



DroneWaste

Material annotation guidelines



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Categories

Several materials can be detected from low-altitude UAV images.

For each material included in the **DroneWaste** dataset, we report the associated **European Waste Code** (EWC).

This enables **unique identification** of each annotated material.

Category	EWC code
Rubble	12.61 Soils
Construction/Demolition materials	12.11 Concrete, bricks and gypsum waste
Asphalt milling	12.12 Waste hydrocarbonised road-surfacing material
Excavation materials	12.31 Waste of naturally occurring minerals
Appliances	08.21 Discarded major household equipment
Electronic equipment	08.23 Other discarded electrical and electronic equipment
Furniture	10.11 Household wastes
Metal barrel	06.31 Mixed metallic packaging
Plastic tanks	07.41 Plastic packaging wastes
Wood	07.53 Other wood wastes
Pallets	07.51 Wood packaging
Scrap	06.11 Ferrous metal waste and scrap
Plastic	07.42 Other plastic wastes
Vehicles	08.12 Other discarded vehicles
Tyres	07.31 Used tyres
Paper	07.2 Paper and cardboard wastes
Foundry	12.42 Slags and ashes from thermal treatment and combustion
Asbestos	12.21 Asbestos wastes
Textile	07.6 Textiles wastes
Mixed items	10.2 Mixed and undifferentiated materials

General guidelines

Nested segmentations are accepted

By default, detection algorithms can detect nested objects with different categories. Therefore nested polygons with different categories can be annotated.



Avoid too detailed segmentations

With materials that are typically found in heaps/piles, annotate only the **largest and most recognizable piles** while avoiding all the scattered and fine-grained instances.

OK



OK



NO



Partially obstructed objects

When objects are partially obstructed, it is advisable to annotate **only the visible parts of the objects** and not the whole object as you imagine it would be.

NO



OK



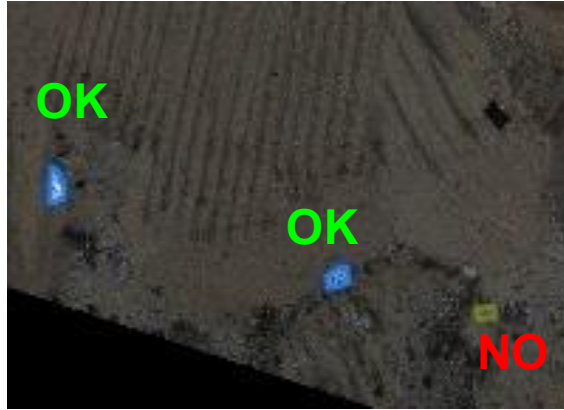
Tight groups of objects

When objects are closely packed together you can annotate them as a single **pile**, like in the case shown below.

However, when there is a significant gap, try to annotate each item as an **individual object**.



Avoid difficult objects (very small, dubious, camouflaged)



Piles of objects

Annotating piles and individual objects (1/4)

When single objects are present in groups or piles:

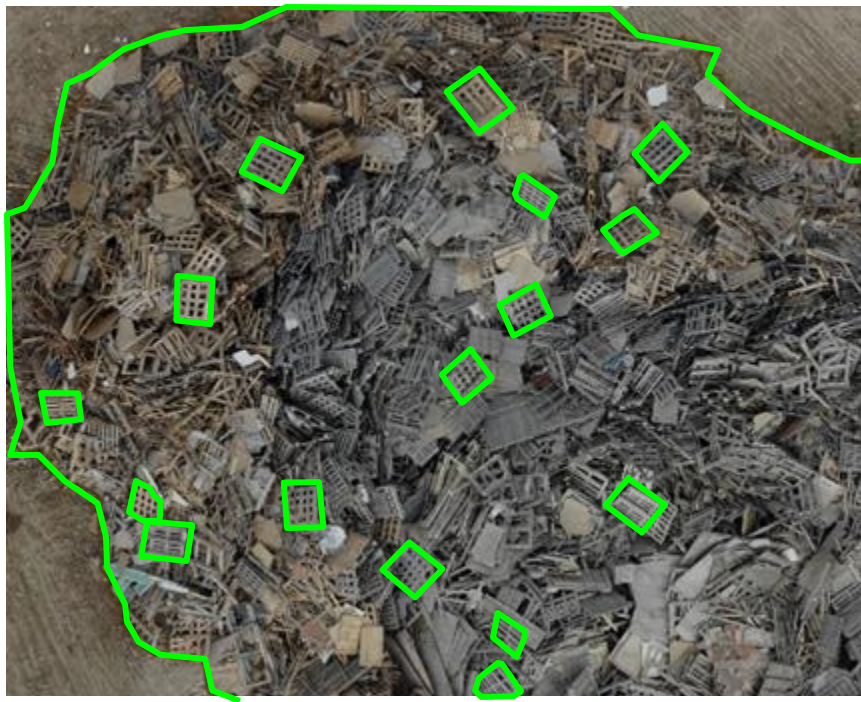
- 1) Create a polygon that **encloses the entire group** and assign the correct category
- 2) Individually annotate **at least some of the contained objects** with a polygon of the correct category (annotate as much as possible **the most visible** individual instances)

Materials that are typically found in groups or piles of objects:

- Tyres
- Pallets
- Metal barrels
- Textiles
- Furniture

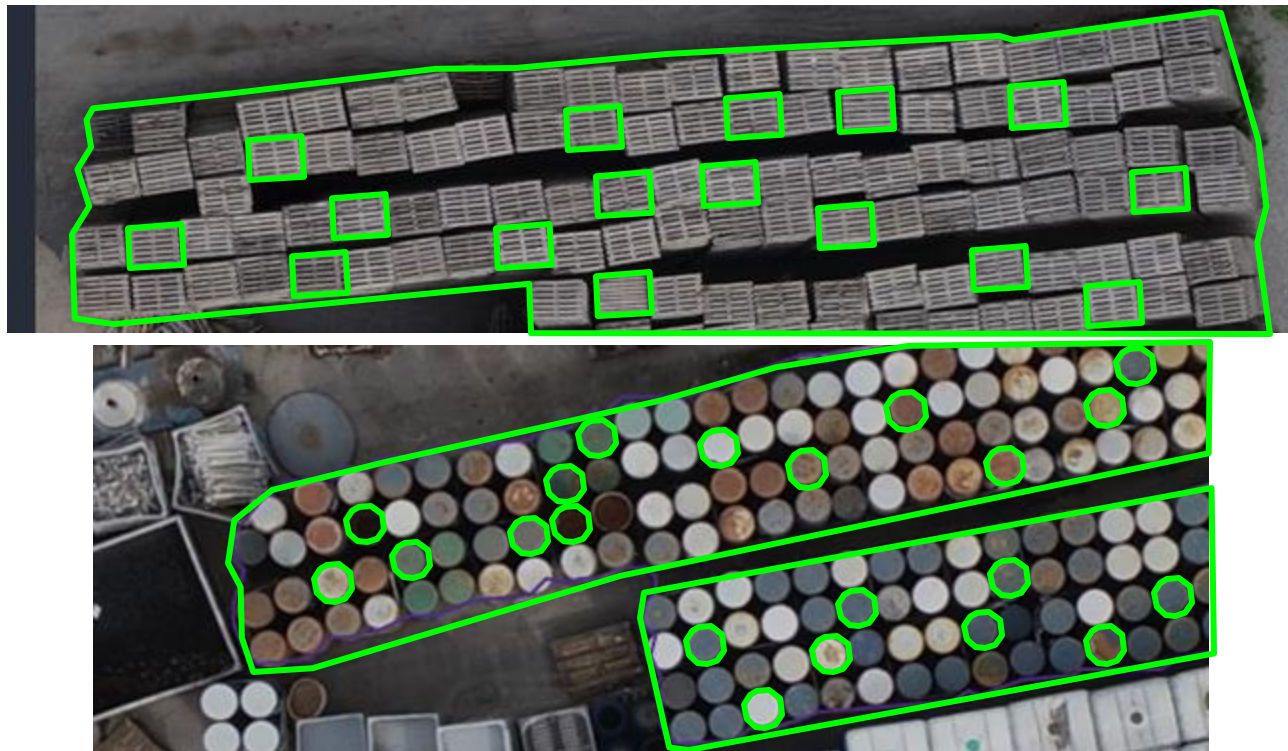
Annotating piles and individual objects (2/4)

Annotate the **entire group/pile** and individually at least **the most visible objects**. There is no need to annotate all instances, but try to annotate as many as possible.



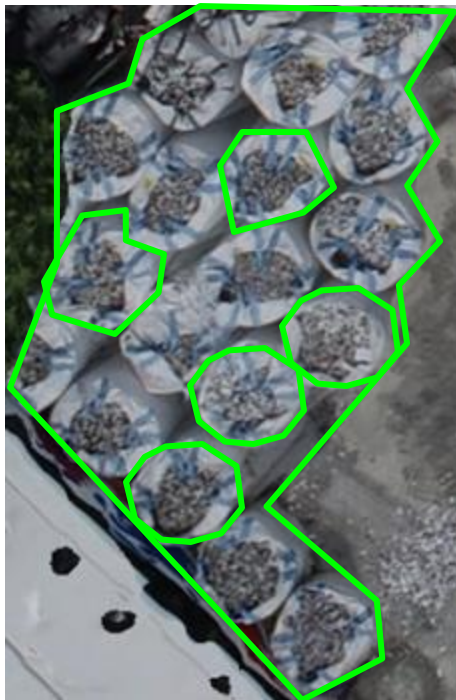
Annotating piles and individual objects (3/4)

Annotate the **entire group/pile** and individually at least **the most visible objects**. There is no need to annotate all instances, but try to annotate as many as possible.



Annotating piles and individual objects (4/4)

Annotate the **entire group/pile** and individually at least **the most visible objects**. There is no need to annotate all instances, but try to annotate as many as possible.



Material categories

Plastic packaging wastes (*bags, cloths, sheets*)

We only consider plastic bags and large plastic cloths/sheets as packaging. Bags usually appear as black, blue or white. Plastic cloths/sheets have similar appearance.

Other plastic containers (e.g. tanks, barrels) **should not be** annotated as this category.



Other plastic wastes

Any other generic plastic material that is not a bag or a cloth/sheet. Include in this category also plastic tanks and plastic barrels.

This category can be very **heterogeneous**, including several types of plastic-like material.



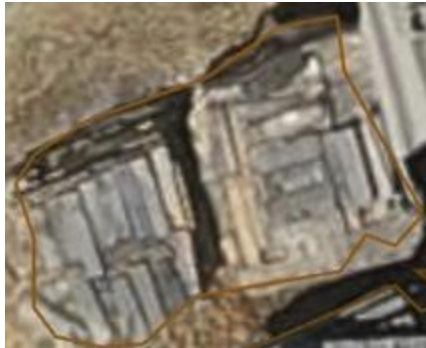
Wood packaging (*Pallets*)

Pallets have a distinguishing pattern with respect to normal wood objects, so we can easily identify it and use it as a different category.



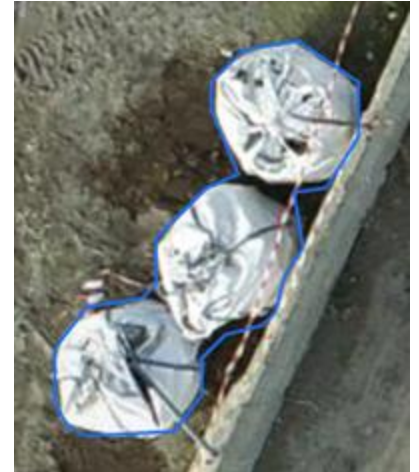
Other wood wastes (*Wood*)

Any other type of wood-like material that is not a pallet. Can be remainings of a wood chipper, part of a construction or even wooden furniture torn apart.



Textiles wastes (*Big bags*)

Bags of textile material that are used to contain other waste. Other objects of textile materials do not belong to this category.



Used tyres

This category refers to car tyres, round objects usually in black. Tyres can often be found in large groups.



Soils (*Rubble*)

Rubble can be easily **confused with patches of terrain**.

Avoid annotating these cases and focus the attention of heaps of rubble that can be easily recognized.



Concrete, bricks and gypsum waste (1/2)

This category includes materials that are used in construction, such as heaps with rocks, large blocks of material.

The distinctive factor with respect to Soils (*Rubble*) is that the **objects are much larger** and distinctive in this case.



Concrete, bricks and gypsum waste (2/2)

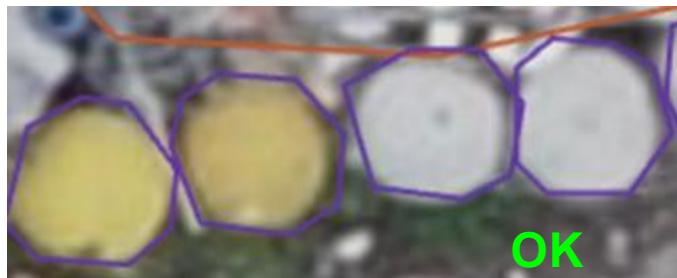
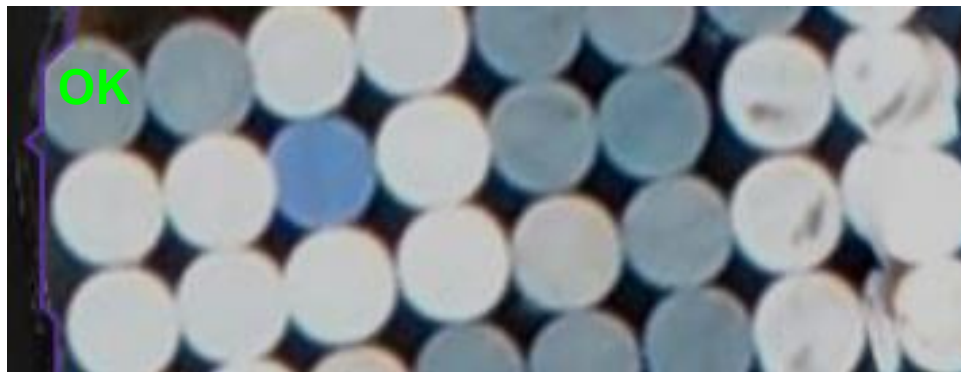
Avoid annotating concrete pipes and beams because it is difficult to discriminate if they are waste or regular allowed objects.



Mixed metallic packaging (*Metal barrel*)

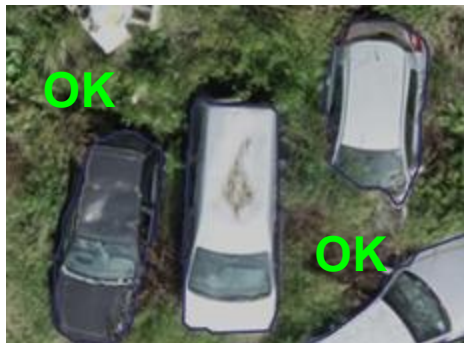
Annotate **only standard metal barrels** (that may contain hazardous liquids).

Do not annotate containers or larger metallic tanks.



Other discarded vehicles

Only damaged, scrapped or unused vehicles should be annotated, therefore if they : (1) are in poor condition or show signs of inactivity; (2) have no way out and therefore accumulated



Ferrous metal waste and scrap

Any item of metallic material that is not a *Mixed metallic packaging* or *Other discarded vehicle*. Parts of vehicles and construction materials made of metals (like pipes or beams) belong to this category. This category is very heterogeneous.



Discarded major household equipment (*Appliances*)

This category encompasses electronic household equipment and appliances that are still intact or at least recognizable.

Some examples are: fridges, ovens, washing machines, microwave ovens, ...



Household wastes (*Furniture*)

This category represents furnitures and other household objects like mattresses and wardrobes that are still intact. If objects (e.g. wardrobes) are torn apart, they should be classified as the materials they are made of (e.g. wood).



Mixed and undifferentiated materials

This category includes piles of multiple materials where it is impossible to properly distinguish single materials or materials that do not belong to any of the previous categories. If specific materials or categories can be identified in the mixed pile, they should be individually annotated.



Any questions?

If you have any doubts or encounter some corner cases, please contact any of the people from POLIMI or CERTH responsible for the DroneWaste dataset.

Thank you for your collaboration!



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