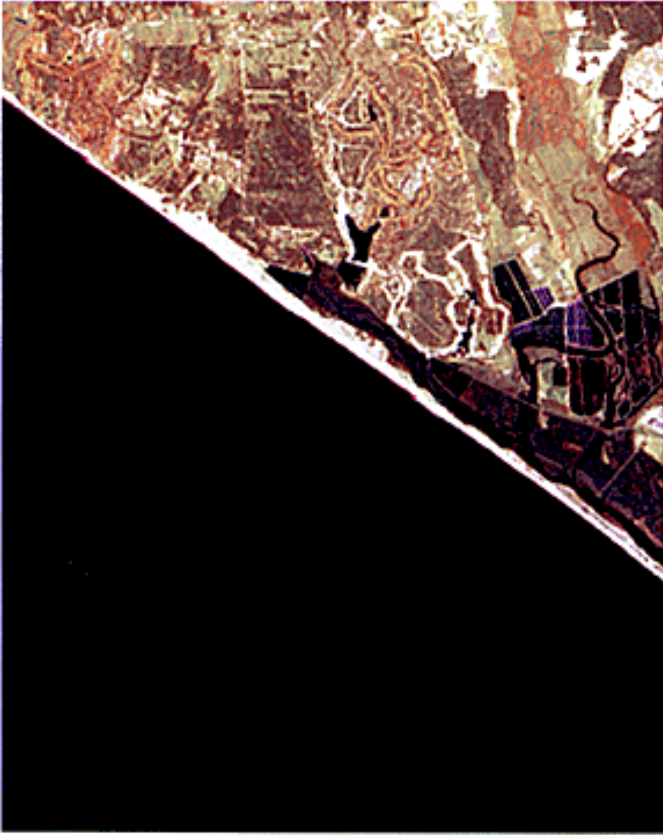
Cemeteries with al little or no vegetation should not be distinguished from headings 1.1.1 and 1.1.2



Topographic map (scale 1:25 000)

1.4.2. Sport and leisure facilities

Camping grounds, sports grounds, leisure parks, golf courses, racecourses, etc. Includes formal parks not surrounded by urban areas.



1.4.2. Portugal/Area: Faro
Landsat TM 4.5.3. 1:100 000, August 1985

Interpretation

The example of a golf course in Portugal shows the typical 'spaghetti' appearance of such areas. The entire surface, including buildings and associated infrastructure, must be included under this item of the nomenclature.

Other features, such as sporting or leisure facilities, are better identified on aerial photographs or by visiting the area. The distinction between this heading and the 'green urban areas' category is not always obvious, so ancillary data must be used.

Holiday villages and buildings in ski resorts should be classed as urban surfaces, though camp-site infrastructures come under 1.4.2. Beaches, ski slopes, school and military sports facilities, hospital grounds (psychiatric and other) and spa facilities do not come under this heading. On the other hand, sports centres, go-kart and motocross terrains, horse-riding centres and formal parks (mansion grounds) not surrounded by urban fabric do come under this heading.



Panchromatic aerial photograph