Sub no 8

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10th. February, 2002

The Environmental Protection Agency,
Johnstown Castle Estate,
Co. Wexford.

Ref: 167 - 1

Dear Sir,

I wish to object to the granting of a waste licence for a proposed Waste Management Facility and Municipal Incinerator at Carranstown, Duleek, Co. Meath, (application lodged with E.P.A. - incomplete - 5th. December, 20010

The grounds for my objection are as follows:

The site in questionat Carranstown, Duleek, is totally unsuitable for a waste management and incinerator site. E.I.S. 2.2 page 3 of "Wilson Associates Architects Site Context" The Landscape character of this part of Co. Meath is essentially rural and agricultural. Topographically the site is on the perimiter of the Boyne River Plain..... Bellewstown Ridge 3Km to the South is the nearest high ground with a max. elevation of 160M OD (Malin Head) . Red Mountain which is approx. 2 Km North East of the site has an elevation of 100M OD (Malin Head). Both of these are protected views. The proposed development will be situated in a landscape area of visual quality VQ11 Rural and Agricultural " as defined in the Meath Co. Co. Development Plan 2000"

Section 2.1 "A number of one-off houses are located in the vicinity of the site" It does not say how many, but there are a number, and a school "Mount Hanover N.S. which is not shown on most of the site maps. The Town of Drogheda Pop. 26,000 (with a planned pop. of 70,000) lies in the path of the prevailing South West wind, which will blow the pollution from the emmissions towards the town and its environs. Duleek is about 2 Km from the site and Donore is even nearer. This North East area has the highest Asthma rate in the whole country, not to mention frighteningly high cancer rates as a new report states. According to the Indaver E.I.S. Site selection criteria (2.10.1) & table 2.4. W.H.O. Site selection criteria, the site should be immediately rejected.

Step 1. ELIMINATE UNSATISFACTORY AREAS

e.g. <u>areas with Limestone deposits</u>. E.I.S. 2.4.1 Bedrock Geology (K.T. Cullen& Co. Ltd.) " The site is located in a relatively narrow expanse of Carboniferous Limestone"

<u>areas critical for aquifer recharge</u> E.I.S. 2.4.3 page 4 K.T. Cullen & Co.Ltd. report "The regional Limestone bedrock constitutes a regionally important aquifer which displays both KARST and fracture flow features..... currently the limestone aquifer in the vicinity of the site is used by a large number of ground water abstractors..... Irish Cement Ltd., located to the North West of the development site is currently de-watering the groundwater for their quarrying activities. It is estimated that the groundwater level in the limestone aquifer has been lowered by 5.0m to 9.0m below its normal level in the vicinity of the site, and will remain lowered until the extraction of rock is discontinued. This dewatering has altered the natural groundwater flow within the bedrock aquifer, which currently flows towards the Platin abstraction zone. The till overburden.... Potential localised contaminant migration, E.I.S. 6.2 page 13 (K.T. Cullen) report, "according to the G.S.I. the bedrock Aquifer is classified as regionally importantAquifer Rf/M"

<u>AREAS OF HIGH WELL YIELD</u>

There are numerous private wells in the area.

AREAS OF RESERVOIR WATERSHED *See K.T.Cullen, &Co/ Ltd., report.*

LANDS DESIGNATED FOR PRESERVATION *The site is close to the Duleek Commons, a fen area, which is now a N.H.A. since Ms. Sile De Valera Minister for the Arts, Heritage, Gaeltacht & the Islands gave commencement orders for the Wildlife (Ammendment) Act 2000.*

Step 2. *HIGHLIGHT PROMISING AREAS*

In my opinion the area in question is not a promising area.

ASSESS PROMISING AREAS IN DETAIL *Freshwater wetlands. (To be ruled out I presume.) DULEEK COMMONS N.H.A. fen area is close by the proposed site. Indaver denies this(page 22(c) Document lead sheet)*

AREAS OF SPECIAL SIGNIFICANCE

The proposed sie at Carranstown is on the edge of the Boyne Valley, and close to the World Heritage Site of Newgrange , Knowth , and Dowth. Unfortunately Duchas the Heritage Service did not receive the file in time to assess the visual impact of the 40m high chimney stack on the World Heritage Site at Newgrange, Knowth, and Dowth.

VISUAL CORRIDORS OF SCENIC RIVERS

As mentioned above, Carranstown is situated on the edge of the Boyne Valley and close to the river NANNY (which is also a salmonoid river being placed at risk if this development goes ahead.)

EXISTING DEVELOPED AREA

E.I.S. (6) Industrial Character page 60 (I quote) "The Platin Cement Factory..... and the existing character of the landscape is industrial in character. The suitability of the Platin area for industrial development was confirmed by the decision of the Meath Co. Co. (which was subsequently upheld by an Bord Pleanala) to grant a planning permission for the development of a power plant in the area" Considering section 98 (1) of the E.P.A. Act of 1992 which prohibits a Planning Authority OR An Bord Pleanala from giving any consideration to environmental pollution matters where an I.P.C. licence, (or a waste licence) is being sought,(section 54 waste management Act 1996,) DID Meath Co. Co. have any option? The Meath Co. Co. decision to grant planning permission to Indaver for the Waste Management facility and Incinerator at Carranstown was similarly constrained under the E.P.A. Act of 1992. So the onus is now on the E.P.A. to consider Public Health risks from Incineration and also damage to the Environment. (As a matter of fact, the Bord Pleanala Inspector in the case of the Marathon Power Plant warned that the granting of permission to Marathon *SHOULD NOT* *BE TAKEN AS A PRECEDENT FOR FURTHER DEVELOPMENT IN THE AREA.*

The Cement Factory at Platin is regarded as "site specific" Do Indaver think that more of the same pollution from emmissions would be good for the residents of Meath & Louth? As is evident from the "fallout" of dust on the vegetation in the area, there is an amount of pollution from emissions from existing plants.

step 3. *ASSESS PROMISING AREAS IN DETAIL*

INDUSTRIAL AREAS (?) This area of County Meath was always regarded as a very fertile agricultural area NOT an Industrial area. The fact the C.R.H. built a massive Cement Plant there, (in the days before the freedom of information act, when there was little public knowledge of what large companies proposed to do) does not entitle this area of County Meath to be developed as an Industrial area. As already stated the Cement Plant was "site specific".

Step 4. *EVALUATE AND RANK SITES*

ACCESS TO SEWERS . There is no public sewer in the area, and the soil failed the "T" test . Section 9 of the E.I.S. deals with Surface Water. Existing environment (I quote) "There are NO surface water features such as rivers. lakes, or ponds on the development site" There are drainage ditches and a stream which is mostly dry in Summer, but which sometimes carries "dirty water" as one former resident of the area told me (source unknown) which drains into the Nanny river. Section 9.2 page 124 of the E.I.S. "The river is not a designated Salmonoid river" But the Eastern regional Fisheries Board state " we wish to state that the River Nanny is a valuable salmonoid river with very valuable stocks of Brown and Sea Trout (letter to P.A. 30/1/01)
"The E.I.S. Fig. 3.1 is an aerial photograph of the proposed site. Mount Hanover School is located 1 Km to the South East and is the only (?) sensitive institution in the immediate vicinity of the proposed development" (Page 20 Meath Co. Co. Planning report.)

WHY WAS THE SCHOOL DELIBERATELY OMITTED FROM THE AERIAL PHOTOGRAPH AND ALMOST ALL THE MAPS???

Page 21 of the same report says "The proposed development will lead to demands for locally sourced goods, services and materials" Is this meant as a Joke? Does anyone think that the people will be clamouring for locally sourced milk? Cheese? and Vegetables? with a high Dioxin content??

Didn't the farmers of New Zealand reject incineration of municipal waste because they KNEW that it would only take one photograph of New Zealand sheep grazing in the vicinity of an incinerator, to cause them to lose their markets in the European Union for the products just mentioned.
Page 21 also: 3.3 Air and Climate; sections 4 & 10 of the E.I.S. "The proposed construction activity and the operation..... a number of emissions . Emissions include dust, flue gases, hydrocarbons , dioxins, furans, and metals" "A number of substances will be emitted <u>for which there is no National or E.U. Air Quality Standards.</u> They then go on to say "that measures and technologies will be employed to to attain these standards, and to reduce them to comply with emission standards. This entire section reads like ABSOLUTE RUBBISH to me, but perhaps it is good enough for people who want to build an incinerator???

So what is the solution to our Municipal waste problem? The infrastructure must be put in place quickly to enable the people to RECYCLE any materials that can be recycled such as glass, paper, tins, plastics etc., by providing "BRING CENTRES" in towns and villages countrywide. My nearest centre is NAVAN 17 miles away , otherwise DUNDALK 22 miles away. DROGHEDA, apart from a bottle bank. has NONE! Every house must be encouraged to compost anything that can be composted! And suppliers of goods must take responsibility for surplus packaging. Centres can then be set up to stabilise the residual waste --------- by now hopefully reduced by 50%-------- before landfilling this inert residue. The landfills once the organic fraction has been removed and composted will not be a source of smells and leachate and vermin. They should be located AWAY from centres of population and should have a limited lifespan of say 5 years.

Burning unsorted waste in an incinerator is a waste of limited resources and the E.U. says it will not grant-aid them in the future.

According to the planners' report "The proposal is for thermal treatment of unsorted waste" (page 10). The E.I.S. states (page 84) Emissions from stack 4.4.4 : "Furthermore, unless particular wastes (containing individual heavy metals) are present in the waste stream, individual heavy metals will <u>RARELY</u> be emitted at <u>SIGNIFICANT CONCENTRATIONS"</u>

<u>If individual heavy metals are to be emitted at SIGNIFICANT CONCENTRATIONS on RARE occasions , even when no such individual heavy metals occur in the waste stream,</u> ARE WE TO TAKE IT THAT WHEN SUCH HEAVY METALS <u>ARE</u> PRESENT IN THE WASTE STREAM THAT THE EMISSIONS WILL CONTAIN SIGNIFICANT CONCENTRATIONS OF THESE HEAVY METALS <u>ALL THE TIME???</u>

Also on page 84 " certain Chromium compounds are thought to be human carcinogens. There are no E.U. or Irish limits for ambient Cr. concentrations , nor do the W.H.O. set a guideline value."

DULEEK COMMONS

N.H.A. No. 001578

In the E.I.S. ATTACHMENT 10 Flora & Fauna Survey page 3 , Biosphere Environmental Services state "NO part of the site is covered by a conservation designation -- or a proposed designation, such as a National Heritage Area, NOR IS ADJACENT TO ANY AREA WITH SUCH A DESIGNATION" This is ABSOLUTELY WRONG! The proposed site is adjacent to DULEEK COMMONS , a wetland complex, now a N.H.A. No. 001578 ... An Taisce? Duchas will confirm this!!!

Yours sincerely,

Mary P. Burke

Mary P. Burke, B. Ed.

P.S. Two further points.

1. This area of Platin and Carranstown is very prone to foggy conditions at certain times of the year and in some atmospheric conditions e.g. during a pressure "Inversion". The nearest meteorological station is at Dublin Airport, which shows on average of 50.5 days with fog per anumn. At Platin the fog becomes smog because of the emissions from the Cement Plant. Have the cumulative effects of emissions from three plants, C.R.H., the proposed Incinerator and Marathon Power Plant in foggy conditions been considered if these latter two go ahead?

2. The proposed incinerator would produce tons of hazardous waste fly-ash and bottom ash. The Waste Management Plan of Meath County Council makes no plans for the disposal of this toxic / hazardous ash and neither do Indaver. Is it to be shipped abroad - crating the risk of spillage from trucks on the roads of Ireland?

M. Burke

Attachment 10
Flora & Fauna Survey
(Prepared for Project Management Ltd by Biosphere Env. Services)

1. Introduction

The proposed development site is situated within the townland of Carranstown in County Meath (site grid reference O 064 708). It is approximately 4 km south-west of Drogheda and 2 km north-east of Duleek. The site is approximately 30 acres in area. The entrance to the site is from the R152 regional road, which skirts the eastern boundary of the site. Ribbon housing development occurs along this road. The Navan to Drogheda railway line runs just west and north of the site. A major cement factory occurs c.500 m to the north-east of the site.

The site comprises agricultural land and this is the main landuse in the surrounding areas. The agriculture in the area is generally intensive and of mixed character (mostly pasture and cereals). The soils are good quality agricultural soils and appear well drained. The general area is drained by the River Nanny, which flows through Duleek and enters the sea at Laytown. There are no streams within the site, the nearest watercourse being a small tributary stream of the Nanny c.100 m to the south of the site.

No part of the site is covered by a conservation designation or a proposed designation, such as an Natural Heritage Area, nor is adjacent to any area with such a designation. untrue

The habitats and vegetation types occurring within the site and surrounding areas are described, as are the vertebrate fauna (i.e. mammals, amphibians, reptiles and birds). The likely impacts of the development on the local flora and fauna are discussed and, where necessary, mitigation measures are recommended.

The general format of this report is in accordance with guidelines recommended by the EPA (1995) *Draft Guidelines on the Information to be contained in Environmental Impact Statements*.

2. Survey methodology

The survey was carried out on 11th June 2000. The survey comprised a thorough examination of the entire site. The areas immediately surrounding the site were also examined (though in less detail than the site) in order to put the site in a local context and to determine whether the development would have any impact on these areas.

The survey methodology consisted of systematically walking the site area and recording plant species and vegetation types present. As most of the site comprises intensively managed land, emphasis was placed on the field hedgerow boundaries. Notes were made on bird species present within and around the site. For mammals, the main emphasis was

on search for signs of activity or dwellings. During the survey, particular attention was given to the possible presence of habitats and/or species which are legally protected under Irish or European legislation (*e.g.* the Flora Protection Order 1999; Wildlife Act 1976; EU Habitats Directive; EU Birds Directive).

The standard literature was checked for reference to the site and locality, as were the listings and maps of sites of conservation importance in Co. Meath held by Duchas the Heritage Service.

What about the Commons N.H.A.

2.1 Survey limitations

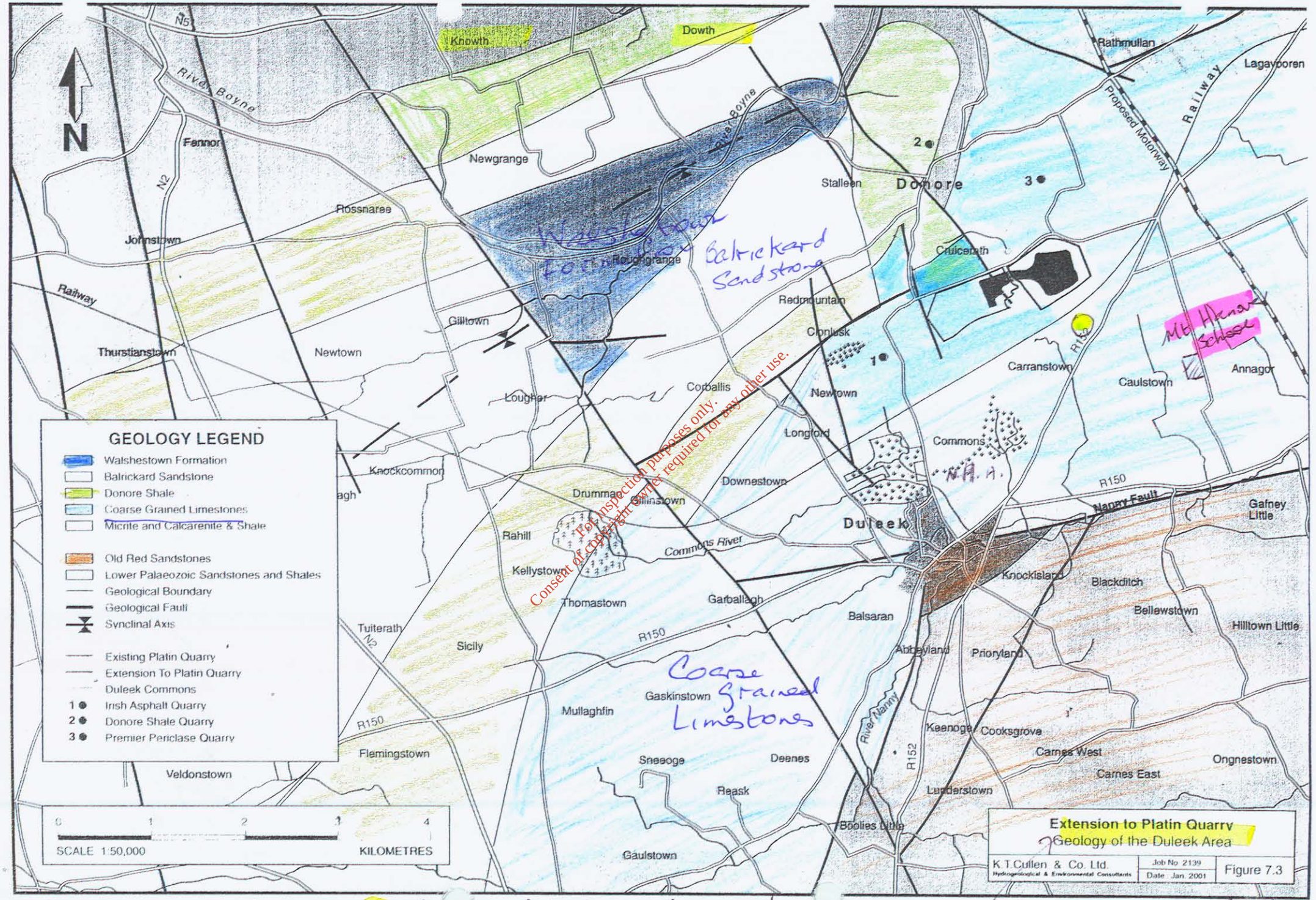
Seasonality is often a constraint in ecological surveying owing to the growing season of plants and the migratory or hibernating behaviour of some animals. The present study was carried out in summer, the optimum period for surveying plants. The timing of the survey is also considered good for surveying mammals and breeding birds. Birds which occur only in winter (winter migrants) would obviously not be present. While this is a survey limitation, it is considered unlikely that any rare or scarce bird species would occur in the survey area during winter owing to the low diversity and intense management of the habitats present. Overall, no significant difficulties were encountered in compiling information on the flora and fauna of the study area.

3. Baseline environment

3.1 Habitats, vegetation and flora

The site comprises three agricultural fields and about two-thirds of a further field (which backs onto the railway line). All of the fields are in grassland, mostly meadow grass which has not been grazed in recent times. Hedgerows and/or treelines form the field boundaries, though most of these have not been well maintained and are not stock proof. Ditches accompany some of the hedgerows. There are no natural or semi-natural habitats, such as woodlands, marshes, streams or rock outcrops, within the site. The main ecological interest at this site lies in the hedgerows.

The vegetation types or habitats which were identified are described below with reference to the accompanying map (Fig. 1). Both English and scientific names are given for plant species (after Scannell & Synnott 1987). For tree species, scientific names are given only after their first mention.



3.2 Vulnerability Categories

Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities.

The vulnerability of groundwater depends on: (i) the time of travel of infiltrating water (and contaminants); (ii) the relative quantity of contaminants that can reach the groundwater; and (iii) the contaminant attenuation capacity of the geological materials through which the water and contaminants infiltrate. As all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area:

(i) the subsoils that overlie the groundwater;

(ii) the type of recharge - whether point or diffuse; and

(iii) the thickness of the unsaturated zone through which the contaminant moves.

In general, little attenuation of contaminants occurs in the bedrock in Ireland because flow is almost wholly via fissures. Consequently, the subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), are the single most important natural feature influencing groundwater vulnerability and groundwater contamination prevention. Groundwater is most at risk where the subsoils are absent or thin and in areas of karstic limestone, where surface streams sink underground at swallow holes.

The geological and hydrogeological characteristics can be examined and mapped, thereby providing a groundwater vulnerability assessment for any area or site. Four groundwater vulnerability categories are used in the scheme - **extreme (E)**, **high (H)**, **moderate (M)** and **low (L)**. The hydrogeological basis for these categories is summarised in Table 1 and further details can be obtained from the GSI. The ratings are based on pragmatic judgements, experience and available technical and scientific information. However, provided the limitations are appreciated, vulnerability assessments are essential when considering the location of potentially polluting activities. As groundwater is considered to be present everywhere in Ireland, the vulnerability concept is applied to the entire land surface. The ranking of vulnerability does not take into consideration the biologically-active soil zone, as contaminants from point sources are usually discharged below this zone, often at depths of at least 1m. However, the groundwater protection responses take account of the point of discharge for each activity.

Vulnerability maps are an important part of groundwater protection schemes and are an essential element in the decision-making on the location of potentially polluting activities. Firstly, the vulnerability rating for an area indicates, and is a measure of, the likelihood of contamination. Secondly, the vulnerability map helps to ensure that a groundwater protection scheme is not unnecessarily restrictive on human economic activity. Thirdly, the vulnerability map helps in the choice of preventative measures and enables developments, which have a significant potential to contaminate, to be located in areas of lower vulnerability.

In summary, the entire land surface is divided into four vulnerability categories - extreme (E), high (H), moderate (M) and low (L) - based on the geological and hydrogeological factors described above. This subdivision is shown on a groundwater vulnerability map. The map shows the vulnerability of the first groundwater encountered (in either sand/gravel aquifers or in bedrock) to contaminants released at depths of 1-2 m below the ground surface. Where contaminants are released at significantly different depths, there will be a need to determine groundwater vulnerability using site-specific data. The characteristics of individual contaminants are not taken into account.

3. Land Surface Zoning for Groundwater Protection

3.1 Information and Mapping Requirements for Land Surface Zoning

The **groundwater resources protection zone map** is a land-use planning map, and therefore is the most useful map for the decision-making process. It is the ultimate or final map as it is obtained by combining the **aquifer** and **vulnerability maps.** The **aquifer map** boundaries, in turn, are based on the **bedrock map** boundaries and the **aquifer categories** are obtained from an assessment of the available **hydrogeological data**. The **vulnerability map** is based on the **subsoils map**, together with an assessment of relevant **hydrogeological data**, in particular indications of permeability and karstification. This is illustrated in Figure 3.

Similarly, the **source protection zone maps** result from combining **vulnerability** and **source protection area maps**. The **source protection areas** are based largely on assessments of **hydrogeological data**. This is illustrated in Figure 4.

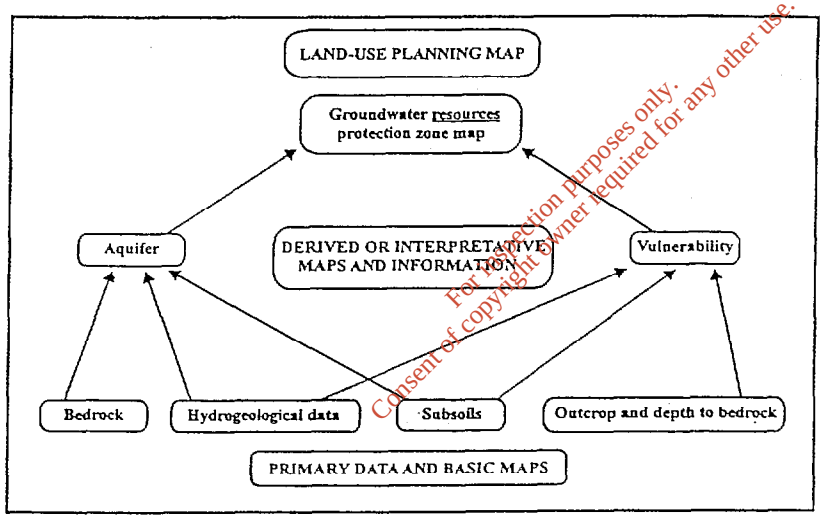


Figure 3. Conceptual framework for production of groundwater resource protection zones, indicating information needs and links

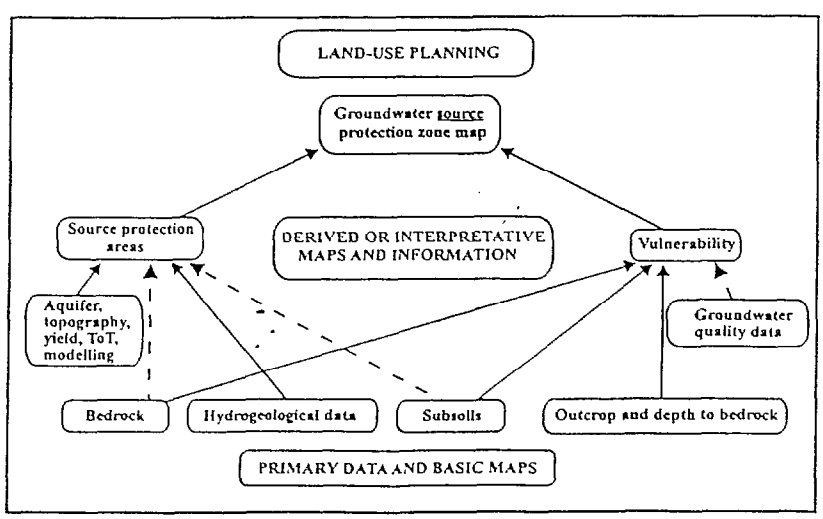


Figure 4. Conceptual framework for production of groundwater source protection zones, indicating information needs and links

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	>3.0m	3.0 - 10.0m	3.0 - 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

Table 1. Vulnerability Mapping Guidelines

3.3 Source Protection Zones

Groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. Consequently, the objective of source protection zones is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source.

There are two main elements to source protection land surface zoning:

- Areas surrounding individual groundwater sources; these are termed source protection areas (SPAs)
- Division of the SPAs on the basis of the vulnerability of the underlying groundwater to contamination.

These elements are integrated to give the source protection zones.

3.3.1 Delineation of Source Protection Areas

Two source protection areas are recommended for delineation:

- Inner Protection Area (SI);
- Outer Protection Area (SO), encompassing the remainder of the source catchment area or ZOC.

In delineating the inner (SI) and outer (SO) protection areas, there are two broad approaches: first, using arbitrary fixed radii, which do not incorporate hydrogeological considerations; and secondly, a scientific approach using hydrogeological information and analysis, in particular the hydrogeological characteristics of the aquifer, the direction of groundwater flow, the pumping rate and the recharge.

Where the hydrogeological information is poor and/or where time and resources are limited, the simple zonation approach using the arbitrary fixed radius method is a good first step that requires little technical expertise. However, it can both over- and under-protect. It usually over-protects on the downgradient side of the source and may under-protect on the upgradient side, particularly in karst areas. It is particularly inappropriate in the case of springs where there is no part of the downgradient side in the ZOC. Also, the lack of a scientific basis reduces its defensibility as a method.

There are several hydrogeological methods for delineating SPAs. They vary in complexity, cost and the level of data and hydrogeological analysis required. Four methods, in order of increasing technical sophistication, are used by the GSI:

(i) calculated fixed radius;

(ii) analytical methods;

(iii) hydrogeological mapping; and

(iv) numerical modelling.

Each method has limitations. Even with relatively good hydrogeological data, the heterogeneity of Irish aquifers will generally prevent the delineation of definitive SPA boundaries. Consequently, the boundaries must be seen as a guide for decision-making, which can be reappraised in the light of new knowledge or changed circumstances.

3.3.1.1 Inner Protection Area (SI)

This area is designed to protect against the effects of human activities that might have an immediate effect on the source and, in particular, against microbial pollution. The area is defined by a 100-day time of travel (TOT) from any point below the water table to the source. (The TOT varies significantly between regulatory agencies in different countries. The 100-day limit is chosen for Ireland as a relatively conservative limit to allow for the heterogeneous nature of Irish aquifers and to reduce the risk of pollution from bacteria and viruses, which in some circumstances can live longer than 50 days in groundwater.) In karst areas, it will not usually be feasible to delineate 100-day TOT boundaries, as there are large variations in permeability, high flow velocities and a low level of predictability. In these areas, the total catchment area of the source will frequently be classed as SI.

If it is necessary to use the arbitrary fixed radius method, a distance of 300m is normally used. A semi-circular area is used for springs. The distance may be increased for sources in karst aquifers and reduced in granular aquifers and around low yielding sources.

3.3.1.2 Outer Protection Area (SO)

This area covers the remainder of the ZOC (or complete catchment area) of the groundwater source. It is defined as the area needed to support an abstraction from long-term groundwater recharge i.e. the proportion of effective rainfall that infiltrates to the water table. The abstraction rate used in delineating the zone will depend on the views and recommendations of the source owner. A factor of safety can be taken into account whereby the maximum daily abstraction rate is increased (typically by 50%) to allow for possible future increases in abstraction and for expansion of the ZOC in dry periods. In order to take account of the heterogeneity of many Irish aquifers and possible errors in estimating the groundwater flow direction, a variation in the flow direction (typically ±10-20°) is frequently included as a safety margin in delineating the ZOC.

A conceptual model of the ZOC and the 100-day TOT boundary is given in Figure 5.

If the arbitrary fixed radius method is used, a distance of 1000m is recommended with, in some instances, variations in karst aquifers and around springs and low-yielding wells.

The boundaries of the SPAs are based on the horizontal flow of water to the source and, in the case particularly of the Inner Protection Area, on the time of travel in the aquifer. Consequently, the vertical movement of a water particle or contaminant from the land surface to the water table is not taken into account. This vertical movement is a critical factor in contaminant attenuation, contaminant flow velocities and in dictating the likelihood of contamination. It can be taken into account by mapping the groundwater vulnerability to contamination.

Locally Important (L) Aquifers

(i) Sand/gravel (Lg)

(ii) Bedrock which is Generally Moderately Productive (Lm)

(iii) Bedrock which is Moderately Productive only in Local Zones (Ll)

Poor (P) Aquifers

(i) Bedrock which is Generally Unproductive except for Local Zones (Pl)

(ii) Bedrock which is Generally Unproductive (Pu)

These aquifer categories are shown on an aquifer map, which can be used not only as an element of a groundwater protection scheme but also for groundwater development purposes.

The matrix in Table 3 below gives the result of integrating the two regional elements of land surface zoning (vulnerability categories and resource protection areas) – a possible total of 24 resource protection zones. In practice this is achieved by superimposing the vulnerability map on the aquifer map. Each zone is represented by a code e.g. [redacted], which represents areas of regionally important fissured aquifers where the groundwater is moderately vulnerable to contamination. In land surface zoning for groundwater protection purposes, regionally important sand/gravel (Rg) and fissured aquifers (Rf) are zoned together, as are locally important sand/gravel (Lg) and bedrock which is moderately productive (Lm). All of the hydrogeological settings represented by the zones may not be present in each local authority area.

VULNERABILITY RATING	RESOURCE PROTECTION ZONES					
	Regionally Important Aquifers (R)		Locally Important Aquifers (L)		Poor Aquifers (P)	
	Rk	Rf/Rg	Lm/Lg	L1	P1	Pu
Extreme (E)	Rk/E	Rf/E	Lm/E	L1/E	P1/E	Pu/E
High (H)	Rk/H	Rf/H	Lm/H	L1/H	P1/H	Pu/H
Moderate (M)	Rk/M	[redacted]	Lm/M	L1/M	P1/M	Pu/M
Low (L)	Rk/L	Rf/L	Lm/L	L1/L	P1/L	Pu/L

Table 3. Matrix of Resource Protection Zones

3.5 Flexibility, Limitations and Uncertainty

The land surface zoning is only as good as the information which is used in its compilation (geological mapping, hydrogeological assessment, etc.) and these are subject to revision as new information is produced. Therefore a scheme must be flexible and allow for regular revision.

Uncertainty is an inherent element in drawing geological boundaries and there is a degree of generalisation because of the map scales used. Therefore the scheme is not intended to give sufficient information for site-specific decisions. Also, where site specific data received by a regulatory body in the future are at variance with the maps, this does not undermine a scheme, but rather provides an opportunity to improve it.

activites, slurry pits or septic tanks. Contamination of this nature is typically associated with some form of agricultural activity.

It should be noted that the levels of contamination are slight, and commonly reflect agricultural works carried out in the vicinity of this site.

6.2 *Site Vulnerability*

Based on visual observations made on site during drilling and soil sampling, the overburden consists of boulder clay and gravels with occasional sand and gravel lenses throughout. Where clay is present, it should act as protection to the underlying bedrock aquifer from surface contaminants.

Based on the thickness and type of overburden cover, the aquifer vulnerability for this site is considered moderate (GSI Guidelines for aquifer protection).

According to the GSI, the bedrock aquifer is classified as regionally important, aquifer, Rf. As the Vulnerability Rating of the overburden is considered moderate, the site is considered to have a Resource Protection Zone Classification of R/M (see Appendix E).

6.3 *Groundwater Abstraction*

Drilling results and a pumptest indicated a high potential for groundwater development at the site (c. 20m³/hour) from a single borehole. It is reasonable to assume this yield could be increased using a well field approach. The raw water sampled from the trial well TW 1 met the Potable Drinking Water MAC Guidelines, with the exception of Nitrate. It should be noted that the Nitrate concentration at MW-4 bedrock monitoring well was below the Potable Water MAC, and Nitrate levels in the general vicinity of this site are generally below the Water MAC.

Due to the indication of minor contamination from agricultural activities in the shallow aquifer, adequate measures should be incorporated in the design of the production well to ensure against the vertical migration of contaminants through the borehole annulus.

6.4 *Future Monitoring*

Additional sampling of the trial well TW-1 should be undertaken in the near future to determine the variation in the concentration of Nitrates in the bedrock aquifer.

To assess any variations in groundwater during the development of the Carranstown Greenfield Site, bi-annual monitoring of certain indicator parameters at all sampling locations is recommended. This analysis should include any parameters, which were observed to exceed the MAC Values discussed previously.

Respectively submitted,

K. T. Cullen & Co. Ltd.

CONOR WALL M.Sc., Dip. EIA Man.

11th July 2000

DATE

TERI HAYES M.Sc., PGeo

11/7/2000

DATE

2.4 General Geology and Hydrogeology

In considering the impact of the proposed development on the geology and groundwater quality, K.T. Cullen & Co. Ltd. have examined the following factors:

- Rock type and permeability
- Overburden type, thickness and, permeability
- Depth to water table
- Importance of groundwater as a resource
- Groundwater vulnerability

Data has been collated from investigations undertaken by this office and from the GSI database for Meath County.

2.4.1 Bedrock Geology

The site is located in a relatively narrow expanse of Carboniferous limestones that outcrops between the Lower Palaeozoic sandstones and shales of the Longford Down Massif to the north and the block of similarly aged meta-sedimentary rocks that extend between Julianstown and Balbriggan to the south (Figure 1). The Platin limestones extend westwards to connect with the Carboniferous rocks that underlie much of Meath. To the east and beyond Drogheda, this narrow band of limestones extends as far as the Irish sea between the Boyne and Nanny estuaries.

The Platin outlier is fault bounded and the limestones at the nearby quarry have a general East North East strike with a shallow (10-20 degree) dip to the northwest. The deposit consists of at least 300metres deep of grainstones, which can be subdivided into some 18 units depending on their composition, grainsize, chert content and colour. The types of grainstones that have been recorded at Platin include crinoidal pepper-type, intra-clastic and skeletal. In general, the limestones are massive with few bedding structures clearly developed.

2.4.2 Overburden Geology

The overburden geology consists predominantly of brown silty clays generically known as boulder clays. These consist of medium dense brown silty clays with pebbles, cobbles and occasional boulders. The boulder clay varies in thickness across the site, ranging from 5.0 metres towards the west of the site, to greater than 20 metres towards the centre. Sand and

gravel lenses are found throughout the boulder clays, and allow some water movement through the otherwise low permeability clay material.

2.4.3 Hydrogeology

The regional limestone bedrock constitutes a regionally important aquifer which displays both karst and fracture flow features. Groundwater within the limestone aquifer flows eastwards and either discharges directly into the Irish Sea or into the Boyne and Nanny River systems as base flow. Based on the groundwater flow direction for the proposed site, the groundwater discharges into the River Nanny by means of local tributaries of the Nanny.

Currently the limestone aquifer in the vicinity of the site is used by a large number of groundwater abstractors. Figure 2 shows the location of these abstraction points. This information was obtained from the Environmental Impact Statement entitled "Proposal for the Development of Limestone Quarry" dated 1997 and produced by Brady Shipman Martin.

Irish Cement Ltd., located to the north west of the development site, is currently de-watering the groundwater for their quarrying activities. It is estimated that the groundwater level in the limestone aquifer has been lowered by 5.0 to 9.0 metres below its normal level in the vicinity of this site, and will remain lowered until the extraction of rock discontinues. This dewatering has altered the natural groundwater flow within the bedrock aquifer, which currently flows towards the Platin abstraction zone.

The till overburden on site contains groundwater, however this has moderate to low permeability thus holding little or no potential for groundwater development. The overburden water does represent a pathway for potential localised contaminant migration.

3 FIELD ACTIVITIES

Field activities for the purpose of this hydrogeological investigation were undertaken in May 2000 and consisted of the following stages:

- Soil Sampling
- Monitoring Well Installation

pay est

	€	GRAPHIC DESIGNER	€
	76,000	Luxembourg	65,000
	50	Austria	46
	48	Germany	44
	38	France	35
	38	Ireland	34
	37	Belgium	34
	37	Netherlands	34
	36	Italy	33
	34	Finland	30
	34	Spain	30
	30	Greece	26
	26	Portugal	24

ther- ortu- Iri- orma- osted sites one. for with peri- ence in their profession.

Maria Mahon, CEO of the Irishjobs.ie, said the survey highlighted Ireland's competitiveness. "As the national currencies for all eurozone countries are removed from circulation, it will be interesting to see how salary scales develop over the coming months."

Crisis means firms 'operate recklessly' with no insurance

Geraldine Collins

CERTAIN companies are operating "recklessly" without full insurance cover because they cannot afford the huge premiums, the Dail heard last night.

It was also stated during a debate on a Labour Party motion there has been a "rip off" in insurance, particularly since September 11.

Several deputies spoke of the hardship of high insurance costs on young people who must have a car to get to work in areas with poor public transport.

The motion, proposed by deputy Pat Rabbitte, called for a statutory inquiry into allegations of discriminatory practices in motor insurance based on age or gender.

It condemned the government for failing to deal with the "crisis in the insurance sector". The motion was defeated by a vote.

Mr Rabbitte said that the crisis in insurance extends to all sectors and is threatening jobs in many companies because of huge increases in employers' and public liability cover.

e case replay

New warning of health risk from waste disposal sites

Treacy Hogan
Environment Correspondent

CLAIMS over serious health effects — including cancer and birth defects — from landfills and incinerators are highlighted in the first ever cross-border study into Ireland's waste management crisis.

The report carried out by NUI Maynooth and Queen's University warns that leaks from landfills can release toxic chemicals, heavy metals, and bacteria into soil and water courses.

This results "in long-term environmental contamination and human health problems," it says.

But until new recycling technologies are found it will remain the best option for some wastes, it concludes.

And it also finds that accusations of NIMBYISM (not in my back yard) did not appear to be well-founded. Most communities soon pass from opposition to developing viable and sustainable waste strategies.

The report 'Waste Management Strategy: A Cross-Border Perspective' says scientists from the London School of Hygiene and Tropical Medicine found that children whose mothers lived within 1.8 miles of 21 industrial landfill sites in five European countries were 33pc more likely to have birth defects than children whose mothers lives between 1.8-4.2 miles from the sites.

"Other research revealed low birth weight and preterm births associated with women living near a municipal waste landfill in Montreal," it adds.

The Maynooth-Queens study published yesterday claims possible costs for incineration may include "litigation by local residents with damaged health".

It stresses that new landfill sites are subjected to stringent environmental monitoring and controls such as capping and lining to prevent emissions of methane and pollution run-off into the environment

And although landfill is the least preferable disposal method the study says it remains the best environmental option for many wastes until new technologies make recycling "a realistic option".

However, it also cites reported health concerns including a Friends of the Earth survey of 100 UK landfill sites claiming revealing that over 33pc of sites were contaminating surface or ground water and claiming that ash from incinerators was more prone to leaking than the original material being burned.

A study by the UK environmental authority reveals incineration as the biggest source of dioxins, accounting for 20-40 pc of total output into the environment, it added.

According to the report a movement to build incinerators in the US peaked in 1988 and that since 1985, 137 projects had been cancelled or put on hold.

"In Europe, Flanders, the Hague, and Amsterdam have cancelled incinerators as confidence in the technology is increasingly questioned."

The study calls for an all-Ireland waste management strategy and the establishment of a cross-border research centre on the technical, social, economic and legal aspects of waste management.

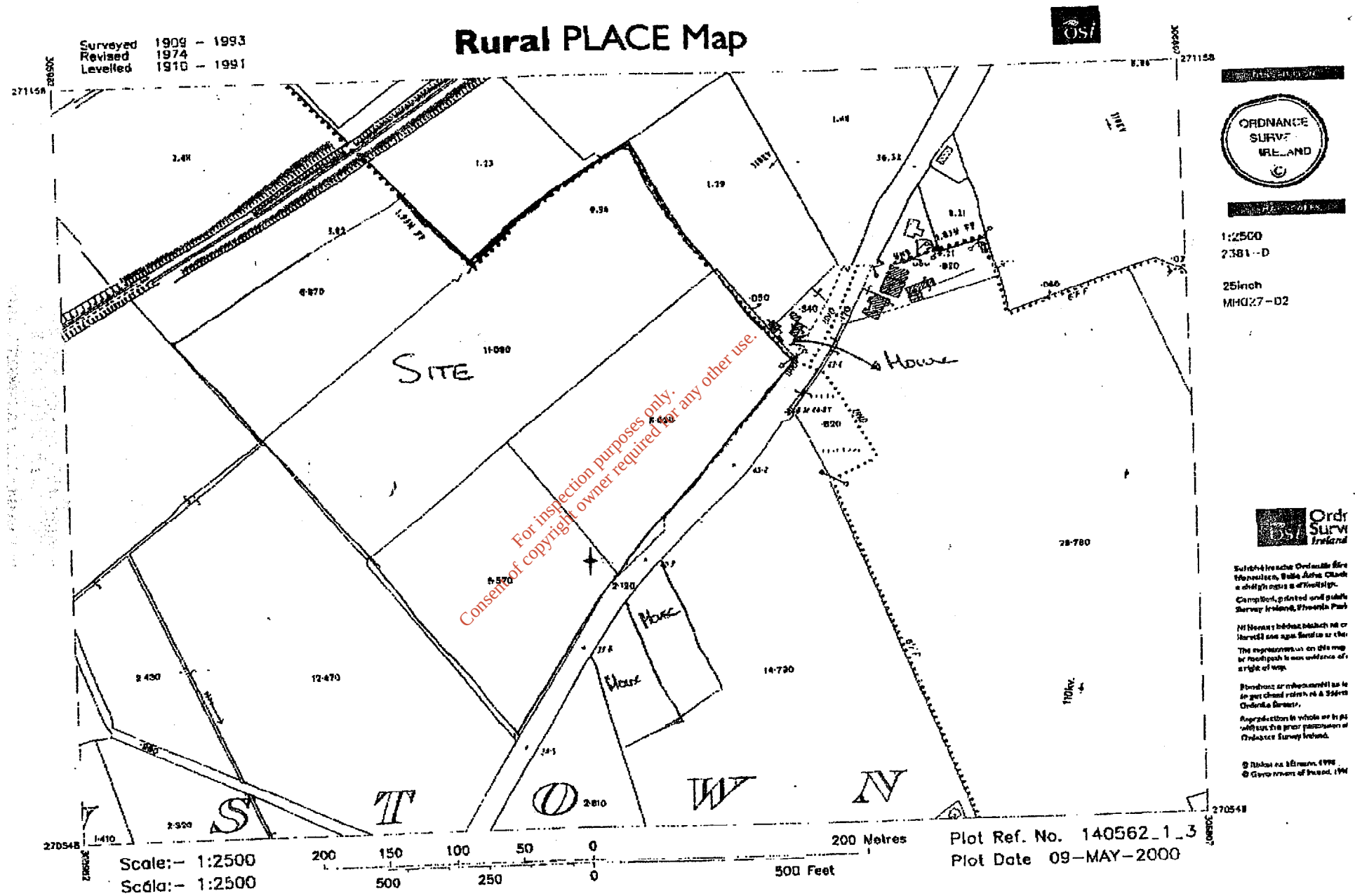


Fig 1. Noise Monitoring Location

Where is Mt Hanover School

5 FLORA AND FAUNA

Introduction

5.1 The site proposed for the extension lies to the south-west of the existing quarry and consists of two shallow, linear ridges covered by a heavy glacial till soil. It is all cereal farmland. The fields have been somewhat enlarged since the O.S. map was drawn so not all the hedges are in existence today.

5.2 The area was visited in March 2000 when the flora and vegetation was examined and note taken of the vertebrate fauna. The survey method was a walkover corresponding to a Phase I Habitat Survey (JNCC 1990) but using the results of a recent habitat classification for Ireland (Fossitt, in prep.). The season is adequate to assess habitat quality and flora, though a few species of summer birds will have been missed.

5.3 The surrounding area is generally of similar agricultural land with housing on the roadsides and the town of Duleek to the south-west. There are small copses and ponds in places. A proposed Natural Heritage Area - Duleek Commons occurs 1.4 km from the site and is described below. Since it is a wetland site it was examined in some detail in autumn 1999.

Now a N.H.A

Receiving Environment

Habitats & vegetation

5.4 This area falls from the road in Cruicerath in a south-easterly direction to a broad, flat valley of fields with a stream and line of trees at both edges. The currently used buildings are situated along the northern stream and there are two older groups on the roadside. Otherwise the only features are the hedges which are mostly as indicated on the O.S. map with two exceptions. The three recognisable habitats are arable crops, hedgerow and drainage ditch.

Arable crops

5.5 Autumn-sown cereals are grown in the entire area and the weed control has been such that in March there is almost nothing to be seen other than the wheat itself. At field edges there is sometimes annual meadowgrass *Poa annua*, scutch *Elytrigia repens*, chickweed *Stellaria media*, red deadnettle *Lamium purpureum* or groundsel *Senecio vulgaris* but by and large the crop runs to the edge of the field and the hedge is the next feature. Later in the season there are probably some other species but they are likely to be the ubiquitous 'weeds' of such places - knotgrass *Polygonum aviculare*, charlock *Sinapis arvensis*, field speedwell *Veronica persica* etc.

Hedgerow

5.6 The hedges consist of medium sized bushes of hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* or gorse *Ulex europaeus* topped by small trees of ash *Fraxinus excelsior* or planted lines of poplars and beech. The poplars grow along the townland boundary that divides the site in a NE-SW direction together with a few sitka spruce and also on the south-eastern boundary where they are mixed with beech and larch. A short line of beech grows along the Platin road while the gorse forms an

almost pure hedge in the upper field parallel to this road. Bramble *Rubus fruticosus*, roses *Rosa canina*, *Rosa* sp. and privet *Ligustrum vulgare* make up the shrub species with honeysuckle *Lonicera periclymenum* and ivy *Hedera helix*.

5.7 The ground flora is rather uniform in most places with shield fern *Polystichum setiferum* and hartstongue *Phyllitis scolopendrium* in damper sites and elsewhere such species as:

Anthriscus sylvestris	cow parsley
Heracleum sphondylium	hogweed
Primula vulgaris	primrose
Viola riviniana	violet
Veronica chamaedrys	germander speedwell
V.serpyllifolia	thyme-leaved speedwell
Epilobium montanum	willowherb
Urtica dioica	nettle
Galium aparine	goosegrass

5.8 The townland boundary hedge in the western corner contains grey willow Salix cinerea, tutsan *Hypericum androsaemum*, grey sedge Carex divulsa and coltsfoot *Tussilago farfara* while the opposite boundary has wood avens *Geum urbanum* and male fern *Dryopteris affinis*.

Drainage ditches

5.9 The great majority of the hedges grow above and around a drain so that the vegetation of the two habitats are somewhat mixed together. However there are a few open stretches, especially along the two SW-NE valleys where wetland plants grow with minimal shading. Everywhere it is noted that the watertable is at a lower level than would be expected and terrestrial plants are tending to invade formerly more wet sites. At the south-eastern corner there is some wet grassland of creeping bent *Agrostis stolonifera* and scutch *Elytrigia repens* with a small stream running through it. Here sweet grass *Glyceria fluitans*, meadowsweet *Filipendula ulmaria*, great willowherb *Epilobium hirsutum* and wild angelica *Angelica sylvestris* grow and there is a little reed fescue *Festuca arundinacea* upstream. Midway up this valley a dug pool at a field corner contains fool's watercress *Apium nodiflorum* and glaucous sedge *Carex flacca* to this list while higher up a little yellow flag *Iris pseudacorus*, grey willow *Salix cinerea*, bittersweet *Solanum dulcamara* and soft rush *Juncus effusus* reach into this area from flatter ground to the south.

Adjacent habitats

5.10 The area surrounding the site is substantially similar in character with tillage and pasture on the undulating ground. Immediately to the south-east, the farm is in permanent pasture which has been established as such since the 1950's. Characteristic grass and broad-leaved species grow there but the vegetation, though varied, is not especially species-rich. A former marsh area has shrunken to a drinking place in a ditch though there is another larger feature to the south-west which retains marsh communities, if not standing water.

5.11 The Nanny River has a certain amount of botanical interest along its banks though it has been deepened and straightened for drainage purposes. Elsewhere, Duleek Commons is the major habitat of importance.

Fauna

5.12 Arable fields have a distinctive if small vertebrate fauna, containing principally rabbit and brown rat and some fox (in this case associated with a Prunus spinosa thicket in the middle of the north-eastern boundary above the present quarry). Wood mouse and house mouse also probably occur, but the presence of hedgehog is unlikely. A few pygmy shrew may live in the gorse hedge towards the north-western margin. There was no evidence of badger, which would not be expected to be more than an occasional visitor.

5.13 The habitat is not suitable for high numbers of bats but a few (most likely pipistrelle) may feed along the tree lines and roost in the roof spaces of the bungalow and/or older houses.

5.14 The breeding birds include yellowhammer which was present at good density, as well as chaffinch, greenfinch, linnet and goldfinch. These obviously benefit from seeds at harvest time but are unlikely to winter on site because of the autumn sowing. Other species are blackbird, song thrush, dunnock, wren and robin which are associated with the hedges. The tree lines are of some value to woodpigeon, chiffchaff and sparrowhawk - there was a probable nest of the latter species along the south-eastern boundary. The pheasant seems to nest sparingly and there was a single moorhen seen at the south-eastern corner. In summer willow warbler and occasional whitethroat are very likely to occur together with a few pairs of swallows, breeding in the farm buildings. None of these were suitable for a large number of nests.

5.15 Rook, jackdaw and magpie come to feed in the fields regularly but none seem to nest on-site. The peregrine also is likely to feed sporadically there as woodpigeons are an occasional prey item. In winter there would be some wintering thrushes (redwing and fieldfare) as well as snipe though conditions are not suitable for large numbers.

Evaluation

5.16 The area represents typical arable farmland with a characteristically limited flora and fauna brought about by the land use. There are no features of ecological interest and all species seen were common in the county generally.

Designations

5.17 The site is not included in any designated area (proposed Natural Heritage Area, candidate Special Area of Conservation etc) and is most unlikely to be in future. Likewise there are no habitats or species given special protection by the EU Habitats Directive (92/43/EEC) or listed by the Flora Protection Order 1999. The bird species have general protection under the Wildlife Act, except for the pest species (corvids and woodpigeon).

Impacts of Development

5.18 Quarrying will gradually remove the existing habitat and further dry out the ditches and streams. The lack of ecological interest in the site makes this process of no real significance except to the local features concerned.

5.19 The current evidence is that adjacent habitats - the Nanny River and Duleek Commons - will not be affected adversely.

5.20 The eventual restoration of the area around the quarry with scrub and woodland will restore a bird fauna that is at present restricted because of lack of nesting sites. Willow warbler and whitethroat will be favoured but yellowhammer is unlikely to return

as it prefers to nest in the hedges adjacent to cornfields. Despite some reduction this species is not regarded as scarce or endangered.

N.H.A

DULEEK COMMONS

Receiving Environment

5.21 Duleek Commons lies between the town and the Navan-Drogheda railway line and is enclosed by the two roads to Commons and Newtown Bridges respectively. It is a low-lying basin through which two tributaries of the Nanny flow in a series of ponds and ditches. In general the area is wet in winter as water tends to accumulate but there is also an input of spring or seepage water at a higher point on the southern side which forms a fen vegetation.

5.22 The area was examined in some detail because of its sensitivity to possible alterations in the groundwater.

Vegetation

5.23 The northern section is dominated by rushes *Juncus effusus*, *J.inflexus*, yellow flag *Iris pseudacorus* and tufted hairgrass *Deschampsia cespitosa*. Such clumped vegetation is well seen on the aerial photograph (Figure 5.1). Between the clumps are patches of wet grassland where grazing has reduced the height of large herbs like meadowsweet *Filipendula ulmaria* and knapweed *Centaurea nigra* and allowed grasses into the stand. Such areas include smaller species such as:

Holcus lanatus	Yorkshire fog
Cynosurus cristatus	crested dogstail
Phleum pratense	timothy
Agrostis capillaris	common bent
Lolium perenne	ryegrass
Nardus stricta	mat grass
Trifolium pratense	red clover
Plantago lanceolata	ribwort plantain
Rumex acetosa	sorrel
Ranunculus acris	field buttercup
Senecio aquaticus	marsh ragwort
Leontodon autumnalis	autumn hawkbit
Hypericum tetrapterum	St John's wort

5.24 The surface is generally uneven with the remnants of artificial diggings and former channels adding to the undulating glacial deposits. The clayey nature of this material provides the waterlogging effect.

5.25 Ditches traverse the site and they are often lined with reed grass *Phalaris arundinacea*, sweet grass *Glyceria fluitans* and bur reed *Sparganium erectum* and have water starwort *Callitriche* sp., watercress *Nasturtium officinale*, fool's watercress *Apium nodiflorum* and forget-me-not *Myosotis scorpioides* growing in the water. Muddy places beside them have brooklime *Veronica beccabunga*, bog stitchwort *Stellaria uliginosa*, curled dock *Rumex crispus*, broad-leaved dock *R.obtusifolius* and creeping buttercup *Ranunculus repens*. One of the hedges in the centre has abundant bittersweet *Solanum dulcamara*.

5.26 The south-western corner is the location of fen vegetation produced by groundwater infiltration. There are several discrete springs but the ground also seems to be subjected to a general if slow upwelling. The water is lead generally northwards

through natural and artificial channels to discharge into the main stream. The seepage communities are characterised by patches of black bog rush *Schoenus nigricans*, sharp-flowered rush *Juncus acutiflorus*, moorgrass *Molinia caerulea*, several sedges *Carex panicea*, *C.flacca*, *C.hostiana*, *C.viridula* and *C.pulicaris* and mosses such as *Campylium stellatum* and *Drepanocladus* spp. Other species are:

Briza media	quaking grass
Succisa pratensis	devilsbit
Potentilla erecta	tormentil
Anagallis tenella	bog pimpernel
Pinguicula vulgaris	butterwort
Hydrocotyle vulgaris	marsh pennywort
Eleocharis uniglumis	spike rush
Triglochin palustre	arrowgrass
Pedicularis palustris	red rattle
Parnassia palustris	grass of Parnassus
Equisetum palustre	marsh horsetail
Achillea ptarmica	sneezewort
Epipactis palustris	marsh helleborine
Euphrasia cf *scottica*	eyebright

5.27 Slightly richer places where water flows or is ponded, bring in common sedge *Carex nigra*, ragged robin *Lychnis flos-cuculi*, water mint *Mentha aquatica*, meadow vetchling *Lathyrus pratensis*, jointed rush *Juncus articulatus*, bog cotton *Eriophorum angustifolium* and silverweed *Potentilla anserina* while the channels and nearby banks have a selection of the following species:

Galium palustre	marsh bedstraw
Nasturtium officinale	watercress
Apium nodiflorum	fool's watercress
Lemna minor	duckweed
Menyanthes trifoliata	bogbean
Ranunculus flammula	spearwort
Epilobium palustre	marsh willowherb
Angelica sylvestris	wild angelica
Caltha palustris	marsh marigold
Juncus acutiflorus	sharp-flowered rush
Dactylorhiza fuchsii	spotted orchid
Equisetum fluviatile	water horsetail
Persicaria amphibia	amphibious bistort
Sparganium erectum	bur reed
Carex riparia	pond sedge
C.disticha	brown sedge
Pulicaria dysenterica	fleabane

5.28 A fringe of wet grassland with a varying calcareous influence occurs above and west of the fen area involving such species as crested dogstail *Cynosurus cristatus*, hard rush *Juncus inflexus*, meadow fescue *Festuca pratensis*, self-heal *Prunella vulgaris*, marsh thistle *Cirsium palustre* and marsh ragwort *Senecio aquaticus* along with occasional mat grass *Nardus stricta*. Just at the field border to the south there is soft rush *Juncus effusus*, cinquefoil *Potentilla reptans*, great willowherb *Epilobium hirsutum*, hoary willowherb *E.parviflorum* and tufted hairgrass *Deschampsia cespitosa* with occasional fox sedge *Carex otrubae* and red bartsia *Odontites vernus*.

Fauna

Vertebrates

5.29 The mammal fauna includes hare, fox and brown rat and there may be occasional visits by young otters without territories. However, there is no suitable feeding or breeding places. The common frog and newt also occur.

5.30 Birds seen on site visits were mallard, moorhen, snipe, meadow pipit, skylark, reed bunting and hedgerow species such as blackbird, robin, dunnock, wren, chaffinch, goldfinch and greenfinch. Rook, jackdaw and hooded crow also make some use of the area with curlew in winter.

Invertebrates

5.31 A molluscan survey of the fen section of the Commons was done by Evelyn Moorkens in January 2000 with the objective of discovering whether any of the protected *Vertigo* species of snail occur. The weather was bright and sunny, but too cold to find many snails by hand, and in some places a thick layer of ice had to be removed before samples of vegetation could be taken.

Materials and Methods

5.32 Mollusca were sampled to some extent by hand, but mainly by taking a series of 6 samples of between 2 and 3kg of vegetation, which were wet sieved through two mesh sizes, 3mm and 0.5mm. The contents of each sieve were dried and examined for snails. An Olympus 40X binocular microscope was used to examine the smaller species.

Results

5.33 A total of 22 species of snail were found at this site, as detailed in Table 5.1 below.

Table 5.1 Molluscan species found in fen at Duleek Commons

Species	Wettest Area	Intermediate Area	Driest area
Valvata cristata	x		
Carychium minimum	x	x	
Carychium tridentatum	x	x	x
Aplexa hypnorum	x	x	
Lymnaea truncatula	x		
Lymnaea palustris	x	x	
Anisus leucostoma	x		
Succinea putris	x	x	
Cochlicopa lubrica	x		
Columella aspersa	x	x	
Vertigo antivertigo	x		
Vertigo substriata	x		
Vertigo pygmaea	x	x	
Lauria cylindracea	x		
Punctum pygmaeum	x		
Aegopinella pura	x	x	
Euconulus alderi	x	x	
Trichia hispida	x	x	
Pisidium casertanum	x		
Pisidium personatum	x		
Pisidium milium	x		
Pisidium nitidum	x		

Evaluation

5.34 The species found in this survey represent a good range of marsh species found in Ireland, and in general form a set of species of a habitat which can dry out and become inundated with water at various times of the year. There were no rare or protected species in any of the samples. There were three species of *Vertigo* found, all representative of wet conditions. It is unlikely that any of the protected *Vertigo* species would be found here. The water levels do not appear to be stable enough to support *Vertigo geyeri* or *Vertigo angustior*, and the vegetation species are not tall enough to support *Vertigo moulinsiana.* There were no slugs found in this survey. They are difficult to find in cold weather, as they tend to retreat underground or into crevices in these conditions. It is expected that a range of common slugs is likely to occur but there are no rare or protected slug species from this broad habitat type.

Conclusion

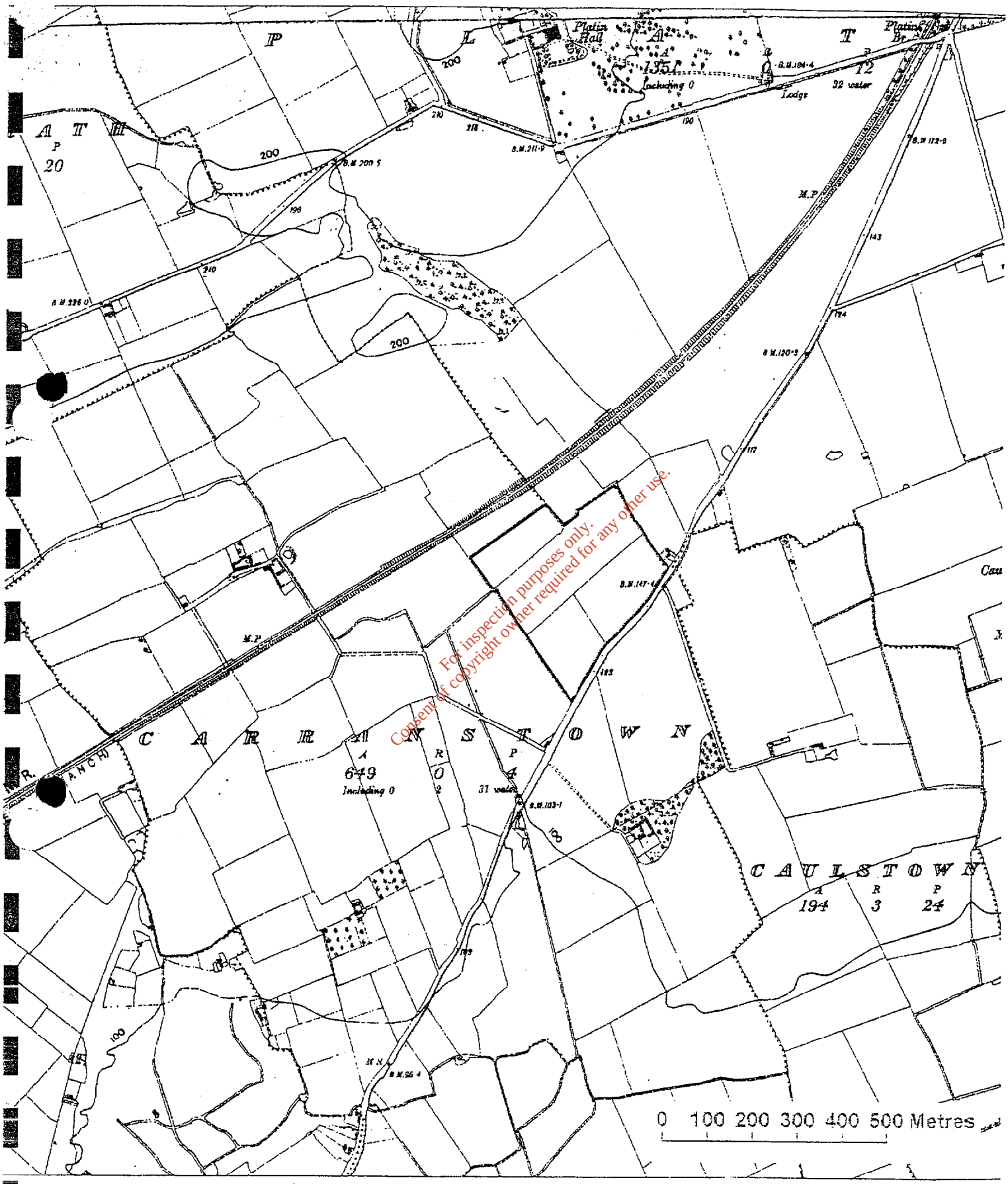
5.35 Duleek Commons is an important wetland with two distinct vegetation types - the wet grassland (and occasional marsh), between and around the stream channels, and the rich fen fed by springs at the southern edge. This latter community is rare in the county generally because of the drift cover over limestone and comparable examples occur mainly in the west, close to Co. Westmeath. The few local fens, e.g. Greenanstown are smaller in extent than the Commons and less secure in management terms.

5.36 Because of the small area of fen the Commons is one of few sites in Meath where plants *Schoenus nigricans*, *Achillea ptarmica*, *Epipactis palustris* and also *Nardus stricta* occur. More notably it supports *Eleocharis uniglumis* which is normally maritime and has been found at only five stations inland.

5.37 The molluscan fauna does not appear to be unusual. Other groups have not been examined as far as is known.

Impact of proposals

5.38 The groundwater regime in this locality has become better known recently because of the drilling programme connected with the development (see Chapter 7), and it appears that restricting the development of the final quarry floor will ensure that the groundwater flow to the fen will continue unaffected. This being so the development will not compromise the future of the Duleek Commons Natural Heritage Area.



Appendix: Site Location Map

Off the Map

To assess any variations in groundwater during the development of the Carranstown Greenfield Site, bi-annual monitoring of certain indicator parameters at all sampling locations is recommended. This analysis should include any parameters, which were observed to exceed the MAC Values discussed previously.

Respectively submitted,

K. T. Cullen & Co. Ltd.

CONOR WALL M.Sc., Dip. EIA Man. DATE 11th July 2008

TERI HAYES M.Sc., PGeo DATE 7/7/2008

activites, slurry pits or septic tanks. Contamination of this nature is typically associated with some form of agricultural activity.

It should be noted that the levels of contamination are slight, and commonly reflect agricultural works carried out in the vicinity of this site.

6.2 *Site Vulnerability*

Based on visual observations made on site during drilling and soil sampling, the overburden consists of boulder clay and gravels with occasional sand and gravel lenses throughout. Where clay is present, it should act as protection to the underlying bedrock aquifer from surface contaminants.

Based on the thickness and type of overburden cover, the aquifer vulnerability for this site is considered moderate (GSI Guidelines for aquifer protection).

According to the GSI, the bedrock aquifer is classified as regionally important, aquifer, Rf. As the Vulnerability Rating of the overburden is considered moderate, the site is considered to have a Resource Protection Zone Classification of R/M (see Appendix E).

6.3 *Groundwater Abstraction*

Drilling results and a pumptest indicated a high potential for groundwater development at the site (c. 20m³/hour) from a single borehole. It is reasonable to assume this yield could be increased using a well field approach. The raw water sampled from the trial well TW 1 met the Potable Drinking Water MAC Guidelines, with the exception of Nitrate. It should be noted that the Nitrate concentration at MW-4 bedrock monitoring well was below the Potable Water MAC, and Nitrate levels in the general vicinity of this site are generally below the Water MAC.

Due to the indication of minor contamination from agricultural activities in the shallow aquifer, adequate measures should be incorporated in the design of the production well to ensure against the vertical migration of contaminants through the borehole annulus.

6.4 *Future Monitoring*

Additional sampling of the trial well TW-1 should be undertaken in the near future to determine the variation in the concentration of Nitrates in the bedrock aquifer.

An Roinn Ealaíon, Oidhreachta, Gaeltachta agus Oileán
Department of Arts, Heritage, Gaeltacht and the Islands

Dúchas
The Heritage Service

Rannóg na nIarratas Forbartha
Development Applications Section

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Our Ref: DAS-2001-ME-ME-01/4014

County Secretary
Planning Section
Meath County Council
County Hall
Navan
Co. Meath

RE Planning Application Reg. Ref. No.01/4014 Previous 87/350, 85/693, 93/222
By.Indaver Ireland at Carranstown, Duleek, Co. Meath

Dear Sir/ Madam

We refer to recent correspondence regarding the above-mentioned development.

Attached are this Department's archaeological recommendations / requirements in relation to this development.

Kindly let us have a copy of your decision as soon as it issues.

Yours Faithfully

Anthony Hehir
Development Applications Section
23 July 2001

RE Planning Application Reg. Ref. No.01/4014 Previous 87/350, 85/693, 93/222
By.Indaver Ireland at Carranstown, Duleek, Co. Meath

The proposed development is large in scale. Previously unknown archaeological features/material may be disturbed by development at this location. The National Monuments Service therefore recommends that archaeological monitoring as described below be carried out at this site as a condition of any grant of planning permission.

as happened with 1G Motorway nearby

Archaeological monitoring shall consist of the following:

1. The applicant shall employ a qualified archaeologist to monitor topsoil stripping, digging of trenches for foundations and services and all ground works associated with the development.

2. Should archaeological material be found during the course of monitoring, the archaeologist may have work on the site stopped pending a decision as to how best to deal with the archaeology. The developer should be prepared to be advised by the National Monuments Service of Dúchas the Heritage Service (of this Department) with regard to any necessary mitigating action (e.g. preservation *in situ*, or excavation) and shall facilitate the archaeologist in recording any material found.

3. The National Monuments Service shall be furnished with a report describing the results of the monitoring.

Please Note:

Unfortunately this file was not referred to our architects in time for them to request additional information in relation to the visual impact of the 40m chimney stack. We would ask that its potential visual impact on the Boyne Valley area site included in the UNESCO World Heritage list, be taken into consideration in the decision on whether or not planning should be granted for this development.

PP granted by Meath Co. Co. on 31/7/01

23rd July 2001

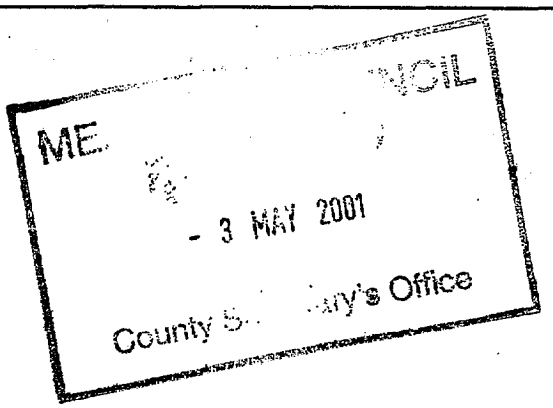
North Eastern Health Board
Bord Sláinte an Oir Thuaiscirt

COMMUNITY CARE SERVICES,
Co. Clinic,
Navan, Co. Meath.

Tel: (046) 21595, Fax (046) 22818

M. Donnelly
Principal Environmental Health Officer
County Clinic
Navan
Co. Meath

2nd May 2001



Planning Application Ref: 01/4136
Applicant: Irish Cement Ltd.
Application for planning permission for a westward extension to their existing quarry, extending to 45 hectares and a finished floor level of 20m below Ordnance Datum (Poolbeg), together with associated landscaping works, in the townlands of Carranstown and Cruicerath at Platin Cement Works, Platin, Co. Meath.

The environmental impact statement failed to fully address the following points, the applicant should be requested to submit the following information:

1. Adequately assess the cumulative impacts of removal of filtering strata on the quality of ground water and surface water in conjunction with the other large proposed developments in the area i.e. Indaver Waste Management Facility and Marathon Power Plant.
2. List in detail the water supply requirements of the proposed extension to include for production, dust control etc. and indicate the specific source of the water supply.

Carmel Lynch
Environmental Health Officer

2/5/2001

(a) WHO Criteria

The WHO suggest a four step site selection procedure which is summarised in Table 2.4.

Table 2.4 – WHO Site Selection Criteria

Step 1 – Eliminate unsatisfactory Areas	Step 2 – Highlight Promising Areas
Coastal Areas Subject to Floods	Industrial areas
Coastal wetlands	Sites of existing Waste Management Facilities
Areas with limestone deposits	Compatible public lands
Areas with subsurface mining	Abandoned properties
Areas critical for Aquifer recharge	Lands with major highway access
Lands designated for preservation	Lands near waste generators
Areas of high well yield	
Areas of reservoir watersheds	
Step 3 – Assess Promising Areas in Detail (environmental and human impacts)	**Step 4 – Evaluate and Rank Sites**
Riverine areas subject to floods	Population Density
Freshwater wetlands	Response time of rescue squads and emergency services
Areas with flood hazards relating to a dam	Whether the site includes critical habitats or areas of potential mineral developments
Coastal areas for shellfish and fishing	Groundwater and soil characteristics
Areas upstream of water supply intakes	Slope
Areas of special significance	Access to sewers No
Visual corridors of scenic rivers	Transport restrictions
Existing developed areas	Structures along transport corridors
Areas for which non industrial development is planned	Whether the area contains historic sites yes
Agricultural districts	Visual impact
	Feasibility of acquisition

While these criteria relate to hazardous waste facilities, and many of the criteria are more applicable for a landfill site than a waste to energy plant, their application potential sites provided a useful objective assessment of the site's suitability.

(b) Feasibility Study for North East Region

The Feasibility Study on Thermal Treatment Options for the North East Region adopts a two stage site selection process of short listing and assessment, using the following criteria:

Short listing:

- Proximity to Origin of Waste
- Transport links with surrounding region
- Proximity to Potential Energy Users

Assessment:

- Cross border possibilities
- Site availability
- Transfer stations
- General considerations

These criteria are specifically designed for evaluating sites for thermal treatment plants in the North East Region and were therefore applied to the site selection exercise.

2.10.2 Alternative Locations Considered

An overall screening exercise was carried out with a view to finding suitable locations within the north east region. This preliminary screening involved the application of the above criteria, namely:

- Indaver's technical selection criteria.
- Steps 1&2 of the WHO selection procedure (where the criteria are applicable to non hazardous waste to energy facilities)
- Shortlisting criteria from the Feasibility Study for the North East

The most important criteria for selection of the general area in which to locate a Waste Management Facility are

a. the Centre of Gravity of waste production, that is to select the area where the haul distance to bring waste to the facility is minimised.

b. Existing industrial character and suitability for industrial development

c. Availability of Sites

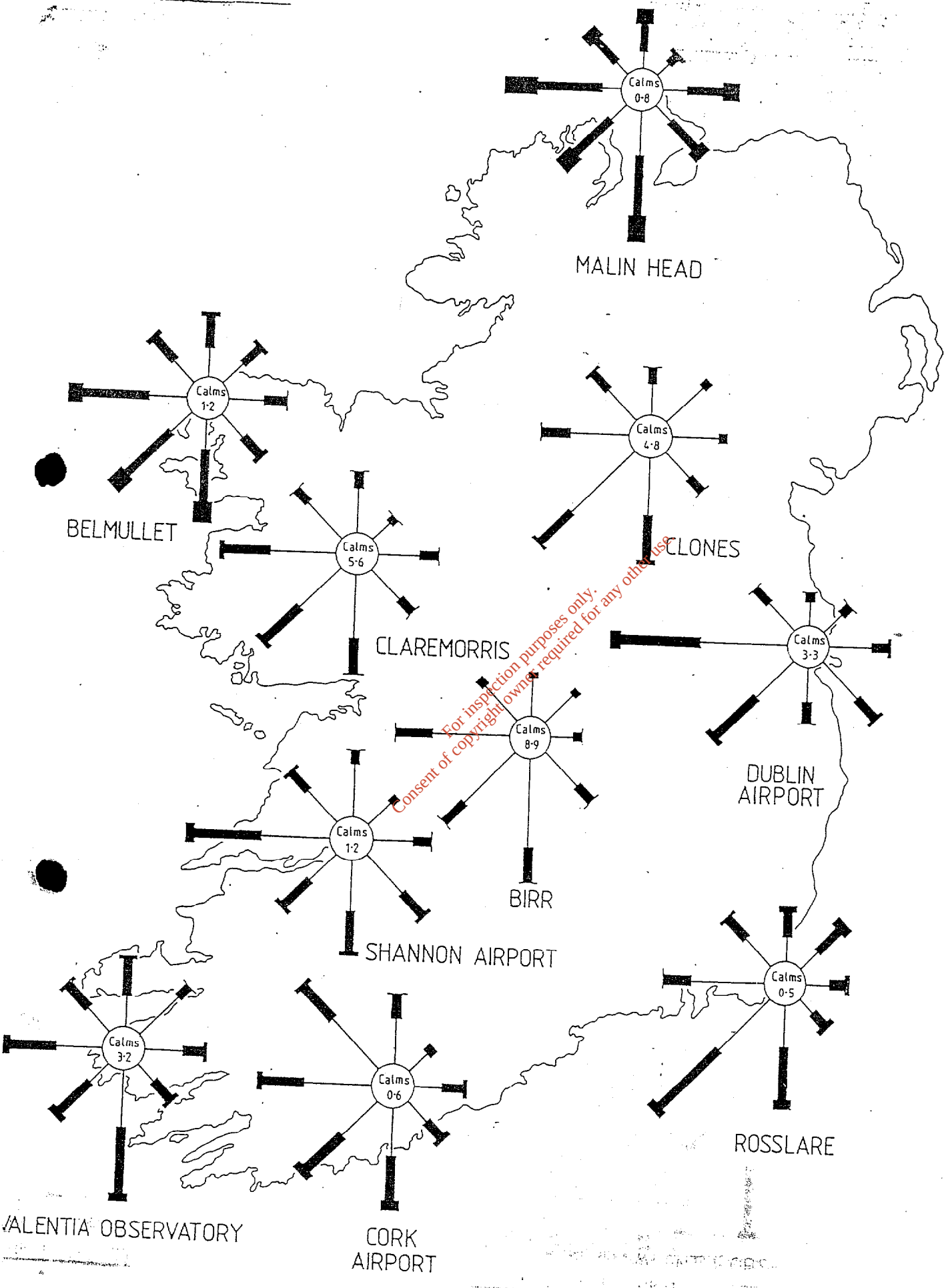
DUBLIN AIRPORT

monthly and annual mean and extreme values
1961-1990

lat. 53° 25' N
long. 6° 14' W
height 71 metres above mean sea level

TEMPERATURE *(degrees Celsius)*	*jan*	*feb*	*mar*	*apr*	*may*	*jun*	*jul*	*aug*	*sep*	*oct*	*nov*	*dec*	*year*
mean daily max.	7.6	7.5	9.5	11.4	14.2	17.2	18.9	18.6	16.6	13.7	9.8	8.4	**12.8**
mean daily min.	2.5	2.5	3.1	4.4	6.8	9.6	11.4	11.1	9.6	7.6	4.2	3.4	**6.4**
mean	5.0	5.0	6.3	7.9	10.5	13.4	15.1	14.9	13.1	10.6	7.0	5.9	**9.6**
absolute max.	16.6	15.3	21.3	20.5	23.4	25.1	27.6	28.7	23.9	21.2	18.0	16.2	**28.7**
absolute min.	-9.4	-6.2	-6.7	-3.7	-1.0	1.5	4.8	4.1	1.7	-0.6	-3.4	-10.1	**-10.1**
mean no. of days with air frost	6.4	4.9	3.3	1.4	0.2	0.0	0.0	0.0	0.0	0.1	3.3	4.8	**24.3**
mean no. of days with ground frost	14.0	12.7	12.4	9.2	2.9	0.2	0.0	0.0	0.6	2.3	9.7	12.5	**76.4**
RELATIVE HUMIDITY *(%)*													
mean at 0900UTC	86	84	82	79	76	76	78	81	82	85	86	86	**82**
mean at 1500UTC	79	75	70	68	67	68	68	70	70	75	78	81	**72**
SUNSHINE *(hours)*													
mean daily duration	1.8	2.5	3.6	5.2	6.1	6.0	5.4	5.1	4.3	3.1	2.4	1.7	**3.9**
greatest daily duration	8.0	9.2	11.9	13.8	15.4	15.9	15.4	14.5	12.4	10.4	8.5	6.9	**15.9**
mean no. of days with no sun	11	8	5	3	2	2	1	2	3	6	8	11	**61**
RAINFALL *(mm)*													
mean monthly total	69.4	50.4	53.8	50.7	55.1	56.0	49.9	70.5	66.7	69.7	64.7	75.6	**732.7**
greatest daily total	30.3	31.3	35.7	26.2	30.0	46.6	34.8	60.2	40.9	47.5	55.1	41.7	**60.2**
mean no. of days with >= 0.2mm	18	14	16	14	16	14	13	15	15	16	16	18	**185**
mean no. of days with >= 1.0mm	13	10	11	10	11	10	9	11	10	11	11	12	**128**
mean no. of days with >= 5.0mm	5	3	3	3	4	4	3	4	4	4	4	5	**48**
WIND *(knots)*													
mean monthly speed	12.2	11.7	11.6	9.7	8.7	8.0	8.1	8.0	8.9	9.9	10.8	11.8	**9.9**
max. gust	75	73	61	60	58	55	54	56	64	73	64	71	**75**
max. mean 10-minute speed	48	49	42	41	39	36	34	41	35	45	43	47	**49**
mean no. of days with gales	2.1	1.1	1.2	0.3	0.3	0.1	0.0	0.3	0.2	0.5	0.7	1.4	**8.2**
WEATHER *(mean no. of days with...)*													
snow or sleet	6.0	5.5	4.3	1.7	0.3	0.0	0.0	0.0	0.0	0.1	0.9	2.9	**21.6**
snow lying at 0900UTC	2.1	1.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	**4.5**
hail	0.7	0.9	2.2	2.4	1.4	0.3	0.1	0.1	0.0	0.2	0.5	0.8	**9.5**
thunder	0.1	0.1	0.2	0.3	0.6	0.7	0.7	0.6	0.3	0.3	0.1	0.1	**4.1**
fog	4.8	4.3	3.9	4.5	3.6	3.1	3.6	5.3	4.9	4.7	4.0	3.9	**50.5**

Frequency of wind directions for groups of wind speeds at selected stations,
1962 - 1984



NATURE CONSERVATION RECOMMENDATIONS

Re: Planning Application Reg. Ref. No. 01/4136 for extension of quarry adjacent to Duleek Commons by Irish Cement Ltd.

The site of the proposed extension lies adjacent to Duleek Commons a proposed Natural Heritage Area (pNHA) No. 001578. This area is a wetland complex incorporating marshes, wet grasslands and a series of ponds and ditches. It is in relatively good condition compared to many wetlands in the area, which have completely disappeared due to drainage. Therefore this wetland is of importance and further drainage work here would be damaging to the nature conservation value of this pNHA. The rare Spike-Rush *Eleocharis uniglumis* has been recorded here in one of its very few inland stations. This species may be supported here by the high calcium content that is also indicated by the presence of Hard Rush.

The development proposes to quarry a further 45ha of land adjacent to the present quarry, in five stages, to –20m AOD level.

The Environmental Impact Statement submitted states in the Conclusion section that "the proposed development has also been designed to ensure no hydro-geological impact on Duleek Commons". However, in the Summary of Impacts & Mitigation Section it is stated that "the extension of the quarry westwards has the potential to impact on Duleek Commons", but "restricting the quarry extension depth and range will ensure that the Duleek Common is protected".

We are concerned that this development may also impact on the Nanny & Boyne Rivers, which host designated areas, albeit not in the immediate neighbourhood of the proposed quarry.

In light of the above, this Department recommends that, **as the development may impact on the pNHA, an evaluation process follow each stage of quarrying. The hydrological data should be assessed by the developer and the results discussed with Dúchas The Heritage Service of this Department. Should there be significant potential negative impact on the Duleek Commons pNHA, suitable mitigation measures will have to be put in place by the developer.**

7 WATER

Receiving Environment

Geology

7.1 The regional bedrock geology for the Platin area is taken from the geology of Meath map as published by the Geological Survey of Ireland (GSI) and dated 1999 (Figures 7.3 and 7.6). The Carranstown Cherty Limestone (Figure 7.6) is not recognised as a Formation or Member within the Platin Formation by the GSI publication but does represent an important local horizon within the context of the Platin Quarry extension.

Bedrock

7.2 Platin Quarry is excavated into the limestone bedrock belonging to the Platin Formation (Figure 7.6). These limestones are part of the Carboniferous succession which here occupies a synclinal structure (Figure 7.3) located between the sandstone cored Lower Palaeozoic Massifs found to the north and south of the Rivers Boyne and Nanny, respectively. Namurian aged sandstones and shales of the Walshestown, Balrickard and Donore Formations occupy the axis of the syncline. The limbs of the east-west trending syncline consist of Dinantian age limestones of the Platin, Clonlusk and Mullaghfin Formations. The Slane (just off Figure 7.3 to the north) and Nanny Faults bound the northern and southern edges of the graben like structure, respectively.

7.3 The Platin Formation consists of crinoidal, peloidal grainstone and packstones. To the east of the existing quarry the Platin Formation contains abundant dolomite and is unsuitable for cement manufacture due to the high magnesium content. Westwards, the presence of the Carranstown Cherty Limestones together with the property boundary and the adjoining public road define the outline of the proposed extension (Figure 7.6). The Carranstown Cherty Limestone is unsuitable for cement manufacture due to the high silica (SiO_2) content and associated high abrasiveness.

7.4 The Carboniferous succession at Platin dips to the northwest towards the synclinal axis and is traversed by faults trending north-northwest by south-southeast. The faulting has no appreciable effect on the limestone chemistry except for local patches of dolomite in the fault zones, but in the quarry area the faulted areas are generally weaker and tend to have abundant solution fissures filled with clay and rubble.

7.5 The limestones at Platin display a range of karst features particularly in the upper bench levels where the solution features are generally filled with clay and rubble. Immediately to the north of the quarry at Cruicerath the local drainage discharges into a swallow hole and emerges in the quarry face south of the intervening public road.

Overburden

7.6 The rock surface outcrops in the areas shown in Figure 7.7. Elsewhere the bedrock surface is covered by a variable thickness of glacial till. The overburden contours presented in Figure 7.7 indicate a zone of thick till cover passing from Duleek Village and extending into the eastern edge of the proposed extension. In the west of the extension area the glacial till is of the order of 5m thick and this increases eastwards to where the overburden is thickest (over 20m) immediately behind the present quarry face as indicated in the cross sections A-A' and C-C' of Figure 7.4, presented in Figure 7.9.

Duleek Commons

7.7 The wetland referred to as Duleek Commons is located in a topographic hollow in the glacial overburden covering the limestone bedrock. Monitoring boreholes completed around the margins of the wetland indicate an overburden succession consisting of glacial tills with some sand and gravel horizons. Generally a brown boulder clay layer is overlain by a brown clay layer, with a suggestion that the succession contains more sand and gravel towards the west (Borehole logs are presented in Appendix 2-2).

Reserves

7.8 The area west of the existing Platin Quarry is suitable geologically as a source of limestone for cement manufacture.

7.9 It is proposed to extend the existing quarrying operation westwards as indicted in the cross sections given in Figure 7.9, effectively doubling the floor area of the existing quarry. The available reserves in the extension will be won through a series of benches similar to the practice in the existing quarry with the final floor level of minus 20m below Ordnance Datum (OD) being the same over the extended excavation. The scheduling of the benching operation in the extension would allow for the economic mixing of overburden stripping and the excavation of the usable reserves (See section 3.13).

Other Quarrying at Duleek and Donore

7.10 In addition to the Platin Quarry other quarrying operations in this part of County Meath include:

- Premier Periclase Quarry;
- Donore Shale Quarry;
- Irish Asphalt Quarry.

The location of these operations is shown in Figure 7.3.

Water

Surface Waters

7.11 Platin Quarry is located in the River Nanny Catchment close to the watershed with the River Boyne (Figure 7.2).

7.12 The River Nanny drains 250 km^2 and rises in the east of County Meath before flowing to Duleek to discharge into the Irish Sea at Laytown. The River Boyne drains a catchment nearly 10 times the size of the River Nanny at 2,300 km^2. It rises in counties Offaly and Kildare and drains most of County Meath before flowing through Drogheda to discharge into the Irish Sea at Mornington in County Meath.

7.13 The Office of Public Works operates a number of gauging stations on both the Rivers Nanny and Boyne. The flows measured at gauging station 0811 at Duleek (Figure 7.2) on the River Nanny together with the flows at the Slane Castle Station on the River Boyne are provided in Appendix 2-1. There is no further hydrometric station on the Boyne between Slane Castle and the Platin area.

7.14 Recent reliable flow measurements have been taken by the OPW on the Boyne at Slane Castle. These indicate that the summer low flows in the Boyne at Slane are in the range 2.5 m^3/sec. The summer low flows in the Platin area, some 10 kms further down stream, can be confidently taken as being greater than 2.5 m^3/sec or 200,000

m^3/day. The lowest flow recorded from the Nanny at Duleek is 0.04 m^3/sec or 3,500 m^3/day.

7.15 Drainage between the quarry and the catchment divide with the River Boyne to the north now drains into the quarry through a solution feature exposed in the quarry face. This drainage is shown in the Ordnance map of the area as historically flowing to a swallow hole at Cruicerath and then rising to the south of the quarry where the principal drainage still rises today.

7.16 Westwards of the planned extension, a tributary of the River Nanny (here called the Commons River) rises in Thomastown Marsh (now a forest) and flows eastwards into the Duleek Commons wetland before entering the River Nanny just south-east of Duleek Village. This stream together with a contribution from north of the Commons has a catchment of some 9.4 km^2 above its exit from Duleek Commons. Flow measurements taken in June and August of 2000 indicate that the summer outflow from Duleek Commons is in the range 0.003-0.01 m^3/sec or 260-860 m^3/day.

7.17 Historically, it would appear that the stream rising in Thomastown marsh was used to power a corn mill just northeast of Duleek village. The connecting millrace is still seen as it exits the Commons but today does not carry the outflow from the Commons. Instead, the Commons River now flows through Duleek Village and discharges into the River Nanny to the south of the village.

7.18 It would appear that the marshy area east of the Commons was also an integral part of the supply to the mill but which today drains southwards directly into the River Nanny. As both the Commons and this marshy area are at a similar elevation they probably were used as water storage features to drive the mill in dry weather conditions.

Drainage Pattern

7.19 The surface drainage pattern (Figure 7.3) at Duleek and Platin is largely determined by the underlying geology and by historical harnessing of the available water supplies. On the larger scale, the lower reaches of the Rivers Boyne and Nanny are determined by the trace of the Slane and Nanny Faults which separate the softer limestones from the harder sandstones. Locally, the catchment divide separating the Rivers Boyne and Nanny near Platin is defined by the high ground underlain by the more resistant Namurian sandstones and shales.

7.20 Southwards of the catchment divide, the surface drainage flowing off the Namurian strata flows into a swallow hole that developed in the Platin Formation limestones at Cruicerath. Westwards, the Commons River rises at the junction between the limestones and the younger sandstones and shales at the elevation of the local drainage network. This is also reflected in the spring line associated with the 30.5 m OD (100 ft.) contour with risings at the Commons, Carranstown, Caulstown and Annagor along the northern bank on the River Nanny. The permanent drainage network rises south of the railway line as the water table in the limestones meets the falling topography at a general elevation of approximately 30.5 m OD.

Quarry Drainage

7.21 Dry working conditions are maintained in the Platin excavation by deep well and sump pumping. The combined drainage from the quarry and related plant is pumped to the River Nanny at the licensed discharge location shown in Figure 7.2. Pumping rates from the quafry have been reported in the range 4,400-6,300 m^3/day.

7.22 Currently, the groundwater pumped from Platin Quarry is piped directly to the River Nanny at the discharge point shown on Figure 7.2. The company has undertaken to pipe the additional quarry drainage to another discharge point indicated on Figure 7.2.

This additional quarry discharge point is intended as a mitigation measure to minimise any impact of the quarry dewatering on the low flows in the River Nanny immediately downstream of Duleek Village.

Groundwater

7.23 Geologically, Platin Quarry is located in a narrow band of Carboniferous aged limestones that are bounded to the north and south by older Lower Palaeozoic sandstones and shales. The Platin limestones connect westwards with the limestone plains of Meath and extended eastwards to outcrop along the Irish Sea between Termonfeckin in the north and Laytown in the south.

7.24 The Platin limestones constitute a regionally important aquifer while the enclosing Lower Palaeozoic strata have little regional groundwater potential. Groundwater within the limestone aquifer flows towards the east coast and either discharges directly into the Irish Sea or into the River Boyne and River Nanny systems as base flow. The pumping of groundwater from beneath the quarry to maintain dry working conditions has altered the natural groundwater flow regime around the quarry. Some of the groundwater that would previously have discharged into the two rivers as base flow has been intercepted beneath the quarry and this groundwater is now discharged to the River Nanny at the licensed outfall.

7.25 This proposal to extend the quarry as indicated in the plans and cross sections will result in an increased dewatering rate as the final quarry floor area is effectively doubled. The increased abstraction will further alter the natural groundwater flow regime around the quarry with the scheduling of this further reduction in the water table and increased dewatering rate being determined by the quarrying programme over the life of the quarry.

7.26 The available reserves in the extension will be won through a series of benches similar to the practice in the existing quarry with the final floor level of minus 20m below OD being the same over the total excavation. The scheduling of the benching operation in the extension will allow for the economic mixing of overburden stripping and the excavation of the usable limestone reserves. The position of the water table at the completion of the present quarry permission is indicated in Figure 7.9. The extension of the quarry area westwards will entail a further lowering of the water table in this direction as the floor intersects the water table position maintained for the present permission.

7.27 The wetland at Duleek Commons is dependent on the local water table and the inflow from the Commons River. The measured groundwater contours around the margins of the wetland indicate that it receives groundwater from spring risings located within the marshy area. The outflow from Duleek Commons was historically directed to a corn mill to the north east of Duleek village. Today, the outflow is directed through the village and discharges into the River Nanny.

Data Base

7.28 The available groundwater data base includes records from 40 boreholes completed on company property and on adjoining public lands details of which are tabulated in Appendix 2-2 for reference and located on Figure 7.4. In addition, information is available from some 55 private wells (Figure 7.5) located around the quarry of which 20 are reported in use while the remainder are no longer in use. Details of the private wells are given in Appendix 2-2.

7.29 Groundwater level monitoring has been undertaken at Platin since January 1996 and the available data is presented in Appendix 2-2 for both the Company monitoring boreholes and the private well network. The company has an active groundwater

level monitoring programme in place and this will continue in compliance with existing permissions and commitments.

7.30 The water table levels recorded from the monitoring well network for the spring of 2000 are presented in Figure 7.8 in plan view and also incorporated into the cross sections given in Figure 7.9. This groundwater flow pattern represents the steady state flow regime now established by the dewatering programme that has been operational at the existing quarry since the mid 1980's.

Present Groundwater Flow Pattern at Platin

7.31 The dewatering of Platin Quarry is primarily achieved through a single deep pumping well referenced in the accompanying drawings as PW2. This practice has been in operation since 1985 with the dewatering rate increasing steadily since 1995 in keeping with the progressive deepening of the quarry floor. The location of the pumping well has changed over the intervening period, as each operating well has had to be abandoned to allow for the deepening of the quarry floor.

7.32 The practice to date has been to provide a single well for each level and to replace the operating well with a new well as each deeper level was excavated. Older wells were then removed as blasting and quarrying extended across the new floor level. The use of a single well located towards the centre of the excavation has managed to maintain the water table below the base of the excavation with the cone at or close to the toes of the advancing quarry face and quarry margins.

7.33 The quarry has now been excavated to an elevation of 0m OD (i.e. zero metres Ordnance Datum). The continuous abstraction of some 4,400-6,300 m^3/day has lowered the original water table from approximately 35m above OD to the current floor level elevation at 0m OD. The dewatering rate varies with the seasons with the higher pumping rates coinciding with periods of wet weather. Similarly, prolonged dry periods result in lower abstraction rates. The existing regulatory permissions allow for the deepening of the quarry floor to an elevation of minus 20m OD (Ref.: Meath Co. Co. P98/187) and the discharge of some 15,000 m^3/day into the River Nanny at the licensed outfall (Integrated Pollution Control Licence (No. 268), Schedule 2(i).

7.34 Figure 7.9 indicates the present position of the water table at, and surrounding, the Platin excavation and shows how it relates to the current floor level, the final floor level for existing quarry permission and the situation for the proposed extension. This picture, together with the position given in Figure 7.8 shows how the current dewatering regime has generated a cone of depression in the water table centered on the deepest part of the quarry. The regional west to east flow of groundwater has been altered in the vicinity of the quarry as indicated in Figure 7.8.

7.35 Monitoring boreholes completed by the Company in 2000 between the quarry and the River Nanny indicate that the cone has not spread as far as the River Nanny. The measured groundwater levels show how there is still a positive flow of groundwater to the River Nanny with a ridge in the water table remaining between the quarry and the River Nanny.

7.36 The discharge of the pumped groundwater from Platin into the River Nanny prevents any loss of base flow to the lower reaches of the river as a result of the quarry dewatering. In fact, the River Nanny gains in this regard as some 42% of the pumped groundwater is estimated as being captured by the Platin excavation from the River Boyne catchment. This loss of base flow to the lower reaches of the River Boyne is not significant while the gain to the River Nanny is a definite positive feature as the River Nanny is characterised by a particularly low flow regime.

the limestone aquifer. Comparison of the up-stream and downstream analyses shows little significant variation.

Meteorology

7.42 The meteorological office maintains a rainfall station at Duleek village. The 30-year annual average rainfall for this station is 802mm as measured during the period 1951-1980. The monthly averages vary from a low of 51mm in April to a high of 87mm in December. The evapotranspiration figures from Dublin Airport indicate a high of 102mm for August. The average monthly rainfall is lower than the average evapotranspiration during the months April to August. In the remaining 6 months, the rainfall exceeds evapotranspiration with the greatest of rainfall surpluses being recorded in the months November, December and January. The monthly averages of rainfall and evapotranspiration for the Platin area are tabulated in Appendix 2-1.

Impacts of Development

7.43 Water discharges from the quarry and the cement plant are governed by conditions attaching to the Integrated Pollution Control Licence (Register No. 268), issued by the Environmental Protection Agency. Surface water and groundwater are currently monitored, analysed and discharged in conformance with the requirements of this licence.

7.44 Quarry operation at the final floor level of -20m O.D. in the proposed extension will require an increased water abstraction rate, the lowering of the water table at and around the quarry and the extension of the cone of depression associated with the existing dewatering operation. The increased volume of water to be pumped from the quarry will primarily be a function of the permeability and storage of the host limestone bedrock, the recharge to the groundwater regime and the relationship between the groundwater system and the Rivers Boyne and Nanny.

7.45 The availability of current and historical water table measurements at and around the existing excavation provides a most useful database on which to base an analysis of the present level of impacts and to predict the likely scale of impacts associated with the proposed quarry extension. As the extension will be developed in similar geological and hydrogeological conditions to the present quarry it is reasonable to assume that the water level observations relating to the present dewatering can be confidently extrapolated into the extension. In particular it is assumed that the same order of transmissivity and storage found in the Platin Formation at the existing workings will also be present in the extension to the west. The drilling programme carried out indicates that the same fracture flow conditions prevail in the extension with a similar wide variation between low and high yielding boreholes.

7.46 The dewatering of the extension will impact on the local water table and this will have minor implications for the local drainage pattern, the Rivers Boyne and Nanny, private wells and Duleek Commons.

Impact on Boyne and Nanny Rivers

7.47 The increased dewatering rate at the quarry will not draw water directly from either the Boyne or Nanny Rivers, as the cone of depression will not extend that far. It will, however, abstract groundwater that otherwise would have flowed to both the Boyne and Nanny Rivers. It is estimated that approximately 42% of the groundwater pumped at the quarry will originate in the River Boyne catchment and this will cause a reduction in the total base flow in that catchment. However, this loss will be relatively small in the context of the Boyne catchment but will be an important gain to the Nanny River.

7.48 The average annual base flow in the Boyne at the Slane gauging station has been calculated as $7x10^8$ m^3. The withdrawal of the maximum 18,000 m^3/day from the extended Platin quarry represents a reduction of less than 0.5% of the annual Boyne base flow measured at the up stream gauging station at Slane. This impact will be even smaller with respect to the base flow in the Boyne in the Platin area, which is a further 10 km downstream of Slane. The projected maximum groundwater abstraction from the Platin excavation will therefore have no significant impact on the Boyne base flow in the lower reaches of this large river catchment. Neither will there be a discernable impact on water levels in the Boyne, even in periods of low flow.

7.49 The observed groundwater flow pattern indicates that the current dewatering programme retains a positive flow of groundwater to the River Nanny to the south of the quarry. It is expected that this groundwater ridge will remain for the dewatering of the quarry under the present permission. The discharge of the pumped groundwater to the River Nanny at Duleek removes any impact of the quarry on the base flow in the river immediately downstream of the village.

7.50 The present analysis of the groundwater flow pattern indicates that the groundwater ridge to the south of the quarry will remain between the quarry and the River Nanny for the life of the extension. However, the cone of depression could extend to the River Nanny around Beaumont Bridge and leakage from the River Nanny could take place here. However, the net increase in the base flow arising from the increased discharge should compensate for any loss through the stream bed along this stretch.

7.51 The expansion of the cone westwards will reduce the flow in the springs feeding the streams rising to the south of the railway line. Also, the marshy area to the north east of Duleek will be impacted with the contributing catchment reduced in size. However, as the groundwater ridge will remain here, it is unlikely that this wet area will dry up completely.

Impact on Duleek Commons

7.52 The groundwater contours measured in the monitoring boreholes indicate that the present quarry operation has not impacted on the groundwater flow to Duleek Commons. Also, the deepening of the quarry to minus 20m OD will not impact on the wetland. The extension of the quarry westwards would have the potential to alter the groundwater catchment contributing to the wetland. However, restricting the development of the final quarry floor (-20m OD) and the –5m OD floor level to not less than 700m and 300m respectively from the western property boundary will have the effect of maintaining the wetland catchment.

Impact on Private Wells

7.53 The lowering of the regional water table will impact on domestic wells located within the cone of depression associated with the quarry operations. The magnitude of this impact will be a function of the depth of each domestic well, it's proximity to the quarry and the depth of water over the pump intake. Shallow wells located close to the quarry would be most affected by the additional abstraction, while deep wells some distance from the quarry will be least impacted. The company is committed to the continued monitoring of water levels in private wells, as has been the case since 1996. The company has undertaken to remedy any impact on private wells with the agreement of the well owner where the impact results from the quarry dewatering programme. The location of existing private wells and extent of the existing mains water supplies is shown in Figure 7.5.

Impact on Groundwater and Surface Water Quality

7.54 The abstraction of additional volumes of groundwater from the same aquifer is unlikely to alter either the physical or chemical character of the pumped groundwater. The quality of the quarry dewatering discharge is unlikely to change in response to the increased abstraction rate. In these circumstances the discharge water will have no significant impact on the receiving waters as the pumped groundwater should continue to meet potable water standards for colour, turbidity, major ions and trace elements.

Mitigation Measures

River Nanny

7.55 Diverting the additional quarry outflow immediately downstream of Duleek ensures that this water will be available to the River Nanny within the zone of influence of the quarry dewatering. This should be a major benefit to the River Nanny during the low flow periods, as the quarry discharge will provide a net increase into the River Nanny by way of groundwater captured from the River Boyne catchment. In periods of high flow the discharge will revert to the present position as the impact at high flows has been shown to be negligible below this point on the River Nanny. Flows in the River Nanny will be reviewed annually to confirm that there is no negative impact.

Private Wells

7.56 The deepening of the Platin Quarry will result in a slow and continuous lowering of the water table as the excavation extends below the present floor level. The company will monitor the impact of the dewatering by reference to the monitoring boreholes already in existence and for which some base line water level data is already available. The monitoring of the company's well network will provide the earliest notification of any impact resulting from the deepening of the quarry. This approach will allow the company to put in place a range of effective mitigation measures that will include:

(i) the deepening of impacted wells;
(ii) the drilling of new wells; or
(iii) the provision of piped water supplies.

Duleek Commons

7.57 The wetland at Duleek Commons is an integral part of the groundwater system at Platin and the excavation to date has had no impact on the groundwater flow to the wetland. The extension to the west would have the potential to alter the groundwater flow pattern around the wetland. However, restricting the development of the final quarry floor (-20m OD) and the –5m OD floor level to not less than 700m and 300m respectively from the western property boundary has the effect of maintaining the wetland catchment. This position can be monitored over the life of the quarry with reference to the monitoring well network now established around the excavation and at the wetland.

The **head of the EU Waste Management Directorate has also stated** that new incinerators are unlikely to be built in Europe, that **the building of incinerators by countries is not part of the EU's waste management programme**, and that thermal treatment hinders progressive waste resource management initiatives. On 19 May The Guardian stated:

Europe is moving to phase out the building of huge incinerators just as Britain is planning a new chain across the country as part of the Government's waste strategy, Ludwig Kraemer, head of the EU Waste Management Directorate, revealed last night.

In France, Belgium, Holland, Italy, Germany and Portugal no more new incinerators are being built because the public will not stand for them. "They are treated in the same way as nuclear power stations - people no longer want them," he said. Mr. Kraemer said concerns about public health and traffic congestion and pollution caused by the lorries required to deliver hundreds of thousands of tons of waste to each incinerator had turned the public against them. "Once they are built we are talking about creating waste streams for the next 25 years to keep the incinerators going," he said.

EU – Incineration Stifles Alternatives
(June 26th 2000)

" An incinerator needs to be fed for about 20 to 30 years and in order to be economic needs an enormous input from quite a region, so for 20 to 30 years you stifle innovation, you stifle alternatives, just in order to feed that monster which you build"

- Ludwig Kraemer, Head of EU Waste Management, BBC 1 Panorama Documentary "Rubbish",

PLANNING REF.NO. P87/350

REASONS FOR REFUSAL

1 It would endanger public safety by reason of traffic hazard because of the additional traffic turning movements and car parking which would be generated by it on to a substandard road at a point where there is an acute bend with restricted visibility.

2 The parking of cars and service vehicles on this narrow stretch of road would cause a serious traffic hazard.

3 The site is located in an area which is predominately agricultural and the objective of the County Development Plan is to preserve such land for the further development of agriculture. The proposed development would be in conflict with this objective and would militate against the preservation of the rural environment.

Refused by Meath Co-Co. Granted by Bord Pleanala with conditions

Print Date: 03 January 2002

Meath County Council
PLANNING APPLICATIONS

Print Time: 14:57

FILE NUMBER: 87/350

NAME	**Geraldine Campbell**		
DECISION DUE	28/08/1987	**ADDRESS**	Carranstown, Duleek, Co. Meath
APPLICATION STATUS	APPLICATION FINALISED	**SIGNIFICANT IND.**	
APPLICATION TYPE	OUTLINE PERMISSION	**PLANNER**	
DEVELOPMENT	erection of dwelling	**NO. CONDITIONS/REASONS**	3
COMMENT			
RECEIVED DATE	09/04/1987	**M.O. (DECISION) NO.**	1111/87
INCOMPLETE RECEIVED DATE		**DECISION DATE**	21/08/1987
VALID APPLICATION DATE	09/04/1987	**DECISION CODE**	R Refused
		GRANT DATE	
WITHDRAWN DATE		**EXPIRY DATE**	
F.I. REQUEST DATE	29/05/1987	**APPEAL NOTIFICATION DATE**	15/09/1987
F.I. RECEIVED DATE	29/06/1987	**APPEAL DECISION DATE**	08/02/1988
EXTENDED DECISION DATE		**EXTENSION AGREE DATE**	
APPEAL DECISION CODE	C		

***** END OF REPORT *****

Permission for a dwelling for Geraldine Campbell (land owner) was refused by Meath Co. Co. for the reasons stated