DUBLIN CITY - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE:	Guinness Wells
IGH THEME:	IGH 16 Hydrogeology
TOWNLAND(S): NEAREST TOWN/VILLAGE:	In Dublin City
SIX INCH MAP NUMBER:	18 712870E 724130N
1:50,000 O.S. SHEET NUMBER:	50 GSI BEDROCK 1:100,000 SHEET NO: 16

Outline Site Description

The Guinness Brewery has always depended upon the availability of water. It requires water for the product and the processes in making beer. Water was also required for transport of raw materials to the brewery, and distribution of product within Ireland and for export overseas. There were several historic sources of water near the site; the River Liffey, the River Camac and the City Basins fed by water from the Grand Canal. However, Guinness' realised that river and canal water quality was variable. They made significant efforts to obtain a high quality water supply from the groundwater system below their site. They started in the 19th Century digging wells and drilling boreholes. There were at least eight historic wells and boreholes on the site. One borehole was a major feat of Victorian technology. Over several years they excavated a borehole down to 1,531.5 feet below Ordnance Datum (Poolbeg) about 85 metres north of Market Street. This is probably still the deepest water supply borehole constructed in the country. Even with this great depth, the yield of water from the Calp Limestone was relatively small. It is reported that they obtained a yield of 1000 gallons per hour. Guinness' dug and bored several wells into the coarse permeable gravels associated with the modern and palaeo channels of the River Liffey. One of these composite wells in the northern part of the site has recently been brought back into use. It is called the Cooperage Well. It currently provides a yield of 22,000 gallons per hour or 100 cubic metres per hour.

Geological System/Age and Primary Rock Type

Both boreholes are historical, dug into and through deposits of the former River Liffey Channel and into underlying Lower Carboniferous 'Calp' Limestone bedrock.

Main Geological or Geomorphological Interest

The Cooperage well is of an historic construction and has been reused to supply high volumes of water for processing needs, rather than for brewing needs. The large sustainable volume of water that can be pumped from the structure show that it is taking water from the gravels in the channel of the former River Liffey, rather than from bedrock.

The deep bedrock borehole has not yet been located, other than knowing that it was in the southern part of the site, north of Market Street, and north of the current Guinness Storehouse visitor centre. An ornate inscribed and hand-painted borehole construction log was seen in 1988. The drawing showed that this borehole was a significant technical achievement, involving geologists, engineers and drillers. Cross-section sketches from 1971 provided by Guinness show the well depth as 1,531.5 feet below Ordnance Datum. It is estimated that the groundlevel at the site was about 70 feet above Ordnance Datum, and therefore the borehole was over 1,600 feet deep. It went down through about 125 feet of the overburden deposits of gravels and boulder clays from glacial and postglacial times, into the Calp limestone bedrock. It is impoprtant because it was one of the earliest boreholes drilled in Ireland. It is also a reminder even in modern times that the yield from a borehole is not a function of depth. Water does not flow through the rock itself but flows through the open cracks or fractures in the impermeable rock. The deep Guinness borehole had a low yield

because it did not encounter many open breaks in the rock. The Cooperage well has a high yield of water because it draws water from the numerous open pore spaces in the loose coarse gravels deposits in the Liffey valley.

Site Importance: County Geological Site; recommended for Geological NHA

For both historical, technical and cultural importance the site is worthy of recognition as a County Geological Site, and may be recommended as a geological NHA in the future.

Management/promotion issues

Access is not possible without the exceptional assistance of Guinness staff responsible for the site. Promotion, other than information within literature and web resources, is not viable.



The access to the Cooperage Well in the Guinness Brewery.



The top of the Cooperage Well in the Guinness Brewery. There were four pumps taking water from the borehole. The right angle cast iron bends on the rising mains for two electric submersible pumps are seen on the right, and the two dark holes were the position of the two removed pump rising mains.

History of Construction Of Cooperage Well



The Cooperage Well was most probably constructed in three stages, as follows:

• 1880 - 3.1 m diameter well to 17.1 metres, inner and outer cast-iron caissons - narrower inner caisson below grating at approximately 3 metres (shown in red in drawing opposite).

• 1902 – 292 mm diameter tube was driven down below the dug well and proved increased supply available from the deeper strata (not shown); and

• 1903 - 762 mm diameter tube to 35.36 m and 660mm diameter bored well below to 56.99 metres below the former Cooperage yard floor level (this level is unknown and is not equivalent to the current Export Warehouse floor level).

Well data Total depth Bedrock depth Gravels Depth

approximately 57m approximately 24m approximately 10m



