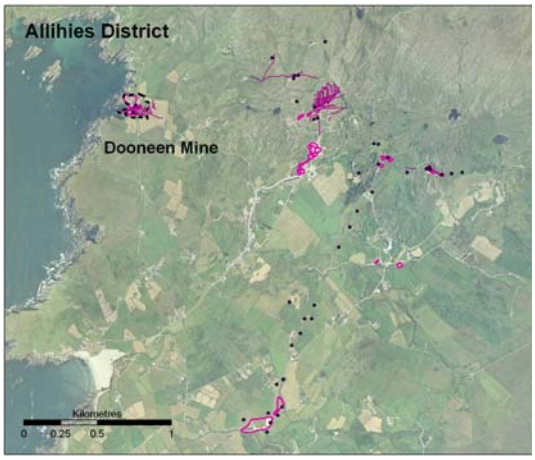
DOONEEN

Background information



Mine District: Allihies

Mine Name: Dooneen

Alternative Names:
Doneen

Elements of interest:
Cu, Sb

Project Prefix: ALL-

County:	**Townland:**	**Grid Reference:**
Cork	Allihies	E57776, N45942

Site Description and Environmental Setting

Copper was first worked at Allihies in 1812 from an east-west-trending 9m-wide quartz vein that juts out into the sea from the cliff face at Dooneen, 1km northwest of the village. Dooneen was succeeded within a few years by the Mountain mine, although production continued until 1838. Three shafts were sunk on the vein to a maximum depth of 90 fathoms or 160m (Cole, 1922). An adit was driven from the cliff face close to sea level. Mine buildings included an engine house and an un-named building whose position and size suggests it may have been a magazine.

The site today (Fig. 1) is located on either side of the coast road that runs north from Allihies to Eyeries. The three shafts are still visible, surrounded by secure 2m+-high chain-link fence (right). As far as can be determined from outside the fences, the shafts have either collapsed or are filled near surface level by rubbish. Low ruined walls and the circular base of the chimney are all that remain of the engine house and the un-named building behind it (left). The grassed-over footprint of a reservoir is clearly visible. A dressing floor extends out towards the cliff face.

A significant amount of spoil is spread around the site, mostly to the west of the road. This has been sub-divided into six solid waste heaps (Fig. 1). Their estimated volumes are relatively modest (Table 1).

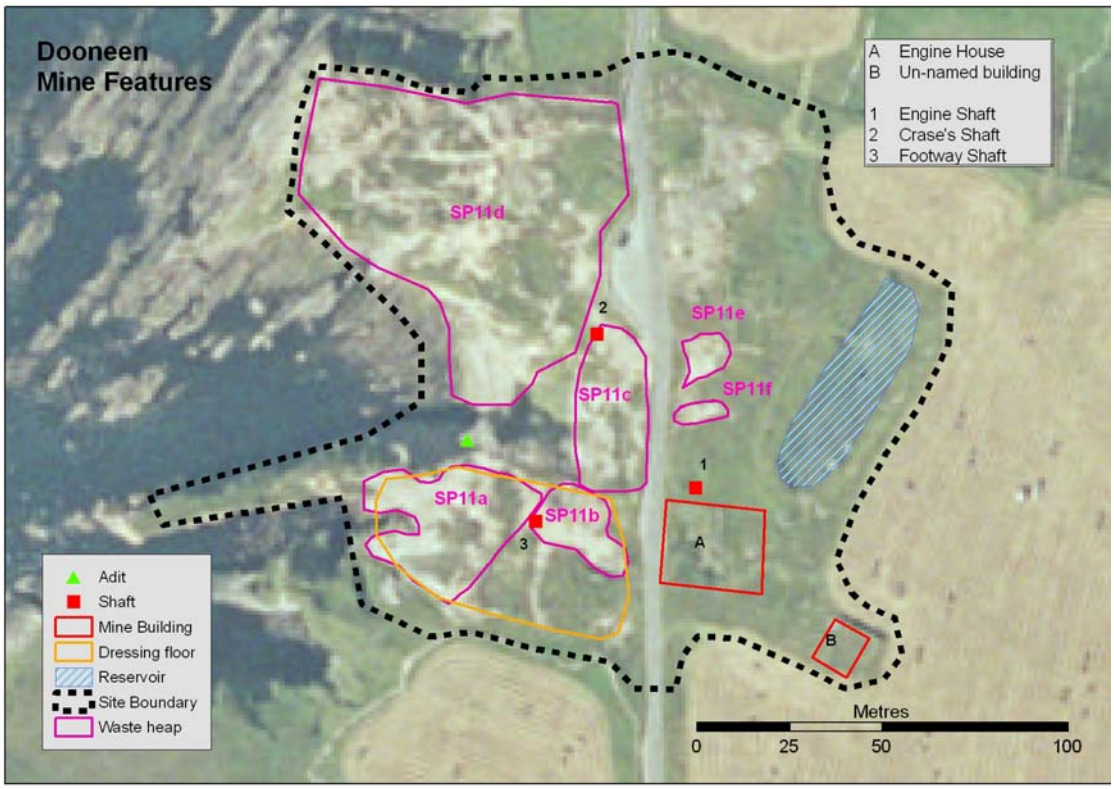


Fig. 1 Dooneen Mine Features

Table 1 Area and Volume of spoil heaps, Dooneen

Waste ID	Area (m^2)	Volume (m^3)
ALL-08-SP011a	1073	805
ALL-08-SP011b	373	186
ALL-08-SP011c	766	1915
ALL-08-SP011d	5048	5048
ALL-08-SP011e	120	12
ALL-08-SP011f	65	32

Geochemical Assessment

1. Surface Water

No surface water sampling was carried out at Dooneen. None of the shafts discharges water and no streams cross the site. The adit opens on to the beach but was not examined during the project owing to difficulty of access.

2. Groundwater

No groundwater sources are available for sampling at Dooneen and no leachate sampling was carried out on spoil samples from the site.

3. Stream Sediments

There are no streams in the vicinity of the site so no stream sediments were collected at Dooneen

4. Solid Waste

In Fig. 2, Cu concentrations for eight samples analysed at Dooneen are classified by reference to all data for the Allihies District. The field XRF analyses suggest that metal concentrations in solid waste are generally lower at Dooneen than elsewhere in the district, with the exception of Sb. The median values for Cu is particularly low (Table 1). The highest value recorded for Cu was 8145 mg/kg. The median value of Sb, 123 mg/kg, is significantly higher than that recorded for Mountain mine (75 mg/kg) or the district as a whole (74 mg/kg).

Table 2 Summary statistics, solid waste geochemistry, Dooneen

mg/kg	Cu	Pb	Sb	Zn
n	8	8	8	8
Minimum	0.0	0.0	0.0	0.0
Maximum	8145	142	705	0.0
Mean	1845	39	191	0.0
Median	594	28	123	0.0
Median (all Allihies)	2588	33	74	0.0

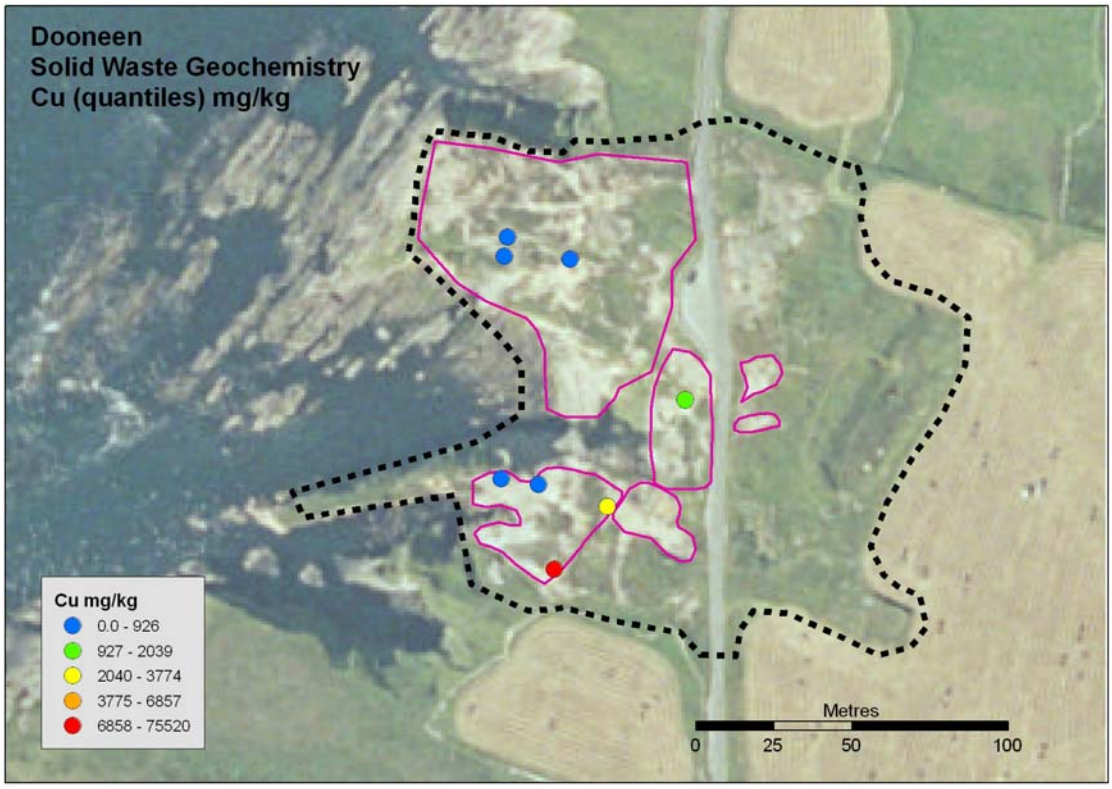


Fig. 2 Dooneen: Solid Waste XRF Geochemistry: Cu

5. HMS-IRC Site Score

Table 3 HMS-IRC Site Score, Dooneen

Waste	SP11	Total
1. Hazard Score	11	11
2. Pathway Score		
Groundwater	1.24	1.24
Surface Water	0.07	0.07
Air	0.0	0.0
Direct Contact	0.02	0.02
Direct Contact (livestock)	-	-
3. Site Score	**1**	**1**

The total HMS-IRC Site Score for Dooneen is 1, contributed by the six solid waste heaps (Fig. 1; Table 3). For the purpose of scoring, the individual scores for each heap have been combined into one overall score, since the individual scores are very low. As indicated above, the measured concentrations of Cu and other potential contaminants in solid waste at Dooneen are among the lowest in the district, with the exception of Sb. However, the absolute concentration of Sb in solid waste at Dooneen is still very low and makes little difference to the site score. The total site score is very low despite a calculated volume of spoil that is higher than that recorded on most other sites in the district. The total solid waste volume at Dooneen (Table 1) is estimated to be 7,998 m^3. At Coom (Site Score = 4) it is 2,559 m^3, at Caminches Stamps (Site Score = 10) it is 1,146 m^3. The very low score at Dooneen reflects the chemistry of the waste as well as its location on the cliff edge which limits its potential to contaminate surface water courses and groundwater.

In contrast to the situation for the Allihies District as a whole, but similar to that for Coom, the groundwater pathway (93%) is by far the greatest contributor to the site score at Dooneen (Fig. 3). The surface water pathway is a relatively minor contributor (5%). The relatively low contribution of the surface water pathway reflects the absence of any surface water courses in the area. Although the relative contribution from the groundwater pathway is high, nevertheless its absolute score (1.24) is very low given the volume of the solid waste on the site. There are no important aquifers in the area. Moreover, as the site is at the cliff edge, the potential for any contamination of groundwater is remote. The negligible contribution of the Direct Contact 1.8%) and Air (0.1%) pathways follows from the low concentration in solid waste of elements with high relative toxicity.

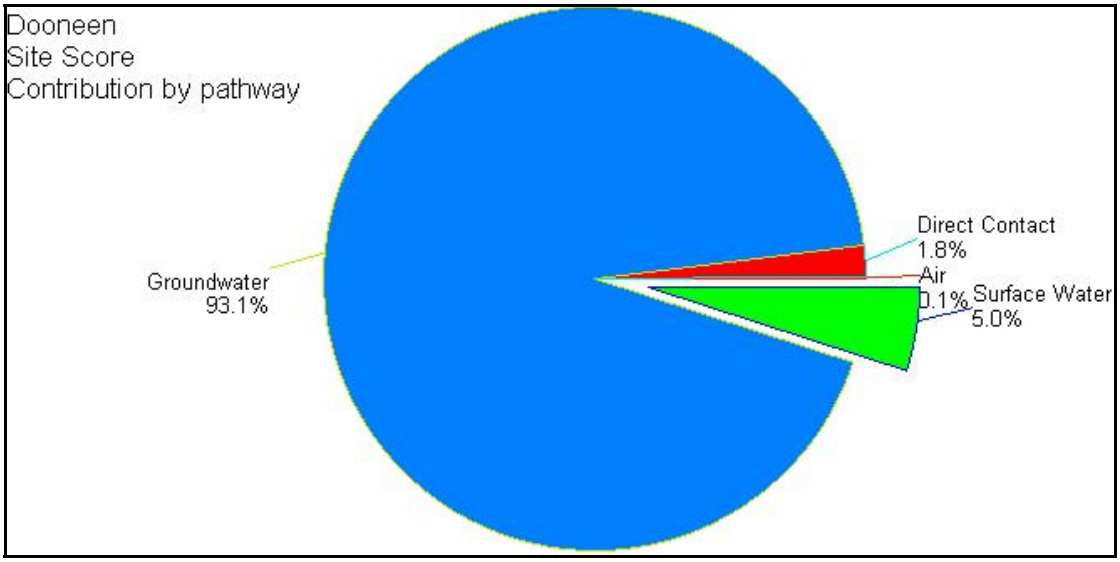


Fig. 3 HMS-IRC Site Score, Dooneen: contribution by pathway

6. Geochemical overview and conclusions

Limited field XRF analysis suggests the solid waste has lower metal concentrations at Dooneen than elsewhere in the Allihies district, with the exception of Sb. Only Cu is present in solid waste in significant concentrations but the levels are well below those recorded at Mountain mine. In the case of Sb, absolute values are difficult to judge from field XRF analyses because of the tendency for XRF analyses to exaggerate Sb concentrations but they are not especially high in the context of Irish mine sites examined for this study. For example, recorded median Sb for Caim mine is 387 mg/kg. Nevertheless, Sb concentrations at Dooneen do appear to exceed those found elsewhere in the Allihies district. Again, as elsewhere in the district, the absence of high concentrations of elements of high relative toxicity is the main reason for the very low site score. The location of the site on a cliff edge also contributes to this.