

Contents

	Page
1. INTRODUCTION	3
2. AGGREGATES LEVY CREDIT SCHEME (ALCS).....	4
2.1 RESPONSIBILITY FOR THE SCHEME.....	4
2.2 ADMINISTERING THE SCHEME.....	4
2.3 MEMBERSHIP OF THE SCHEME	5
2.4 CURRENT REGULATORY FRAMEWORK.....	6
3. THE CODE OF PRACTICE:	9
3.1 AIMS & OBJECTIVES.....	9
3.2 USING THE CODE OF PRACTICE	9
3.3 ACCREDITED ENVIRONMENTAL AUDITOR.....	10
4. AREAS OF ENVIRONMENTAL IMPACT.....	11
4.1 AIR QUALITY (EXCLUDING DUST)	11
4.2 ARCHAEOLOGY AND GEODIVERSITY	12
4.3 BIODIVERSITY	14
4.4 BLASTING.....	15
4.5 COMMUNITY	19
4.6 DUST (EXCLUDING BLASTING DUST).....	20
4.7 ENERGY EFFICIENCY	22
4.8 ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)	23
4.9 GROUNDWATER	25
4.10 LANDSCAPE AND VISUAL.....	26
4.11 NOISE.....	28
4.12 OIL/CHEMICAL STORAGE & HANDLING	31
4.13 RESTORATION AND AFTERCARE	33
4.14 SURFACE WATER	35
4.15 SECONDARY AGGREGATES USAGE	36
4.16 TRANSPORT (OFF-SITE EFFECTS).....	37
4.17 WASTE MANAGEMENT.....	39
5. ENVIRONMENTAL AUDITS	41
5.1 COMPLIANCE AUDITS.....	41
5.2 ASSESSMENT OF COMPLIANCE.....	42
5.3 IMPROVEMENT ACTIONS	43
5.4 TIMEFRAME FOR ENVIRONMENTAL IMPROVEMENTS	44
5.5 VERIFICATION AUDITS.....	44
5.6 ADJUDICATION OF DISPUTES	45
6. AUDIT PROTOCOL	46
6.1 AIR QUALITY (EXCLUDING DUST)	46
6.2 ARCHAEOLOGY AND GEODIVERSITY	48
6.3 BIODIVERSITY	49
6.4 BLASTING.....	51
6.5 COMMUNITY	53
6.6 DUST (EXCLUDING BLASTING DUST).....	55
6.7 ENERGY EFFICIENCY	57
6.8 GROUNDWATER	59
6.9 LANDSCAPE AND VISUAL.....	61
6.10 NOISE.....	63
6.11 OIL / CHEMICAL STORAGE AND HANDLING.....	65
6.12 RESTORATION AND AFTERCARE	68
6.13 SECONDARY AGGREGATE USAGE	69
6.14 SURFACE WATERS	70
6.15 TRANSPORT (OFF-SITE EFFECTS).....	72

6.16	WASTE MANAGEMENT	74
7.	USEFUL CONTACTS	78

1. INTRODUCTION

The Department of the Environment (the Department) has produced this Code of Practice and related audit protocol in conjunction with Her Majesty's Customs and Excise (HMCE) following consultation with other key stakeholders, including aggregates industry representatives. The Code of Practice is a key element of the Aggregates Levy Credit Scheme (ALCS). Operators who join the ALCS will enter into agreements with the Department to implement environmental improvement targets. These targets will be based on environmental audits of operators' sites, measured against the standards specified in this Code of Practice.

The Code of Practice provides an environmental audit protocol against which each site's performance in key areas of environmental impact can be assessed and appropriate improvement measures identified.

Any queries in relation to any aspect of the Code of Practice should be directed to the Department at the contact points specified in section 7.

2. AGGREGATES LEVY CREDIT SCHEME (ALCS)

The Aggregates Levy Credit Scheme provides a mechanism to deliver the environmental objectives of the Aggregates Levy whilst addressing its adverse economic impacts on the industry in Northern Ireland. Mineral extractors, including quarry operators and sand and gravel extractors, who join the scheme and comply with its environmental obligations, will be entitled to claim relief from payment of the Aggregates Levy at a rate of 80% relief from the full rate. The scheme will run until 31 March 2011. The ALCS is comprised of:

- The Code of Practice & Audit Protocol
- The Aggregates Levy Credit Agreement
- The Aggregates Levy Credit Certificate
- The ALCS Improvement Notice.

2.1 RESPONSIBILITY FOR THE SCHEME

The Department of the Environment will administer the Aggregates Levy Credit Scheme on behalf of Her Majesty's Customs & Excise (HMCE). The Department will be responsible for entering into aggregates levy credit agreements with aggregate operators, monitoring such agreements and issuing and withdrawing aggregates levy credit certificates.

2.2 ADMINISTERING THE SCHEME

The Department will assign staff to ensure the effective operation of the scheme by carrying out the key functions delegated to it, including

- the issue of application forms to applicants who wish to join the ALCS;
- processing of such application forms to include checking that applicants satisfy the conditions for entry to the ALCS, such as, compliance with the basic regulatory consents as listed on the application form;
- establishment and maintenance of a register of traders holding an Aggregates Levy Credit Certificate;
- entering into individual aggregates levy credit agreements (ALCAs) with aggregates operators.
- monitoring of each operator's performance of his/her obligations under an aggregates levy credit agreement;
- termination and suspension of ALCAs;
- the issuing of aggregates levy credit certificates to operators who are and remain compliant with the terms of their underlying aggregates levy credit agreements;
- the withdrawal of aggregates levy credit certificates where appropriate and the notification of such withdrawal as provided for in the Regulations;
- the provision of a central contact point to deal with queries in relation to the operation of the ALCS.

- notification in writing to HMCE Belfast of the withdrawal of any aggregates levy credit certificate together with a brief explanation of why the certificate was withdrawn; and
- operation and oversight of the arbitration scheme to resolve disputes between an operator and DOE in relation to the discharge by the operator of his obligations under an ALCA.

2.3 MEMBERSHIP OF THE SCHEME

To join the Aggregates Levy Credit Scheme operators must apply to the Department and complete an application form. The form requests information relating to the operator, the site and the current regulatory status of the operation. The Department will verify that the site is holding (or has applied for) all the relevant permits or licenses required by the current regulatory framework. When satisfied that the operation is operating within the regulatory framework, the Department will invite the operator to sign an Aggregates Levy Credit Agreement. This agreement is a legally binding contract obliging the operator to comply with all aspects of the ALCS.

2.4 CURRENT REGULATORY FRAMEWORK

The following table outlines the current legislation applying to the minerals extractive industry in Northern Ireland. It also details all licenses and permits required under that legislation.

AREA	EXISTING LEGISLATION	PERMIT/LICENCE (P/L)
Air Quality	IPC (NI) Order 1997 Pollution Prevention & Control Regs (NI) 2003 Air Quality Limit Values (Amend.) Regs. (NI) 2002	IPC require authorisation from EHS Inspectorate if you operate Crushing/Screening equip. in a Hard Rock quarry. 2003 Regs. shall take effect from 2004 onwards, and will require quarries to have a Permit.
Blasting	Planning (NI) Order 1991 H&S at Work (NI) Order 1978 Part II of the Environment (NI) Order 2002	Require planning permission from Planning Service (Minerals Unit). No P/L, just planning permission. All quarries must inform H&S of their existence for inspection. Applies to waste management (site licence) for controlled waste and therefore not quarries.
Dust	Pollution Prevention & Control Regs (NI) 2003 Planning (NI) Order 1991	Shall not come into play until 2008. Require permit. Planning permission from Planning Service.
Noise and Vibration	Planning (NI) Order 1991	Planning permission from Planning Service.
Community	N/A	
Groundwater	Water (NI) Order 1999 Waste Management Licensing Regs. 2003	Requires Water Order Consent from EHS Water Management Unit. Must apply for WO1 Application Form. Applies to controlled waste, which does not currently include

AREA	EXISTING LEGISLATION	PERMIT/LICENCE (P/L)
		quarries, although this may be subject to change..
Surface Water	Water (NI) Order 1999 Planning (NI) Order 1991	Requires Water Order Consent (WO1 Form). Planning permission from Planning Service.
Oil & Chemical Storage	Chemical (Hazard Info. & Packaging for Supply) Regs. (NI) 2003. Waste Management Licensing Regs. (NI) 2003	Apply to controlled waste, therefore not quarries.
Biodiversity	Planning (NI) Order 1991 Part IV of the Environment Order 2002 The Conservation (Nature Habitats) Regs. (NI) 1995	Planning permission from Planning Service. ASSI sites must have consent from EHS. Require planning permission. All SACs are already ASSI sites so the same procedure applies. Require planning permission.
Archaeology & Geodiversity	Planning (NI) Order 1991 Historic Monuments & Archaeological Objects (NI) Order 1995	Planning permission from Planning Service. Only require licence for archaeological excavation, NOT for quarries as they are to do with mineral extraction.
Landscape & Visual	Planning (NI) Order 1991 Waste Management Licensing Regs. (NI) 2003 Part IV of the Environment (NI) Order 2002 Litter (NI) Order 1994	Planning permission from Planning Service. Apply to controlled waste, not quarries. ASSI sites must have consent from EHS. Require planning permission.
Restorations	Planning (NI) Order 1991 Water (NI) Order 1999	Planning permission. Water Order Consent required from EHS.

AREA	EXISTING LEGISLATION	PERMIT/LICENCE (P/L)
	<p>The Conservation (Nature Habitats) Regs. 1995</p> <p>Part IV of the Environment (NI) Order 2002</p> <p>Waste and Contaminated Land (NI) Order 1997</p> <p>Waste Management Licensing Regs. (NI) 2003</p>	<p>SAC sites require consent from EHS and planning permission.</p> <p>ASSI sites require consent from EHS and planning permission.</p> <p>Apply to controlled waste, not quarries.</p> <p>Apply to controlled waste, not quarries.</p>
Waste Management	<p>Waste Management Licensing Regs. (NI) 2003</p> <p>Controlled Waste (Registration of Carriers & Seizure of Vehicles) Regs. (NI) 1999</p> <p>Controlled Waste (Duty of Care) Regs. (NI) 2002</p>	<p>Apply to controlled waste, not quarries.</p> <p>Apply to controlled waste, not quarries.</p> <p>Apply to controlled waste, not quarries.</p>
Transport	<p>Planning (NI) Order 1991</p> <p>Road Traffic (NI) Order 1995</p> <p>Litter (NI) Order 1994</p>	Planning permission.
Energy Efficiency	N/A	
Environmental Management Systems	N/A	

3. THE CODE OF PRACTICE:

The code of practice comprises two related elements:

- A robust code of environmental practice for commercial aggregates operations, identifying the key areas of environmental impact and means of addressing them through the establishment of a structured framework for the management and improvement of environmental performance. The Code Of Practice refines and enhances the existing regulatory framework to suit the specific requirements of Northern Ireland;
- An audit protocol designed to enable the Department to assess the environmental impact of individual commercial aggregates operations against the Code of Practice, identify improvements required, monitor implementation of improvement works and ongoing environmental performance, and monitor the extent of use of secondary materials in place of virgin aggregate.

3.1 AIMS & OBJECTIVES

The formation and implementation of this Code of Practice represents a firm commitment to, and enshrines the principles of, sustainable development. The Code seeks to meet the objectives of the Aggregates Levy; that is, to reduce the environmental impact of minerals extraction by reducing the amount of virgin aggregate extracted and increasing the use of recycled and recovered aggregate. It addresses the key areas of environmental risk for the quarry and sand and gravel extraction industries, and identifies opportunities to manage and reduce associated adverse impacts. The Code establishes a structured framework for the management and improvement of environmental performance in the following areas of mineral extraction:

- Air Quality
- Archaeology & Geodiversity
- Biodiversity
- Blasting
- Community
- Dust
- Energy Efficiency
- Environmental Management Systems
- Groundwater
- Landscape & Visual
- Noise & Vibration
- Oil & Chemical Storage
- Restoration
- Secondary Aggregates Usage
- Surface Water
- Transport
- Waste Management

3.2 USING THE CODE OF PRACTICE

The Code addresses aspects of the industry that have significant impacts on the environment and suggests some general improvement strategies. The suggestions should be viewed as a starting platform. Improvement strategies will require tailoring to suit the nature of the impact and the environmental setting on a site-by-site basis. For companies that chose to join the Aggregates Levy Credit Scheme, this will entail the carrying out of an environmental audit, by an accredited environmental auditor, and the subsequent implementation of environmental improvements specified by the Department.

Where action has been taken on site, to manage an environmental impact, it is vital that objective evidence exists to show that action has been taken. This may comprise a physical feature or an action - for example, planting around a settling lagoon to prevent the wind stirring up silt - or it may require documented evidence, for example, copies of waste management licenses of the waste contractor. In many cases, the use of 'before and after' photographic evidence will be a key method of demonstrating improvements.

3.3 ACCREDITED ENVIRONMENTAL AUDITOR

An accredited environmental auditor is regarded for the purposes of the Aggregates Levy Credit Scheme as an individual either

- (a) holding membership of the Institute of Environmental Management and Assessment (IEMA) at Environmental Auditor level; or
- (b) holding equivalent qualifications and experience.

The IEMA professional standard of Environmental Auditor is available to view on the IEMA website at <http://www.iema.net/htmlpage.php?pname=eARnew>. The detailed qualifications and experience required to meet each standard can be downloaded from this site. Alternatively you can contact IEMA (professional.standards@iema.net) to receive an email copy of the application pack giving all relevant details. Postal and telephone contact details for IEMA are included at Section 7.

The onus is on the operator to ensure that an auditor holds the requisite qualifications and experience. The Department may seek to verify an auditor's qualifications as part of a verification audit (see Section 5.5). If an auditor is subsequently found to be insufficiently qualified, the audit may be considered null and void. In such a case, the operator will have breached the Aggregates Levy Credit Agreement and may be subject to punitive actions including loss of tax relief.

4. AREAS OF ENVIRONMENTAL IMPACT

4.1 AIR QUALITY (EXCLUDING DUST)

Air Quality is a critical issue on both a local and global scale. Emissions to air impact on climate change, and the control and reduction of emissions is fundamental to the UK's contribution to meeting the Kyoto protocol. Locally, it is acknowledged that air quality can have significant impacts on our health and well-being.

Many of the potential air quality impacts an operational site can have are legislated for under the Industrial Pollution Control (Northern Ireland) Order 1997 and the Industrial Pollution Prevention and Control Regulations (Northern Ireland) 2003, as well as under the Alkali and c.Works Order (Northern Ireland) 1991. These regulations impose rigorous controls on emissions from sites. The Code looks to ensure that conditions imposed on sites through the regulations and permits are adhered to. The principal processes on a quarry site that relate to air quality impacts under this legislative framework involve coating plant. Batching and crushing plant also require permits but emissions from these are primarily dust (see item 4.3)

AQ1 Operating prescribed processes – Operators must ensure that a current statutory permit is in place for all prescribed processes and that the conditions of that permit are being adhered to. For process-based guidance contact the Department's Environment & Heritage Service (EHS). To show continued improvement, options exist for actions to be taken over and above that stated in the permit; e.g., if not specified, continuous in-stack monitors are a valuable method of monitoring stack emissions, including variations over time. All permit conditions should be reviewed by the operator and options for further upgrades considered.

AQ2 Burning of material – Do not burn material on site and avoid the production of grey and dark coloured smoke on site.

AQ3 Vehicle transport fumes – Poorly maintained site and road vehicles can generate excess exhaust gases, especially particulates from diesel engines. All site and road vehicles should be regularly maintained and serviced.

4.2 ARCHAEOLOGY AND GEODIVERSITY

Archaeological remains are often found in superficial mineral deposits, particularly in alluvium. Remains can easily be damaged or destroyed by extraction operations. Northern Ireland has a long and rich history, resulting in many archaeological features being recorded and a high potential for new sites to be discovered. Archaeological remains and their study are important because they help to fulfil an innate curiosity about the past; contribute to a sense of tradition and culture and promote a sense of national identity. Their protection is therefore a fundamental part of any mineral operator's responsibility.

'Geodiversity' refers to the variety of geological features and processes that may be evident on a mineral extraction site and certain geological features may also be vulnerable to damage by mineral extraction. However the extraction process will often have a positive impact by exposing features that may then be recorded and, where practical and desirable, preserved.

These two elements are combined within the Code as the improvement measures required for each are similar.

At many sites where modern planning conditions have been applied, suitable controls for preservation of features will exist. This stage will also allow identification of any known/protected features that may require protection under the planning system. In these situations actions to identify and preserve features will have mandatory controls. An important factor in preserving any uncovered features is the restoration plan. Where such finds are made during the operations on site the restoration plan should be reviewed to identify the potential to modify this to incorporate the new features (see Section 4.13).

AG1 Response Plan – In order to maximise the effectiveness of archaeological and/or geological feature conservation, a response plan must be in place in case such features are discovered. Site staff should receive brief training on what typical archaeological or interesting geological features may look like, although common sense on this issue during everyday working operations will also be necessary. Such a response plan may include the following procedures:

- if likely archaeological or interesting geological features are discovered, work should be stopped in that area and staff should be temporarily re-deployed elsewhere on the site
- the site manager should telephone EHS for immediate advice. by law (the historic monuments and archaeological objects (Northern Ireland) Order 1995), archaeological objects discovered must be reported to the EHS Built Heritage Directorate, or to the Ulster Museum, or to the Police Service of Northern Ireland, within 14 days of discovery and details provided of where and how the object was found. The taking of digital photographs and their e-mailing to the Built Heritage Directorate may facilitate the swift appraisal by them of the potential archaeological/geological importance of the find. A site visit by specialists may be necessary; and
- care should be taken to ensure that newly discovered remains and the areas in which they are found, are stable and safe areas in which archaeologists or geologists can work.

It will be important to the operator that the response by the relevant specialists is as rapid as possible, in order that disruption to working activities is minimised and every effort should be made by the operator to achieve this.

Particular care should be taken when extracting alluvium, as this material is often rich in archaeological deposits. The site reclamation scheme should always be modified to take account of new archaeological and geological discoveries.

Specific threats to sites of archaeological or geological interest arise from soil stripping and excavation processes.

AG2 Stripping of Soils – Soil stripping should not be undertaken in wet conditions if possible (normally an operational requirement), as the potential for damaging buried archaeology during wet conditions is greater than during dry conditions. Topsoils should also be stripped and the subsoil surface, where most features may be exposed, should be inspected prior to its excavation and removal. In areas of recognised archaeological interest, subsoils may be left exposed for a period of time, as agreed with the mineral planning authority, to allow inspection by specialists.

AG3 – Mineral extractions – Site management should brief plant operators on the potential for features of geological or palaeontological interest to be encountered within the extraction zone. Site staff should report discovery of any unusual feature to site management who must then implement the response plan.

AG4 De-Watering Operations – such operations can dry out adjacent areas which may contain archaeological remains only preserved because they are submerged. Drainage may initiate rapid decay of the remains and result in damage/destruction of the archaeological resource. Actions to minimise disturbance should take place in appropriate circumstances where a find has been made. This may be achieved by the following:

- leaving an undisturbed safety / buffer zone around the remains
- recharging the area and continuously monitoring the water level to ensure that it does not fall too low; or
- creating a bund around the area and filling it with water to ensure that remains are kept submerged.

4.3 BIODIVERSITY

Conservation of biodiversity is fundamental to sustainable development. The aggregates industry has a key role in protecting and conserving valuable flora and fauna and the habitats in which they thrive. Many of the key actions should have been taken at planning stage and during the restoration, but it is important to maintain vigilance for biodiversity issues throughout the operational life of a site.

It is recognised that mineral sites can have a valuable role to play in developing biodiversity, particularly during their restoration. Over the UK as a whole, many nationally important nature conservation sites have developed in old quarry workings and the potential for increasing local biodiversity may be a defined after-use for a site as part of the scheme of restoration. Aspects relating to the restoration of sites are covered in Section 4.13.

Mandatory control over biodiversity only exists where there is a specified condition within a planning consent or, potentially, where the operations may affect an area of recognised national or international importance that has legal protection.

BD1 Biodiversity related planning constraints – Operators must adhere to biodiversity constraints set out within the planning permission for the site. Failure to do so could result in damage to habitats identified through the planning process as being valuable. Any such areas must be clearly marked off and staff made aware of the importance of such areas. The responsibility for the management of and access to these areas for habitat management and recording must be defined and acted upon.

BD2 Non-designated site - Where no planning conditions apply, operators must review their sites for any areas of potential importance and agree with EHS a scheme of working and restoration that affords the maximum practical protection to any sites that are identified. Particular attention should be paid to disused sections of any quarry and where progressive restoration may be undertaken (see Section 4.13). Schemes should be agreed for access to and management of any identified sites during the operational phase.

BD3 Protected species - Operators must ensure that staff are aware of the key protected species that may occur on site. Should protected species be found, avoid disturbing the habitat and seek guidance from EHS. Occurrence of protected species should be assessed at the planning stage, however, vigilance for protected species should also be maintained during the operational phase of a site, as protected species may be found at any time. Where identified, safe access for naturalists to undertake recording and make recommendations on management must be facilitated.

BD4 Native Species – Operators must ensure that during restoration planning or landscape works, native species, from local seed sources, should be used for all planting if appropriate. Contact EHS for further advice.

4.4 BLASTING

Blasting can create the most noticeable of environmental impacts, although such impacts are usually only temporary and rarely cause structural damage. Planning Service affords a high degree of weight to this issue during decision-making, and can attach stringent conditions to blasting activities.

The impacts of blasting can frequently extend beyond the boundary of the site, and have *potential* for adverse effects on both local residents and their properties. In terms of general improvement measures, the following operational conditions are typical. These may form part of a planning consent and under these circumstances these controls are mandatory:

- limits on the days per year when blasting occurs
- limits on the number of blasts that occur in a day
- limits on the timing of blasts (e.g. only between 10.00 – 12.00 and 14.00 – 16.00 Mondays to Fridays, between 10.00 – 12.00 Saturdays, and with no blasting on Sundays, bank holidays or national holidays)
- audible warnings prior to blasting
- scheme of vibration monitoring prepared and submitted to the Planning Service for approval (see BL1)
- methods for minimising air overpressure (see BL2)
- monitoring to ensure limits are not exceeded (for limits see BL1).

The Health & Safety Executive of Northern Ireland (HSENI) also undertake regulation of blasting although its role relates more to safety than environment.

Additional general improvement measures include the following:

- ensuring adequate separation distances between the working face and any property, to remove the risk of slope failures affecting such adjoining property
- informing local residents prior to blasting, particularly if blasting activities are infrequent
- carrying out face surveys prior to blasting to double-check. If necessary, revise blast design following inspection
- temporarily closing nearby roads if necessary
- if possible, directing detonation away from sensitive locations
- setting up a formal complaints procedure

BL1 Ground vibration – Where blasting may affect local receptors, a scheme of vibration monitoring must be established on site and results made available to all interested parties. This requirement will only be mandated when included within a planning condition or required by HSENI. The following information on the monitoring and control of ground vibration is taken from the Scottish Executive (2000), which is based on data from Vibrock Ltd (1998):

The location and number of monitoring points

Usually the closest vibration-sensitive building to current blasting operations would be the preferred monitoring location. Where blasting takes place in more than one area within a site then more than one monitoring location may be necessary. It may also be

appropriate to monitor at other vibration-sensitive locations that are not the closest to the blast site. In some situations access to a vibration sensitive building may not be practicable. In this case, consideration should be given to the selection of a location away from the building in a general line with the area to be blasted and at which monitoring could be regularly undertaken. Such locations may be at or just within the site boundary.

The type of equipment to be used and the parameters to be measured

The measurement of vibration should be undertaken using specialist monitors designed for the purpose of blast vibration monitoring. Such instrumentation, termed seismographs, should be capable of recording both ground and airborne vibration. Ground vibration should be recorded in terms of peak particle velocity in millimetres per second and in 3 mutually perpendicular directions. Airborne vibration should be measured in terms of decibels (dB) or on a linear scale in terms of pounds per square inch (p.s.i.).

How often the measurements are required to be taken

It would generally be the case that all blasts are monitored in order to be able to demonstrate compliance with a vibration limit. In a situation where measured vibration levels are relatively low when compared with the site limit, it may be appropriate that only a representative sample of blasts is monitored over a given time period. In all cases the scheme should define precisely what is required.

The method by which such data are made available to the planning authority

The results of monitoring should be freely available to the planning authority. Typically the results would be kept at the site and made available for inspection by the planning authority at all reasonable times with copies being supplied to the planning authority upon request.

The method by which such data are used in order to ensure that the site vibration limit is not exceeded and to mitigate any environmental effects of blasting

Procedures may be specified if recorded values exceed an agreed level. Typically these procedures would involve notification of the event to the planning authority together with an assessment of its implication with respect to future blasting activity and the site's vibration limit.

Limits on ground vibrations received at noise or vibration-sensitive properties are also likely to be mandated by planning conditions. For example, vibration levels at sensitive properties may be restricted by conditions to a peak particle velocity (ppv) of 6mm/sec or 10 mm/sec (depending on type of material being worked and other environmental factors) in 95% of all blasts measured, and no individual blast may exceed a ppv of 12 mm/sec.

BL2 Air overpressure and Noise – Noise and vibration are intrinsically linked and improvement of both their impacts is dealt with in this section. All sites where blasting may affect local receptors must have a written scheme of air overpressure control (which will also reduce noise). This may be a requirement of planning and under the HSENI regulations but where this is not the case a voluntary scheme should be developed. The following information taken from the Scottish Executive (2000), which is based on data from Vibrock Ltd (1998), provides guidance on such schemes:

A scheme which details the intended methods to be employed in minimising air overpressure from blasting operations is recommended in preference to limit

values...This is because of the nature of this phenomenon and because conditions that are intended to control its effects need to be both precise and enforceable. Such a scheme would need to be detailed by the operator and agreed with the planning authority.

Although air overpressure can be controlled to a great extent at source by careful attention to blast design and implementation, once detonation occurs the prevailing atmospheric conditions play a significant role in determining air overpressure values at distance from the blast site.

A scheme of air overpressure control should address:

- *the adequate confinement of all explosive charges through sufficient quantity and quality of stemming material (the inert material used to confine or separate explosives in a borehole, usually in the form of angular chippings. NB – fine materials should not be used for stemming because they may create dust)*
- *the adequate confinement of all charges by means of an accurate face survey and subsequent judicious placement of explosive charges*
- *the precautions to be taken in areas known to exhibit weaknesses in the ground*
- *the detonation techniques preferred, including the practicality of prohibiting the use of surface lines of detonating cord*
- *the practicality of prohibiting the use of secondary blasting; and*
- *the procedure to be followed in the event of a misfire*

In addition, detonation cord(s) should be covered, (e.g. with chippings), which will mean that noise becomes a dull ‘thud’ rather than a sharp ‘crack’.

BL3 Dust – Blasting operations must be undertaken in a manner designed to minimise dust generation. Methods to reduce dust (both from the blast itself, and from drilling holes for explosives) include filtering dust from drill rigs, bagging and removing drilling dust from the blast zone, and using angular chippings as stemming material.

BL4 Flyrock – Flyrock is the unexpected projection of debris beyond the blast zone and methods must be adopted (set out within a written scheme) to minimise this effect. It can never be completely eliminated, but it can be minimised by the following:

- conducting face profiling and providing accurate drillers’ logs
- preparing a written specification for blasting and following it exactly (unless authorised otherwise by explosives supervisor)
- carrying out pre-loading face inspections to check for reduced burden or previously unidentified weak zones
- using sufficient and appropriate stemming material (and monitoring size of explosives and stemming during loading)
- using screen nets if necessary
- using toe rather than collar priming/detonation
- correctly training personnel

- ensuring drill holes are accurate (check location and measure hole angle and direction) to avoid hole convergence, and avoid concentration of explosives at a particular point (e.g. corners)
- filling natural rock cavities if they are visible and if practicable
- in the event of a misfire, re-profiling where burden may have been reduced and avoiding use of relieving holes for misfire recovery unless essential.

4.5 COMMUNITY

Public perception of a site and the attitude of local residents are crucial to smooth site operation. It is important that local residents feel they can speak initially and directly to operators and feel there is a prompt and efficient system in place to deal with concerns. The provision of feedback is vital to reassure the community that any issues are being taken seriously and that action is being taken.

Community liaison activity is rarely a mandatory requirement at mineral sites.

CO1 Dedicated Contact – Operators must provide a dedicated contact name and number for the local community and, where practical, make the contact available throughout all operational hours. The contact details must be appropriately publicised.

CO2 Documented Complaints Procedure – Operators must devise and adhere to a complaints procedure that details the complaints process from the initial contact through to resolution. Ensure the procedure prescribes timescales for response.

CO3 Complaints and Corrective Action Log – A log must be maintained of all complaints. This should include dates of when objections were raised, records of corrective actions taken and the eventual outcome. This log will provide objective evidence that complaints have been taken seriously and that corrective action has been implemented.

Optional Improvements

CO4 Educational Initiatives and Open Days – Operators may consider organising open days and conducting educational visits by local schools and colleges. They may also provide opportunities for access to the site for interested parties.

4.6 DUST (EXCLUDING BLASTING DUST)

In terms of its impact on the wider environment, dust rarely presents a serious threat, but its localised effects can be significant. Effects are normally most significant within 100m of the dust source, but can extend up to 1000m in certain situations.

Dust can cause any of the following impacts:

- staining/soiling of surfaces (particularly clothes on washing lines, cars and window sills)
- hazy conditions
- visible plumes
- aesthetic or chemical contamination of water courses
- effects on personal comfort, amenity or health
- damage to vegetation and/or agriculture (particularly if dust contains cement dusts)

Several aspects of dust control are regulated under the Integrated Pollution Prevention Control (IPPC) Regulations, and control and improvement programmes are often applied under the authorisations. These Regulations cover all batching and crushing operations at mineral sites.

For site activities not covered under IPPC, such as soils stripping and replacement, if dust impacts are high and are deemed to be a “nuisance” under environmental law, then enforcement action can be taken by the local authority.

For most modern planning consents, control of dust is usually stipulated within the conditions applied to the consent. Where this applies, control measures are mandatory. The following general improvement measures may be applied to minimise dust impacts:

- locate dust generating activities away from sensitive receptors
- aim to have sensitive receptors, such as houses, upwind (prevailing direction) from the dust source
- the need to transport minerals around the site may be minimised
- ensure maximum protection is obtained from the local topography and vegetation

Dust generation potential is greatest during dry conditions and scheduling of major dust-generating activities, such as soil handling, should avoid extremely dry or windy weather. Similarly, utilising dust suppression watering techniques can minimise dust spread and available methods include the use of the following:

- bowsers
- hand-held pumps
- water trucks with water cannons
- automated water atomising sprays

D1 Operating prescribed processes – Operators must ensure that a current statutory permit is in place for all prescribed processes and that the conditions of that permit are being adhered to. These conditions may include some of the following recommendations set out within the Code. For process-based guidance contact the Environment & Heritage Service.

D2 Conveyor transfer of minerals – Where conveyors are in sensitive locations and are susceptible to dust generation, control measures must be implemented. These may include minimising the speed of conveyors and drop heights, the installation of wind guards and covers on high and steep conveyors, fitting belt cleaning equipment and dust collection systems, and regularly cleaning and maintaining conveyors.

D3 Mineral crushing – Operators must comply with D1. Measures that may be specified for the control of dust include installing water-misting equipment in accordance with manufacturers' advice/specifications; wetting of mineral feed, where practicable; enclosing plant and fitting dust extraction systems.

D4 Batching plant – Operators must comply with D1. Measures that may be specified for the control of dust include use of sealed silos for concrete with automatic alarms to prevent overfilling; sealed mixing areas with dust proof covers; dust extraction filters and sealed materials delivery systems, etc.

D5 Removal and replacement of topsoil – It is recognised that removal or replacement of soils in wet conditions (to control dust) increases the potential to damage soil structures and is not best practice. Soils should only be handled when they are in a dry and friable state; however, in this condition the risk of causing dust rises. Operators must therefore avoid working during dry and windy weather where working is within influencing distance of sensitive receptors and wind direction is towards such receptors.

D6 Mineral stockpiles and loading – Where stockpiles are in sensitive locations measures must be implemented to minimise impacts. Mineral stockpiles are subject to daily addition; reclaim and control measures must take account of this. These may include storage within sheltered bays (potentially three-sided bays with roof), use of atomising sprays or regular wetting, or locating the stocking and loading area at a distance from sensitive receptors. Where stockpiles represent longer term features, consideration should be given to sealing and protection using chemical or physical means.

D7 – Soil and overburden dumps – All soils and overburden dumps that will be in place longer than six months must be seeded as quickly as is practicable, in order to reduce erosion and the consequent dust that this may create.

D8 Road Transport – Operators must ensure that off-site transport of materials does not result in an increase in dust generation beyond the site boundary. The installation of wheel washing equipment is a commonly used method to avoid transferring dust outside the confines of the site. Loaded vehicles must also be covered or treated with a binding agent if dusty materials are being transported.

D9 Internal haul roads - Internal haul roads are often a major source of dust and operators must ensure adequate control. Watering haul roads, to suppress dust generation, using dedicated bowsers, should be undertaken routinely as appropriate to weather and road conditions. Where long-term or heavily used roads exist *in situ*, sprinkler systems, either manually or automatically controlled, can be installed. Where hard surfaced roads are used, these should be kept swept clean.

D10 Mobile Plant – Exhausts on mobile plant should not be directed downwards as this can cause dust rise on roadways or unsurfaced areas.

4.7 ENERGY EFFICIENCY

The direct use of fossil fuels in plant and the indirect use of fossil fuels through consumption of electricity produces a range of pollutants harmful to human health and the environment. Minimising consumption of fuels and electricity will help reduce the impact and help the UK meet its obligations under the Kyoto protocol.

EE1 Purchasing of Plant – Consideration should be given to the efficiency of plant as part of the purchasing criteria. This can lead to reduced whole-life impacts and costs. For example, motors can cost up to 100 times as much to run over ten years as their initial purchase cost. For guidance contact the Government-funded programme Action Energy at www.actionenergy.org.uk or via the Environment and Energy Helpline 0800 585794. This programme has industry-specific guidance for achieving reductions in energy consumption.

EE2 Monitoring Energy Consumption – Operators should establish a monitoring programme to chart energy consumption data for the site. This can be used to identify areas of high-energy consumption, potential savings and a baseline from which improvements can be made. For guidance contact Action Energy. Guidance on monitoring and benchmarking consumption includes *Energy Use in the Minerals Industry (ECG70)* and *The Minerals Industries of Northern Ireland (ECG47)*.

EE3 Compressed Air – Operators should routinely check air compressors and lines for leaks and avoid unnecessary long runs of air-lines. Compressed air is expensive to generate, as most compressors are only 10% efficient. Only operate compressors when required. Contact Action Energy for guidance, including *Energy Savings in the Selection, Control and Maintenance of Air Compressors (GPG241)*.

EE4 Motors and Drives – The purchase and use of high-efficiency motors should be included as a matter of site policy. Motors should be switched off when not in use and motor speeds reduced where possible. Variable Speed Drives can save 30 – 40% on operating costs. For guidance contact Action Energy.

EE5 Transport – Operators should ensure the regular servicing and maintenance of vehicles. Transport planning should aim to reduce the number of journeys required and driver awareness about driving techniques for efficiency should be raised. For guidance contact Action Energy.

EE6 Servicing and maintenance – Regular servicing and maintenance of all plant should be undertaken in order to maintain efficiency.

4.8 ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

An Environmental Management System (EMS) is a systematic management tool, used to identify, manage and improve environmental performance. Most systems are based around the Environmental Management standard ISO 14001. It is possible to have a compliant system certified by an accredited third party assessor to ISO14001 or to the Eco Management Audit Scheme (EMAS). EMAS differs to ISO14001 in that it requires more information to be made public. ISO14001 only requires the policy to be made public.

Attainment of EMS accreditation is not essential for compliance with the code, and will not affect operators' obligations to address environmental impacts in order to achieve compliance. It is not therefore included in the audit protocol, but it is included here because achievement of EMS provides a tangible demonstration, to customers and the general public, of an organisation's commitment to sound management of its environmental responsibilities. This section of the Code provides a framework for an Environmental Management System that will benefit all operators. It also allows for progression to a fully compliant certified EMS.

EMS1 Environmental Policy - An environmental policy should be defined by senior management. It should define the nature and scale of the operations, commit the organisation to legal compliance, pollution prevention and continual improvement. It should be documented, implemented, maintained and communicated throughout the organisation. It should also be available to the public, customers and other interested stakeholders.

EMS2 Register of Aspects and Impacts – Site management should develop a full register of all impacts arising from the operations that may require management activity. In order to manage the environmental impacts of an organisation it is necessary to identify the aspects of a business that have an impact. Aspects are usually identified by means of an Initial Environmental Review (IER). This is a structured survey used to identify where the operations of an organisation interact with the environment, for example, emissions to air, water and land. The Impacts are the effects an aspect has on the environment.

EMS3 Register of Legislation – All operators must be aware of the environmental legislation that affects their activities. A register of the legislation should then be developed. The register should: identify the piece of legislation; state how it is relevant; identify what needs to be done to comply; state who is responsible; identify records that need to be retained; where they should be filed and how long they need to be kept.

EMS4 Operational Controls – Sites should have written operational control procedures for all activities that have the potential to impact on the environment. Operational controls define how a process should be undertaken. They should be written for those tasks on a site that have been identified as being of potential environmental risk, for example, filling an oil tank. They should also include emergency procedures, such as how to deal with an oil spill. Operational controls should identify: who is responsible; how, when and why it should be done and what records need to be retained. All relevant staff should be aware of the operational controls and should know where they can find the procedure if required. Operational control procedures can even be placed at the point where they are needed, for example stuck to the side of the oil tank or placed on the side of a spill kit.

Optional Improvements

EMS5 ISO14001 – Operators may consider the option of developing a full EMS system. The four actions identified above are the basis of a full Environmental

Management system and can be built upon to form a full EMS based around the international management standard ISO 14001 or EMAS.

EMS6, EMS certified to ISO14001 and/or EMAS – Once a full EMS has been implemented, operators should consider certification by an accredited third party. This certification, much like the quality standard ISO9001, can be used to demonstrate environmental credentials to customers and other stakeholders.

4.9 GROUNDWATER

Groundwater represents a highly valuable natural resource. Groundwater, and the cycle of water through the strata, is the natural process by which water is purified. Polluting groundwater and aquifers can damage precious water resources. Altering the hydrology of an area can also have detrimental effects on nearby surroundings, for example, dewatering of wetlands or affecting water supplies.

Within Northern Ireland there are currently no regulations in force to require the licensing of groundwater abstractions. As such the control of abstraction, should impacts occur, is limited under statute. Pollution of groundwater is controlled under the Water (NI) Order 1999. However this generally relates to prosecution of operators following incidents and has limited powers to enforce on-site control measures.

GW1 Monitoring – Where groundwater resources are at risk from site activity, the operator must implement an appropriate monitoring regime. Failure to monitor the effects on groundwater will result in late detection of any potential issues, preventing early identification and implementation of appropriate mitigation.

GW2 Abstraction – A balance between surface and groundwater resources will often meet the required water supply within a site. For each site, reference for the most appropriate resource to use must be sought from the Environment & Heritage Service (EHS) Water Management Unit (contact details are available at Section 7). Once the balance of resource is agreed, groundwater abstraction must be restricted to the agreed quantities. Water-saving systems should be used to reduce abstraction to below the agreed quantity, where practical.

GW3 Pollution of Groundwater – Operators must ensure that measures are in place to minimise the risk of pollution of any groundwater resource. Once pollutants enter the groundwater system, they are very difficult and expensive to remedy. Use low permeability barriers, if necessary, for surfacing any areas where toxic reagents, fuels, oils, etc may be stored or handled (this is covered within the code under OCS8). It should also be noted that surface water bodies (lakes, ponds and streams) also often recharge underlying groundwater, or are fed by groundwater and pollution control measures for groundwater and surface water are closely linked.

GW4 Dewatering – Operators must avoid dewatering where practical. If dewatering is unavoidable, dewater progressively in cells, monitoring effects continuously. Reduce inflow of water by sealing.

GW5 Aquifers – Operations must be designed to ensure that groundwater resources are not left in a vulnerable condition. This may include leaving an effective filter layer (unsaturated zone) above the aquifers and ensuring works allow adequate opportunity for recharge.

Some mineral extraction activities can cause landscape and visual impacts, which may include the following:

- affect some of the existing landscape, e.g. hills, distant views, skyline, etc
- introduce a feature into the landscape which may be alien to it and create a visual intrusion, e.g. a quarry face, overburden mound, machinery, or screening fences and hedges
- screen from view some of the landscape that is otherwise unaffected, e.g. by an overburden mound or plant/equipment

Adverse landscape and visual effects can also have knock-on effects on tourism

‘Landscape’ impacts relate to the impacts upon the physical characteristics or components of the landscape, which together form the character of that landscape, e.g. landform, vegetation and buildings. ‘Visual’ impacts relate to individual ‘receptors’ views of that landscape, e.g. local residents or motorists passing through the area. Within Northern Ireland, as in GB, areas of particularly high landscape value are designated and given protection. Where such areas exist, sensitivity to impacts will be high and improvement measures will need to reflect the specific nature of the designation.

Improvement of landscape impacts is usually controlled within the regulatory system under the planning conditions applied to any permission. These may require the submission and approval of a landscape scheme, which then becomes legally enforceable. As with many other issues, these controls are only likely to apply to more recent planning consents. Enforcement of such conditions is under the control of the Planning Service.

There are a number of general improvement measures that can be undertaken to avoid or minimise landscape and visual impacts. Fundamentally, good site design during the planning application and operational phases is required. Operators should plan ahead for tree/vegetation planting and ongoing management; direction of working; progressive restoration and sensitive siting of processing plant. Good use can be made of existing topography, woodlands, hedges, mounds and general site layout to screen potentially intrusive activities. It is also common to introduce screen planting, landscaping, and/or fencing in order to shield potentially sensitive visual receptors. In addition, the site should have a ‘good housekeeping’ policy that seeks to keep the site tidy and well-maintained.

LV1 – Landscape management plan – site operators must have, or develop, a landscape plan for the site covering the full life cycle from current operations to final restoration. In the case of modern permission this will have formed part of the planning consent. Where a mandatory scheme is not in place a voluntary plan should be developed and agreed with the planning authority. The plan may include the following:

- a review of the site landscape identifying areas of potential landscape sensitivity in both visual and landscape terms. This will include a review of all potentially sensitive receptors within the vicinity of the site (the zone of visual influence). This should also identify any area of specific landscape designations and protected landscapes as well as general landscape character
- review of current and proposed future operations in relation to the landscape setting to identify areas of potential impacts

- development of an improvement strategy to offset the identified impacts to the extent practicable within the confines of an already permitted area of extractions etc. Plan to include screen belts, mounds, plant site colour schemes, operational phasing etc. as appropriate
- plan to identify existing features to be retained during future operations to enhance landscape improvements
- landscape restoration plan
- programme of works to enable improvement to be achieved in a timely manner.

Once developed, the landscape management plan must be held on site and the operations should progress in accordance with the works and programme. Where the plan is to be developed the following items identify some of the specific issues.

LV2 Tall structures – Consideration should be given, preferably during the planning stages of the operation, to the location of tall structures so their landscape and visual intrusion will be minimised. Where adequate screening is not possible, suitable cladding materials should be installed to reduce visual intrusion.

LV3 Open quarry faces, excavation voids, overburden mounds, etc. – The landscape and visual impacts of such features can be major and the landscape works should plan to minimise the impacts. Improvement may be achieved as part of the site restoration scheme and via specific landscape improvement measures such as screen planting; retention of existing visual/screen features; construction and planting up of screening mounds and management of vegetation once established. (Landscape and noise screen mounds may be combined)

LV4 Site entrances – Site entrances are often the most visible part of an operations. These should be kept in a clean and tidy state; have well maintained fencing and planting schemes, as appropriate; signage should be well kept; roads surface cleaned; verges etc, kept cut and tidy and debris, litter, old plant etc removed from view.

LV5 Good House-keeping – Measures include the control and clearance of any litter from around the site and site entrances; cleaning of soils from roads and entrances; maintenance of site waste (such as used oil drums) in contained areas and not spread around the site and cutting of grass verges and weed control around the site and within planting areas, etc. In many cases the visually intrusive features of a site are obvious and where these can be controlled by good house-keeping this should be done.

Environmental noise can cause interference with verbal communication, can disturb work, leisure and/or sleep and can cause annoyance. This can lead to possible effects on people's mental and/or physical health and can also disturb wildlife (particularly breeding birds).

Measures to control noise can be mandatory under two systems. Noise can be classed as a "statutory nuisance". If complaints are made, and the noise is judged to be significant by the Environmental Health department of the district council, measures to control noise would then be required.

Controls on noise, and the imposition of set noise limits at identified properties can also be applied as part of the conditions of a new planning permission. In this situation, the control of noise, to within the set standards, becomes a statutory issue enforceable by the planning service. Such conditions are, however, only likely to apply to more modern permissions.

For extraction and processing activities, which involve both mobile and fixed plant, there are a number of general improvement measures that can be undertaken:

- buffer zones can be incorporated between extraction and processing activities and sensitive receptors in order to mitigate impacts. Such buffer zones can also be useful in resisting the encroachment of new developments towards the extraction site. It is also important to remember that not all noise-sensitive properties are equally sensitive
- advantage can be taken of natural topography and quarry faces to screen noise. Site buildings could also be used to provide a form of screening, if appropriate
- installing acoustic screening can significantly reduce noise effects at sensitive receptors. Simple soil bunds can reduce noise by between 5 and 10 decibels (dB(A)) at the receptor. British Standard 5228 provides advice on various types of acoustic enclosures and screens
- low-noise plant (possibly electric-powered) can be selected so that noise effects are less. It is possible to reduce noise by up to 10 dB(A) by using different earth-moving plant. The power supplies, or the items of plant themselves, could be housed in acoustic enclosures
- plant can be located as far away as possible from sensitive receptors; and
- plant can be regularly maintained, especially the lubrication of bearings/joints and the sharpening of cutting edges; rusty bearings/joints and blunt cutting edges can cause highly irritating noises

For all activities (and certainly specific activities that may be undertaken close to sensitive receptors), consideration may be given to limiting working hours to daytimes only. In evenings and at nighttime, background noise levels are lower and site noise is likely to be more intrusive and experienced by more people. This must, however, be balanced against wider considerations such as the need to supply coated roadstone to highway works conducted at night or during holidays.

General provisions

N1 – General Site operations – Where quarries or plant are in noise sensitive areas operators must develop operational plans and appropriate improvement strategies to

ensure noise impacts from static and mobile plant are minimised. Where conditions relating to site noise are already included within the planning conditions, these will form the basis of the site control measures and must be adhered to. Where plans do not exist, they must be developed and adhered to on a voluntary basis. The plan may consider:

- the sensitivity of different areas of the site to noise impacts
- the site plant that may give rise to noise and their current or proposed locations
- locations of haul roads, convoy routes etc. so as to avoid, where practical, sensitive areas
- provision of appropriate screening measure (soil bunds etc) or other methods at areas of potential noise impacts
- restricting operational hours in areas where impacts may occur
- limiting duration of works for operations that cannot be screened (e.g. areas of final site restoration)
- agreed monitoring locations and noise limits at defined properties

Once developed, the plan must be implemented and monitoring undertaken at noise sensitive locations to ensure the agreed limits are not being exceeded.

Provisions that may be included within the plan are set out below:

Static plant and operations

N2 Drilling – Where in a sensitive location, drilling operations must be conducted at times least likely to cause nuisance. Well-maintained and silenced equipment must be used and portable acoustic barriers installed in highly sensitive locations, if agreed limits or restricted working hours cannot be achieved.

N3 Draglines, excavators and conveyors – As a general measure, operators must keep all draglines, excavators and conveyors well maintained and lubricated, and fit appropriate silencers to all diesel engines. Where appropriate, plant should be located at the lower level (within the excavations) to maximise screening effects.

N4 Pumping - Operators must ensure pumps are well maintained (diesel units with silencers), are located away from sensitive receptors and screened by either local topography or soil mounds or by use of suitable acoustic insulation if required. Night time operation should be avoided in sensitive locations.

N5 Engine noise – All static plant must be well maintained, fitted with appropriate silencers and, if appropriate, be located in acoustically insulated enclosures. Options for the use of electrical plant should be reviewed.

N6 Crushing and screening – Operators must ensure that plant is located away from sensitive receptors and the advantage of available screening (natural topography, building etc) is maximised. In sensitive locations, plant may be housed in acoustically insulated enclosures or specific mounds or screen walls constructed.

N7 Erection, maintenance and movement of plant – Operators must ensure that all such activities are undertaken at times least likely to cause nuisance. Where out-of-hours activity is necessary (weekends, etc.), early starts or late working should be avoided and activities controlled to minimise noise generation within sensitive locations.

Mobile plant and operations

N8 Trucks, dozers, scrapers, loaders - general engine noise – To ensure mobile plant noise generation levels are kept to a minimum, operators must adopt appropriate control measures. These may include selection of low-noise plant, and ensuring that fitted exhaust silencers are in good order and that all equipment is maintained to manufacturers' standards. Tracked vehicles should be regularly lubricated to minimise squeal. Plant operators should be instructed to refrain from over-revving engines at start up to minimise noise generation.

N9 Internal haul roads – Operators must ensure that the maintenance of haul roads is conducted to ensure they have a smooth running surface so reducing vehicle bounce. Where practical, gradients and gradient changes should be kept to a minimum and roads located away from sensitive receptors.

N10 Audible reversing alarms – The need for safety in operation is paramount, but consideration must be given to the use of alternative alarm systems, such as “smart” alarms which monitor the ambient noise levels and only emit an alarm 10 dB(A) above this level. Radar control systems and directional alarms are also available. Operators must discuss the acceptability (or otherwise) of such systems with the Health and Safety Executive and the Planning Service.

N11 Other whistles and sirens – Sites must ensure sirens and whistles are appropriate to their purpose and positioned so that disturbance of sensitive receptors is minimised.

N12 Body slap of empty vehicles – To avoid noise impacts operators must limit working hours to times least likely to cause significant disturbance. Maintenance must ensure that body panels, tailgates, etc are in good order and correctly fitted.

In 2000 about one sixth of all pollution incidents affecting the environment involved oil. The Environment & Heritage Service (EHS) reports that most incidents were caused by oil leaking from tanks whether during storage or delivery. Within the aggregates industry, the storage, delivery and handling of oil and chemicals probably represent the area of highest environmental risk to surface water, ground water and land. This risk can be greatly reduced through adoption of simple practices and by planning for any potential spillage situations. As noted below, recommendations are made that the Pollution Prevention Guidance notes (PPGs) issued by the Environment Agency in GB are referenced. Whilst these are not mandatory in Northern Ireland they are a good source of information and guidance.

OCS1 Bulk Oil and Chemical Storage facilities – Operators must ensure that oil tanks are of good integrity. They must be regularly inspected and well maintained. All tanks should be housed within secondary containment (bund) and constructed in line with *PPG2: Above Ground Oil Storage*, available from EHS. Where systems have underground delivery or discharge lines these must be pressure tested on a regular basis to ensure integrity.

OCS2 Bulk Oil and Chemical Delivery to a Tank – Both management and physical systems must be established on site to minimise the risk of oils and chemical pollution. Notices giving details of safe delivery procedures and what to do in an emergency, available from EHS, must be placed near the delivery point. The fill pipe should be located within the secondary containment. Automatic cut off valves should be fitted; spill kits kept in the vicinity; delivery must be supervised and filling areas should be isolated from surface water system using ramps, roll-overs and bunds etc. For guidance see *PPG1: General Guide to the Prevention of Pollution*, available from EHS.

OCS3 Location of Oil Storage Facility - Oil storage facilities must be sited away from surface water drainage systems, controlled waters and boreholes (minimum 10m from a watercourse and 50m from a borehole).

OCS4 Use of Mobile Bowsers - All bowsers should have appropriate secondary containment e.g. double-skinned. They should always be sited away from sources of potential risk, such as routes used by mobile plant. They should have shut-off valves/trigger guns fitted. All bowsers must be locked outside of operational hours.

OCS5 Manual Handling of Oils and Chemicals – Procedures must be in place on site to minimise the risk of pollution during handling of oils and chemicals. This may include hand pumps being used for the manual extraction of liquids from drums and filling undertaken on impermeable hard standing. Guidance on handling is contained in *PPG11 Preventing Pollution on Industrial Sites and PPG26 Storage and Handling of Drums & Intermediate Bulk Containers*, available from EHS.

OCS6 Signage on bulk oil and chemical tanks and stores - All bulk tanks must be clearly marked as to their contents. Delivery and emergency procedures must also be placed on the tank next to the point of delivery.

OCS7 Storage of drums - Drums must be stored on an impermeable base, within secondary containment. Drum storage areas should be sited away from areas of risk from impact from mobile plant, watercourses and drains. Drums and Intermediate Bulk Carriers (IBCs) should be stored in accordance with *PPG26 Storage and Handling of Drums & Intermediate Bulk Containers*, available from EHS.

OCS8 Pollution incident response – Sites must have spill kits near areas of risk, staff should be trained in correct spill procedures. All incidents must be logged and corrective

actions put in place. Guidance is available in *PPG21 Pollution Incident Response Planning* available from EHS. Direct notification of any incidents should be made to the EHS Water Management Unit on the freephone hotline (0800 80 70 60)

OCS 9 Security and Vandalism - Oil storage facilities must be as resistant as possible to unauthorised interference and vandalism. Any permanent taps or valves must be locked shut when not in use.

Restoration is a fundamental process in repairing the environmental impacts of mineral workings. At a basic level it can entail 'restoration' (simply making a site safe and physically stable, and covered in subsoil, topsoil or soil-making materials) but normally also involves 'aftercare' (full restoration to a defined after-use, including ongoing management and maintenance of the site to ensure restoration success).

Statutory control of restoration works is usually only available under the planning conditions applied at the time of the grant of consent. Where such conditions apply the operator is usually required to submit, for approval by the planning authority, a scheme of restoration and aftercare. This scheme then becomes legally enforceable. In older permissions such conditions may not apply and as such statutory control may not exist.

The potential restoration scheme varies dependent on the nature of the operations. Sand and gravel workings are usually more amenable to progressive restoration and productive after-uses than hard rock quarries. Restoration may also be enhanced by importing fill materials to bring surface levels back to original contours. However any importation of fill will be subject to waste management control and require the appropriate applications and consents. The use of inert materials to infill and restore sites may also require inert waste category discharge consent under the Water (NI) Order 1999.

In developing restoration schemes it is important to consider the potential long term benefits to the local or regional setting of the site that may be achieved via restoration. This may include enhancement of biodiversity, increased public access and amenity, and protection of agricultural lands and may include provision for protection of archaeological or geological features of interest. Irrespective of the final after-use, all sites must be left in a safe and stable condition appropriate to that use.

R1 Restoration Scheme – Operators must hold a copy of any agreed restoration scheme and conduct site works in accordance with it. A restoration scheme is likely to have been required under the planning system, and may have planning conditions associated with it. If there is no mandatory restoration scheme (site opened prior to such requirements being mandatory) then a voluntary scheme must be developed and agreed with DOE. The main issues to be included within such a scheme are set out in R2 onwards.

R2 Proposed after-use - Restoration and aftercare is a highly detailed subject, and comprehensive information is not presented in this Code of Practice, but general issues are considered briefly below. The fundamental factor for any restoration scheme design is to define the proposed after-use of the site. This must take account of, amongst other things, the physical characteristics of the site; adjacent land uses and setting; planning designations; local opinion and the desires of any interested parties.

For any after-use involving plant growth, the restoration scheme needs to consider the following:

- soil stripping and its storage, use and replacement (it is better to re-use immediately than to store)
- storage, use and replacement of overburden
- landscaping and land profiles
- soil treatments (cultivation, drainage, fertilising etc)

- plant types and planting method including any aquatic areas; and
- aftercare requirements

The design of the restoration scheme must also take account of the health, safety and welfare of any subsequent site users. After-use selections may include:

Agriculture - If the original land was classified as “best and most versatile” agricultural land (i.e. Grades 1, 2 or 3a under the Agricultural Land Classification system), then this is considered a national resource and there may be a desire for the after-use to be agriculture.

Forestry- It is an aim of the Government to increase forest coverage over the next 50 years, and a forestry after-use will contribute to this. Forestry use is usually less demanding in terms of landforms and soil types than agriculture. Any after-use involving forestry should comply with the UK Forestry Standard.

Amenity – Flooded sites may lend themselves to use as fisheries or for water sports and may be combined into a country park to facilitate greater public access to the countryside.

Nature conservation – Almost all mineral sites could be developed to provide a nature conservation after-use and help increase local biodiversity. If nature conservation is the intended after-use, soils with a low nutrient content (often subsoils) are preferable as these allow less dominant species to establish. Water areas, rock slopes, upland moorland sites or low valley site can all be adapted to appropriate habitats.

R3 Progressive restoration Progressive restoration must be undertaken where appropriate. This involves ongoing reclamation work performed as and when certain areas within sites are no longer required for operational purposes. Progressive restoration is preferred rather than leaving reclamation works to the end of the operational site life, because it reduces the site’s environmental impacts more quickly. The rate of progressive reclamation (particularly for sand and gravel sites) should be roughly equal to the rate of mineral extraction. Progressive restoration should be incorporated into the overall restoration scheme and works conducted in accordance with this scheme.

R4 Financial provisions for restoration works – Operators must ensure suitable planning for future restoration costs has been undertaken. The need to have finance in place for reclamation is clear; although only in rare cases does Planning Service currently require financial guarantees to ensure reclamation takes place. Consultation with financial experts and accountants is recommended, particularly for advice on taxation issues.

R5 Regulatory authority consultation – Consultation must be undertaken with the regulatory authorities at all stages of restoration for the purposes of both technical advice and advice on land use planning issues, and to agree final completion of the restoration scheme. In GB annual aftercare meetings are a statutory requirement until formal release of the scheme from planning provisions (nominally 5 years after restoration).

R6 Public consultation regarding the restoration scheme – Public involvement in the development of the restoration scheme should be considered by the operators. This approach is preferred, in addition to consultation with the statutory agencies, as it can assist in raising the public image of the company, help define appropriate after-uses and identify any potential socio-economic benefits that may be derived from the scheme.

Unmanaged surface water can carry contaminants from a site and provide a pathway to watercourses, which could result in a pollution incident. Due to the often large areas of land within mineral sites and the nature of the operations, these activities have a high potential to cause surface water impacts, particularly from suspended solids. Particular attention must therefore be paid to water management on site.

Control of discharge from sites is mandatory and sites must achieve the water quality standards set out in any consent. However, requiring on-site action to ensure impacts do not occur is not mandatory unless under a remediation notice following an incident or included within the planning consent.

SW1 Consent to Discharge – Any discharge from a site to surface waters within Northern Ireland requires consent from the Environment and Heritage Service. All sites must hold relevant consents for any discharges and adhere to the consent conditions. These conditions will include a number of factors such as volume, suspended solids, pH, elemental concentration etc. Discharging in breach of consent is a criminal offence.

SW2 Settling of particulates – Operators must ensure that particulates are settled out, in sumps or lagoons before discharge. These must be of adequate size to cope with storm events (using design guidance such as the Wallingford procedure for estimating storm water storage requirements) and should be suitably shielded from the wind to prevent material being ‘stirred up’. Provision must be made for regular removal and appropriate disposal of settled solids to maintain the efficacy of these structures.

SW3 Oil Interceptors and Scum Removal – Operators must ensure oils are not discharged from sites. Interceptors must be installed before final discharge from at-risk areas. Interceptors should be well maintained and emptied as required (the contents should be treated as special waste). Detergents must not be allowed to enter the surface water system, as these will negate the effect of an interceptor. Systems may also be fitted with alarms to indicate when full and be multi-chamber to provide further levels of control on sensitive sites.

SW4 Water Consumption minimisation – Operators must take measures to ensure water use on site is minimised. Water is a valuable natural resource. Mains water has undergone an energy intense process of cleaning and distribution and as such, consumption incurs extra environmental impacts. Mains water use should therefore be minimised. Where possible and appropriate, minimisation and recycling of water should be undertaken and run-off water used on site where appropriate, e.g. for dust control.

SW5 Erosion – Site operators must ensure that excess silt loads are not generated within site run-off water. Erosion will increase concentrations of suspended particulate matter that may place increased pressure on the settling systems and increase the risk of silt pollution. Re-vegetation of exposed areas and soil mounds should be maximised; overburden and waste dumps may be covered using a physical barrier or run-off control measures instigated. Any sensitive water channels may require lining and site operational areas should be kept clean of silt (where practical).

SW6 Site drainage / water management plan – Operators must hold an appropriate site water management plan. This may include clean water (such as from roofs) being separated from dirty water and discharged directly from site (or collected if required). Drainage plans should be held for the site indicating where all site run-off occurs and where statutory discharge points are located. Where formal foul and surface water systems exit on site, these should be shown on a site plan and any appropriate drain covers marked to indicate whether foul or surface.

A key aim of the Aggregates Levy is to reduce the amount of virgin aggregate extracted through increased usage of recycled material. The application to the European Commission for State Aid approval for the introduction of the Aggregates Levy Credit Scheme for Northern Ireland, while acknowledging the limits of the current availability of recycled and alternative materials available in Northern Ireland, gave a commitment that firms would, where feasible, given their location, increase the use of recycled material. It will be a condition of the relief scheme, therefore, that the quarry sector meets an obligation to increase its use of recyclate.

The Study on the Impacts of the Aggregates Levy on Northern Ireland prepared by the Symonds Group for Her Majesty's Customs & Excise estimates that at present the total production of recycled aggregate in Northern Ireland is no more than 280,000 tonnes. In the absence of the conditions necessary for construction & demolition waste recycling to reach significant levels, that figure could increase to no more than 1.28 million tonnes, or 5.5% of total aggregate production.

Following discussions with the Quarry Products Association of Northern Ireland and consideration of its Proposal on the Development of a Recycled Aggregates Industry in Northern Ireland, it has been determined that a target should be set for individual quarries, where feasible, to have achieved a level of use of Construction & Demolition Waste of 5% of their annual extraction figures by 31 March 2011; the end of the period of the scheme. To facilitate the overall objective of increasing use of recyclate most equitably, whilst minimising difficulties associated with monitoring and penalties, the audit protocol includes a section on secondary aggregate usage.

The operator will be given an audit score, just as he is given an audit score for other environmental impacts. The score will derive from provision of verifiable evidence of steps he is taking to work towards the overall target. Such steps could include

SA1 - Evidence of efforts to source recyclate materials

SA2 - Evidence of tonnages of recyclate materials brought on to site

SA3 - Evidence of advising local construction companies and landfill sites of capacity to take in recyclate

SA4 - Evidence of installation of recycling equipment

SA5 - Evidence of acquisition of any additional licences or permits required to undertake recycling activities

SA6 - Evidence of tonnages of recyclate incorporated into aggregate products

This mechanism means that increased recycling activity contributes to an operator's overall compliance level, but that operators who fail to meet their recycling target because the evidence demonstrates that there are valid reasons for failing to meet the target, would only lose entitlement to relief if that failure occurred in conjunction with failure to address other environmental impacts.

TRANSPORT (OFF-SITE EFFECTS)

The movement of minerals by road is the primary mode of transport used by operators, and it can create a number of general environmental impacts:

- it adds to the number and size of vehicles on the roads
- it can increase congestion, accident risk, and difficulties for pedestrians (especially on rural roads and in town centres)
- it can cause vibration, which may adversely affect the physical integrity of buildings
- it can cause damage to road surfaces and verges (particularly on narrow roads); and
- it can create air pollution, dust and noise

In terms of general improvement measures, sensitive routing should, if deemed necessary, be adopted in order to avoid residential or other sensitive areas such as narrow roads or town centres. The Roads Service (an agency of the Department for Regional Development) could issue Weight Restriction Orders on particular routes, or routing agreements could be signed by mutual undertaking (if not part of a planning consent) in order to formalise such routes.

Consideration should be given to alternative means of transportation, such as rail for long distance movements (if facilities are available), or conveyor systems to adjacent sites if applicable.

Impacts can often be worse when privately-owned vehicles are involved. Drivers of such vehicles may not be aware of site-specific circumstances, such as the need to access the site via a certain route, which has been established in order to minimise impacts. Additional care should therefore be taken to inform drivers unfamiliar with the site of any relevant local environmental considerations.

T1 Ingress to and egress from the site – The operator must review site access and establish whether any impacts on congestion, safety, noise, etc. are being caused. Where these are identified consideration must be given to sensitive routing of traffic to and from the site. Provision for safe site entrance design is important and is likely to be tied to Planning Consent conditions and be subject to statutory control.

T2 Dirt on vehicles leaving site – Operators must ensure that dirt from the site is not carried onto the public highway. In order to minimise the amount of dirt on vehicles leaving the site, which in large quantities can be classed as “litter” and can create a danger to motorists as well as a source of nuisance dust, wheel washing equipment or similar must be installed. Provision for road sweeping may also be justified.

T3 Accidental spillage of aggregate on roads – Operators must ensure that loads are properly loaded, trimmed and sheeted, as appropriate, in order to minimise the risks of spillage. In a similar way to dirt on vehicles (above), significant amounts of spilt aggregates on roads can be classed as “litter” and can create a danger to motorists.

T4 Parking facilities on site – sufficient car parking must be provided on the site for visiting vehicles (both lorries and cars, but particularly lorries). If not, off site parking must take account of the likely effects on local residents and be sensitively located. Furthermore, it is beneficial to have a site access of sufficient width or length to avoid the need for vehicles to queue on public roads prior to entering the site.

T5 Aggressive driving, convoying, and other inconsiderate activities – The site should have a written policy on the conduct and controls expected from drivers entering and using the site. This should be provided to all drivers whether employed by the operator or independent. This should include provision to ensure drivers are particularly careful during early morning, late evening and at night, detail any routing agreements and ensure that horns are not used unless in the interests of safety and as absolutely necessary.

T6 Backhaul materials – where materials are being imported to a site, backhaulage should be adopted (as appropriate to material types) to minimise road traffic generated by the site.

Waste can be viewed as a product upon which time and money have been invested, and environmental impacts incurred, which cannot be sold and which may involve paying someone to take away. Bearing this in mind, it is imperative that the amount of waste produced is minimised. The production, handling, storage and disposal of waste is also an area that is heavily regulated. It is important from both a cost and legal compliance perspective that waste is managed effectively. It is necessary to consider mineral working wastes as well as other wastes produced on site.

WM1 Waste Minimisation - With all waste, operators must apply the following waste hierarchy:

1. reduce the amount of waste
2. re-use as much as possible
3. recycle
4. dispose of responsibly to landfill

Minimising the amount of waste produced cuts costs and reduces liability. Guidance is available from the Government-funded Envirowise programme at www.envirowise.gov.uk or via the Environment & Energy Helpline 0800 585794.

WM2 Mineral Working Waste – Operators must develop an appropriate mineral waste management plan for all non-saleable arisings from the workings. Uncontaminated mineral waste may be used for landscaping works and as part of the restoration scheme. Any waste heaps should be vegetated (or subject to other suitable treatment, eg. surface binding agent) to minimise erosion; stored within the site and located to reduce visual intrusion and, where practical, be within the site's water management system so that run-off is subject to the same controls as other water on the site. Where materials are to be used as part of the site restoration, they should be placed in their final location as soon as practical and subject to restoration and aftercare.

WM3 Waste Containers - Waste containers must be provided for all appropriate waste types arising on site. These must be robust and suitable for the material to be stored in them. They should prevent waste escaping into the environment and should not allow water to leach out pollutants. They should deter vandalism i.e. be lockable or placed in a secure area.

WM4 Siting of Waste Storage Facilities - Waste facilities should be stored on hard standing of sound integrity, away from surface water systems. Flammable waste should not be stored next to buildings.

WM5 Waste Management / Carriers Licences – Following the introduction of Waste Management Licensing in Northern Ireland, operators must ensure all waste management contractors and carriers used, are licensed to manage the wastes that are to be consigned. Copies of these licences should be obtained and verified with the regulator.

Operators must ensure a Waste Management Licence is gained for any process that may require licensing. If the process is exempt, ensure there is written confirmation of the exemption. For further information on Waste Management Licensing contact the Environment & Heritage Service (EHS), www.ehsni.gov.uk

WM6 Waste Transfer Notes and Consignment Notes – Operators must ensure Controlled Waste Transfer Notes and Consignment Notes are collected and are completed correctly, including an accurate description of waste consigned. Ensure that the description adequately covers all the waste types in the skip. Transfer Notes must be retained for a minimum of 2 years and Consignment Notes for a minimum of 3 years. For further information on Waste Management Licensing contact EHS, www.ehsni.gov.uk

WM7 Waste Segregation – Operators must be aware of any special wastes that may be generated on site. These must be handled and stored separately from non-special controlled waste. Categories of Special Waste must not be mixed. Ideally, active and inactive wastes should be segregated. Waste contaminated with a material that would be deemed as Special Waste should also be treated as Special Waste and managed in accordance with the Special Waste Regulations (Northern Ireland) 1998 and the Controlled Waste (Duty of Care) Regulations (Northern Ireland) 2002. For further information on Waste Management Licensing contact the Environment & Heritage Service, www.ehsni.gov.uk

5. ENVIRONMENTAL AUDITS

5.1 COMPLIANCE AUDITS

Operators joining the scheme will agree to commission a primary environmental audit, to be carried out by an accredited environmental auditor (see Section 3.3). This audit will follow the Aggregates Levy Audit Protocol (Section 6), addressing all the areas of environmental risk pertaining to the specific site. The audit protocol is generic in nature as it is intended to cover the full scope of works set out within the Code of Practice. The actual conditions at each site will vary and therefore some elements of the code will not always be applicable, and the primary environmental audit will adapt the protocol accordingly, turning it into a site-specific document for each individual site.

This primary audit will record the basic environmental performance on site and will be submitted to DOE for review. DOE will assess the primary audit and establish improvement targets in each of the areas addressed by the audit. The improvement targets will be notified to the operator on an Improvement Notice. This notice will include the following information:

- identification of the area of non-compliance with the Code of Practice
- improvement works to address incidences of non-compliance
- timeframe for the implementation of the works
- formal notification that failure to comply with this notice will result in suspension of the Aggregates Levy Credit Certificate (and therefore in application of the full rate of the levy).
- the date by which the improvements should be re-audited and the updated audit report submitted to DOE (usually 24 months).

5.2 ASSESSMENT OF COMPLIANCE

The audit is set up with a ranking system of 1-5 for each issue with 1 being unacceptable and 5 showing compliance at or above the defined standards. General guidance on the ranking within each category is set out within Table 2.1. However this general guidance will require further refinement for individual issues as the audit protocols are developed to become site specific documents.

Audit score	Guidance
1	<ul style="list-style-type: none"> * Issue of potential high impact significances has not been recognised or improvement action taken. * All mandatory issues are deemed to be of high significance
2	<ul style="list-style-type: none"> * Issue of potential moderate/low impact significance that has not been recognised or improvement action taken. * Partial action taken (such as system in place) on an issue of potential high significant impacts but full control not achieved (e.g. system not operated correctly)
3	<ul style="list-style-type: none"> * Site achieves basic legal compliance with mandatory issues * Site complies with the basic tenet of the code actions for that issue.
4	<ul style="list-style-type: none"> * Monitoring data shows results well within set standards however further improvement works are practical. * Improvement measures are in place and management responsibility to ensure they are conducted is well defined, however, further improvement could be implemented.
5	Works undertaken to a standard that indicate that no further practical action can/need be taken to reduce impacts.

Not all issues within the code will require a full level '5' audit score to achieve compliance. Some issues are simple yes/no type answers which score either 1 or 2 for a "no", dependent on the importance of the issue, or 5 for yes. In other cases, basic legal compliance (normally an audit score 3) may represent the practical limit to the improvement measures at a given site; therefore, it would be scored as a 5. *For example D3 (Dust) – a simple crushing plant, in a low sensitivity site, has its required permit and operates within its conditions, and the regulatory authority is content with operations. In this situation, to require the fitting of further control measures such as misting equipment would be considered unnecessary or inappropriate, so the legal compliance would score 5.*

The incremental scoring system reflects the progression of potential environmental improvements in each category of the audit framework. *For example SW3 (Surface Water) - Oil discharge to surface water - is a significant environmental issue, therefore operator inaction will accrue an audit score of 1. If an interceptor is in place, but is not checked and therefore is prone to failure, then the audit score may be 2. If a system is in place and is cleaned, but there is no clear responsibility for by whom and when this is to be done, the audit score may be 3. If full responsibility and control is clearly defined and the person who is responsible understands their duties, then the audit score may rise to a 4 or, in some circumstances, 5. However, systems incorporating further levels of security, such as oil interceptors fitted with auto alarms or having multi chambers, are more likely to accrue an audit score of 5.*

It is also recognised that certain issues do not currently lend themselves to auditing. In such cases, the issue may be left within the Code as advice but not included within the compliance system. An obvious example is R4 (financial provision for restorations). This is an important issue to highlight to operators but without the setting up of bonds is

difficult to audit. Some issues under energy efficiency, EMS and community may also come into this bracket.

The matter to be determined is whether a site is compliant or not. As set out in Section 3, non-compliance will have various financial implications for aggregate companies and therefore the compliance assessment will be crucial for all concerned. Site protocols should be customised to make them site-specific. This will significantly aid the assessment of compliance as more defined targets/standards will be set out within the site-specific protocols.

The basis of compliance is the incorporation and implementation of continued improvements over an agreed period of time. This approach is based on the results of previously carried out sample audits, which suggest that a number of sites have poor environmental controls. Such sites will require management practice changes and capital investment programmes to upgrade their operations to what may be considered an acceptable standard. It is considered a reasonable approach to provide these sites with a timeframe within which to undertake this work. Once this work has been completed, the Code seeks to raise standards over time; hence the threshold for the compliance assessment will be raised in ensuing audits. The initial compliance assessment would be based on the following criteria:

1. All mandatory issues (planning conditions, authorisations, etc.) achieve legal compliance.
2. No other issue within the code requires major improvement measures to be implemented (Audit score 2 or higher).

The requirement for the assessment of legal compliance as part of the code impacts upon the Code's relationship to the current regulatory system. To ensure there is no overlap or inconsistency, the assessment of legal compliance (and any subsequent enforcement) is retained by the current regulatory authorities. Assessment of compliance with the code in relationship to this issue will then be achieved either by liaison with all regulatory authorities prior to site audits, or by the inspection of the relevant permits/licensing paperwork held by the operator.

As noted within the Code itself the range of issues that will come within the control of the regulatory authorities at each site will vary, dependent in some cases on the planning conditions that have been applied.

For assessment of the ongoing continued improvement of environmental performance, site-specific targets will be derived from the findings of the first audits, which will allow identification of issues (non-mandatory) of importance at each site. Targets for improvements over the external audit period would then be set on an issue by issue basis for the site.

This approach has the advantage of taking account of the specific site conditions and the current site performance, i.e. a high performing site would be expected to achieve less improvement over time than a low performing site.

5.3 IMPROVEMENT ACTIONS

The purpose of the environmental audit is to assess the level of compliance with the Code of Practice. This will enable identification of any requirements for improvement action to correct shortfalls in compliance with the Code of Practice. In terms of identifying suitable improvement actions, the Code of Practice has been developed to provide a summary of generic action to correct any non-compliance for all issues covered within the Code. It is the intention that these measures will cover most of the

issues that may arise on sites; however, more detailed actions may be required. The site operator is ultimately responsible for the appropriate specification and conduct of improvement works.

5.4 TIMEFRAME FOR ENVIRONMENTAL IMPROVEMENTS

Once full compliance has been established it is assumed that no further significant capital investment or management changes should be required at any of the sites. It is accepted that the level of manpower on different sites, with managers at small operations often filling in on the machinery etc, may cause a slight delay in some on-site upgrading of environmental controls; therefore target dates for implementation will be determined following the initial audits. However, the general principle must be that any further non-compliance will be given significantly less time to rectify. A series of factors will be taken into account when setting timeframes:

- the sensitivity of the receiving environment of the non-compliance
- scale of non-compliance e.g. significance of impacts
- whether a legal non-compliance
- site history of previous non-compliance
- nature of remedial actions required
- level of local community complaints

Where significant impacts or legal non-compliance are involved then actions should be with immediate effect. Where the improvement action is seasonal, e.g. such as planting or sowing, then these must be specified for appropriate dates rather than timeframes. In all other cases improvement action should be completed within the timescale stated on the Improvement Notice unless suitable reasons for extension can be presented.

The application of these criteria will take account of the general management practices on site and the previous record of non-compliances. A generally well-managed site, possibly with its own internal Environmental Management System, where a one-off incident caused a non-compliance should not be cause for the tax exemption to be immediately removed. In this instance the Department will request a report on the cause of the incident and what action is being taken. In the case where this was a failure of a regulated discharge, such reports and action notices may already be held by other departments.

For sites that have few formal management controls on site, where overall compliance is marginal and where non-compliance is a regular feature of their operations then such an operation would be deemed in breach of the code.

To assess full legal compliance of an operation, the audit protocols will have to be upgraded to make them site-specific so including all authorisations and planning conditions. This has an impact on the compliance timeframe.

5.5 VERIFICATION AUDITS

Throughout the period of the scheme, the Department will carry out a sample of verification audits to ensure a consistent and accurate approach from operators' auditors. Operators (and their auditors) will be notified not less than 7 days in advance of such a verification audit. The audit may review the entirety of the most recent audit carried out on site, or any part of it. Examination of regulatory permissions and auditors

qualifications may also form part of the verification audit. Operators (and their auditors) will be informed of the outcome of the verification audit.

Where it is considered that the verification audit diverges from the findings of an operator's auditor's report, the Department may take actions to ensure that such divergences are resolved. These actions include discussion and negotiation of additional improvements by way of an Improvement Notice. If such divergences constitute non-compliance with the Code of Practice the Department may consider withdrawal of the Aggregates Levy Credit Certificate.

5.6 ADJUDICATION OF DISPUTES

It is recognised that, from time-to-time, disputes arising from the auditing and verification process will arise. Where possible, it is hoped that such disputes can be resolved through discussion and negotiation between the Department's environmental auditors and operators. In cases where it is not possible to reach a negotiated conclusion, either party may refer the dispute for professional adjudication.

An adjudication scheme for the Aggregates Levy Credit Scheme will be administered by the Chartered Institute of Arbitrators (CI Arb). This service is still in development and will be subject to a fee. The adjudication process is designed to avoid lengthy and potentially expensive court cases. It is proposed that on application to CI Arb, the Institute will allocate the case to one of a list of individuals deemed qualified to assess the facts and make a judgement, by which both parties agree to be bound. Further details of the adjudication process will be sent to all ALCS members in due course.

6. AUDIT PROTOCOL

6.1 AIR QUALITY (EXCLUDING DUST)

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
AQ1	Operating prescribed processes	Release of emissions without or in breach of an emit for an authorised process is a criminal offence	Avoid emissions to air. Avoid producing dark smoke, odours and other potential nuisance. If you operate a prescribed process under LAPC then ensure that the site has obtained the appropriate permit and that it is not in breach of any of the conditions imposed	Ensure a permit has been acquired and that the site is not in breach of the conditions of the permit. Additional measures to upgrade permit conditions could include monitoring stack emissions with continuous stack monitors.		
AQ2	Burning of material	Burning of material and the production of smoke represent local air pollution. This has a detrimental effect on local air quality and will also contribute to global issues such as climate change. It may also represent a nuisance to local residents		Do not burn material on site and avoid the production of grey and dark coloured smoke on site.		
AQ3	Production of noxious and offensive gasses	Release of noxious or offensive gasses may have a detrimental effect on local air quality and may constitute a nuisance to local residents		Avoid the production of noxious and offensive gasses.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
AQ4	Road and site vehicles	Exhaust fumes from diesel engines can reduce local air quality		Ensure both site and off-site vehicle fleet is regularly maintained.		

6.2 ARCHAEOLOGY AND GEODIVERSITY

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
AG1	Response plan	Loss or damage of finds incurred during operation	Particular care should be taken when extracting alluvium. Care should also be taken to ensure that newly discovered remains, and the areas in which they are found, are stable and safe areas in which archaeologists can work.	A Response Plan should be in place in case archaeological remains or important geological deposits are discovered – the reporting of archaeological finds is required by law.		
AG2	Stripping of soils	Can be particularly bad in wet conditions, and when soil is stripped down to clean gravel	The restoration plan should be modified to take account of new discoveries	Avoid wet conditions if possible. In areas of recognised archaeological interests subsoils may be left exposed for an agreed period of time to allow inspection by specialist.		
AG3	Mineral extraction	Loss or damage to geological or palaeontological features of interest		Instruction/training of site staff to raise awareness of potential features. Implement response plan for any finds.		
AG4	De-watering operations	Can dry out adjacent areas which may contain remains which are only preserved because they are submerged. Any change from this may initiate rapid decay, and the consequent damage / destruction of the archaeological resource		Artificial watering, creation of buffer zones or wet working may be instigated.		

6.3 BIODIVERSITY

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
BD1	Biodiversity related planning constraints	Failure to adhere to biodiversity planning constraints could result in damage to habitats identified as being valuable	<p>Planning constraints linked to biodiversity should be adhered to rigorously.</p> <p>Areas of high ecological value should be fenced off and staff made aware.</p> <p>The site should be continually monitored for the possible occurrence of protected species.</p>	<p>Adhere to planning constraints and avoid degrading designated areas.</p> <p>Areas to be marked off and access for recording and management provided.</p>		
BD2	Non-designated sites	Valuable, non-recorded sites may be lost if not identified and protected		Review site for areas of potential value. Agree access and management plans.		
BD3	Protected species	Damage to protected species and their habitat represents a detrimental impact upon biodiversity and could also contravene The Conservation (Nature Habitats etc.) Regulations (Northern Ireland) 1995.		<p>Adhere to any planning constraint imposed with regard to protected species.</p> <p>Monitor the site.</p> <p>Ensure that staff are aware of the key protected species that may occur on site.</p> <p>Should protected species be found, avoid disturbing the habitat and seek guidance from the Environment and Heritage Service.</p>		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
BD4	Use of Native Species	Use of native species in planting can contribute positively to biodiversity		During restoration planning or landscape works, native species for all planting should be used if appropriate. Contact the Environment & Heritage Service for further advice.		

6.4 BLASTING

Impact No	Impact of Blasting	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
BL1	Ground vibration	Can cause damage to property, ranging from minor cosmetic cracks to major structural damage	<p>The following might be activities mandated by planning conditions:</p> <ul style="list-style-type: none"> ▪ Limits on the days per year when blasting occurs ▪ Limits on the number of blasts that occur in a day 	<p>Scheme of vibration monitoring. Make results available to interested parties. (see Code of Practice – may be mandated by planning condition)</p> <p>Limits on ground vibrations received at noise or vibration-sensitive properties</p>		
BL2	Air overpressure and noise	<p>Air overpressure is blast energy transmitted through the air as pressure waves. It can be felt by humans, but is entirely safe. However, it can cause windows to rattle and ornaments to shake in houses</p> <p>Noise can be quite loud, often in the form of a sharp 'crack', but impacts are temporary. Noise can also adversely affect wildlife (particularly breeding birds)</p>	<ul style="list-style-type: none"> ▪ Limits on the timing of blasts ▪ Audible warnings prior to blasting ▪ Methods for minimising air overpressure ▪ Monitoring to ensure limits are not exceeded <p>These can, of course, be undertaken voluntarily, as well as:</p> <ul style="list-style-type: none"> ▪ Ensuring adequate separation distances between the working face and any property, to remove risk of slope failures affecting such property. 	<p>Noise and vibration are intrinsically linked, and are dealt with together in this section</p> <p>Prepare a written scheme of air overpressure control (see Code of Practice for details)</p> <p>Cover detonation cord(s) (noise becomes a dull 'thud' rather than a sharp 'crack')</p>		
BL3	Dust	Blasting creates large piles of rock, which fall to the ground and create dust. Drilling holes for explosives also causes dust.	<ul style="list-style-type: none"> ▪ Personally informing local residents prior to blasting, particularly if blasting activities are frequent 	<p>Filter dust from drill rigs</p> <p>Bag and remove drilling dust from blast zone</p> <p>Use stemming material (angular chippings)</p>		

Impact No	Impact of Blasting	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
BL4	Flyrock	Flyrock is the unexpected projection of debris beyond blast zone, caused by a number of factors. It can represent a danger to human health and safety, and if it carries beyond the site boundary, or injures someone, the event must be reported to the Health and Safety Executive. It can also cause damage to property	<p>infrequent</p> <ul style="list-style-type: none"> ▪ Carrying out face surveys prior to blasting to double-check. If necessary, revise blast design following inspection ▪ Temporarily closing nearby roads if necessary ▪ If possible, directing detonation away from sensitive locations ▪ Setting up a complaints procedure 	<p>Can never be completely eliminated, but can be minimised by:</p> <ul style="list-style-type: none"> ▪ Preparing a written specification for blasting and following it exactly ▪ Using sufficient stemming ▪ Using screen nets if necessary ▪ Using toe rather than collar priming/detonation ▪ Correctly training personnel ▪ Ensuring drill holes are accurate and avoid concentration of explosives at a particular point (e.g. corners) ▪ Filling natural rock cavities if they are visible and if practicable 		

6.5 COMMUNITY

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
CO1	Dedicated contact	Failure to provide a dedicated named contact could result in complainants contacting regulators.	<p>Provide a dedicated contact and phone number, which the local community can contact at any time.</p> <p>Encourage regular liaison between the site and the local community.</p>	<p>Provide a dedicated contact name and number for the local community.</p> <p>Try to make the contact available throughout all operational hours. Publicise this name and number</p>		
CO2	Documented complaints procedure	Adoption of a complaints procedure can help to ensure that complaints are handled in a uniform fashion and within specified timescales.	<p>Provide advance notice to any residents that may be affected by any activities that may cause nuisance.</p> <p>Consider holding open days and encouraging school visits to educate the community.</p> <p>Log any complaints and undertake prompt remedial action.</p>	<p>Write and adhere to a complaints procedure that details the complaints process from the initial contact through to resolution.</p> <p>Ensure the procedure prescribes timescales for response.</p>		
CO3	Complaints and corrective action log	Failure to log complaints and corrective actions may result in unresolved issues and an inability to assess effectiveness of outcomes. It also provides an audit trail to prove that complaints have been taken seriously and that appropriate corrective action was taken.	<p>Liase with the complainant to re-assure them that action is being taken.</p> <p>Log all corrective actions taken so that effectiveness can be reviewed.</p>	<p>Log all complaints in detail.</p> <p>Record corrective actions taken and the eventual outcome.</p>		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
CO4	Educational initiatives and open days	Educating local communities can help to improve the perspective of local residents towards aggregates and there extraction and processing. It can help build relations and inspire confidence in the management of a site.		Consider organising open days and conducting educational visits by local schools and colleges. Provide opportunities for access of interested parties.		

6.6 DUST (EXCLUDING BLASTING DUST)

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments	
D1	Operating Prescribed Processes		<p>If possible, locate dust-generating activities where:</p> <ul style="list-style-type: none"> ▪ Sensitive receptors such as houses are upwind from the dust source ▪ The need to transport minerals around the site is minimised ▪ Maximum protection can be obtained from the local topography and woodland <p>Schedule major dust-generating activities to avoid extremely dry or windy weather</p> <p>Utilise dust suppression watering techniques as appropriate, such as:</p> <ul style="list-style-type: none"> ▪ Bowsers ▪ Hand-held pumps ▪ Water trucks with water cannons ▪ Automated water atomising sprays <p>Install and maintain on plant dust suppression technology recommended by manufacturers</p>	Ensure current permit is in place for all prescribed processes. Ensure all operations meet the conditions of the permit.			
D2	Conveyor transfer of minerals	Dust levels from conveyor transfer activities are often the most significant on mineral extraction sites, particularly because of their continuous, long term, nature.			<p>Minimise speed of conveyors and drop heights to minimise likelihood of dust spread</p> <p>Install wind guards, covers on high and steep conveyors, belt cleaning, and dust collection systems</p> <p>Regularly clean and maintain conveyors</p>		
D3	Mineral crushing				Where problems arise introduce control measures such as water misting; wetting of mineral feed as practicable; enclosing plant and fitting dust extraction systems.		
D4	Batching Plant				To control dust, plant should have sealed silos for concrete with automatic alarms to prevent overfilling, sealed mixing areas with dust proof covers and dust extraction filters etc		
D5	Removal of topsoil and vegetation				Avoid wetting of soils as this can cause damage to soil structures.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
D6	Mineral stockpiles and loading			Mineral stockpiles are likely subject to daily addition and reclaim and control measure where excess generation occurs. Reduce dust generation through storage within sheltered bays (potentially three sided bays with roof), use of atomising sprays or regular wetting, or locate stocking and loading area remote from sensitive receptors. Where stockpiles represent longer term features, consideration should be given to sealing and protection using chemical or physical means.		
D7	Soil and Overburden dump	Exposed soil and overburden can cause dust and be subject to erosion.		All soils and overburden dumps that will be in place longer than 6 months should be seeded as quickly as is practicable.		
D8	Haul roads	Vehicles can carry material onto highways and dust can be emitted from uncovered loads.		Install wheel washing equipment Cover loaded vehicles		
D9	Internal Haul Roads	Can be a major source of dust		Water haul roads with a dedicated bowser as required. Consider installing sprinklers in areas likely to be operational for long periods.		
D10	Mobile Plant	Dust rise		Exhausts on mobile plant should not be directed downwards as this can cause dust rise on roadways and unsurfaced areas.		

6.7 ENERGY EFFICIENCY

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
EE1	Purchasing of plant	Purchasing equipment without assessing energy consumption can result in acquisition of inefficient plant and equipment increasing energy consumption through out the life of the equipment	Always seek to use the most efficient equipment and plant possible. Only operate equipment when it is needed. Regularly service and maintain plant and raise awareness of the need for energy efficiency amongst staff.	Consider efficiency of plant and equipment as part of the purchasing criteria. This can lead to reduced whole life impacts and costs. E.g. Motors can cost up to 100 times as much to run over ten years as their initial purchase cost.		
EE2	Monitoring energy consumption	Monitoring is essential to managing energy consumption. Failure to monitor can result in ineffective identification of potential energy savings and therefore opportunities to reduce the impact and cost		Establish a monitoring programme to chart energy consumption data for the site. This can be used to identify areas of high-energy consumption, potential savings and a baseline from which improvements can be made.		
EE3	Compressed Air	Compressed air is expensive to generate in terms of impact and cost. Compressors are typically only 10% efficient.		Check air compressors and lines routinely for leaks. Avoid unnecessary long runs in air lines. Only operate compressors when required.		
EE4	Motors and Drives	Motors are large consumers of energy. They account for up to two thirds of electrical energy in industry.		Use high efficiency motors. Switch off motors when not in use. Reduce motor speeds where possible – Variable Speed Drives can save 30 – 40%.		
EE5	Transport	Consumption of fuels by vehicles depletes fossil fuels and cause associated emissions, they may also constitute a nuisance		Regularly service and maintain vehicles. Try to reduce the number of journeys required through planning. Raise awareness amongst staff about driving techniques for efficiency.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
EE6	Servicing and maintenance	Poorly maintained plant will be less efficient and consume more energy to carry out the same task than efficient well maintained plant		Regularly service and maintain plant.		

6.8 GROUNDWATER

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
GW1	Monitoring	Failure to monitor the effects on groundwater will result in late detection of any potential issues preventing early identification and implementation of appropriate improvement.	Assess the hydrology of the site before commencing operations. Continually monitor groundwater levels and also affects of abstractions on agriculture, ecology and the land.	Sites should identify and regularly monitor sensitive receptors and record pertinent data.		
GW2	Abstraction	Over abstraction may cause a significant cone of depression and adversely affect the hydrology of an aquifer. It will also provide a pathway to an aquifer for pollutants	Prevent the infiltration of pollutants into the groundwater	EHS Water Management Unit should be consulted on maximum abstraction levels. Operators should use minimisation techniques to reduce below this level.		
GW3	Pollution of Groundwater	Pollutants entering the groundwater could pollute important water resources.		Have appropriate spill kits in areas of risk. Respond to any spill as quickly as possible, contain the spill and remove pollutants through use of appropriate spill kits.		
GW4	Dewatering	Dewatering can adversely affect the Hydrology of an area		Avoid dewatering. If dewatering is unavoidable dewater progressively in cells, monitoring effects continuously. Reduce inflow of water by sealing.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
GW5	Aquifers	Removal of filter layers and failure to provide for sufficient recharge may damage a valuable water resource.		Leave effective filter layers of aquifers and provide adequate opportunity for recharge of aquifers.		

6.9 LANDSCAPE AND VISUAL

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
LV1	Landscape Master Plan		<p>Good site design during the planning application and operational phases can minimise impacts.</p> <p>Operators should plan ahead for planting and management, direction of working, progressive restoration, and siting of processing plant.</p>	<p>Site operators should have or develop a landscape plan for the site covering the full life cycle from current operations to final restoration and closure</p>		
LV2	Tall structures	Introduction of features alien to the landscape can adversely affect that landscape and can cause visual intrusion	<p>Good use can be made of existing topography, woodlands, hedges, mounds, and general site layout to screen potentially intrusive activities.</p> <p>Introduced improvement measures such as screen planting, landscaping, fences, etc. can also be effective.</p>	<p>Consider alternative locations for tall plant – can it be located where its effects will be less visually obtrusive?</p> <p>If unavoidable select suitable cladding.</p>		
LV3	Open quarry faces, excavation voids, overburden mounds, etc.	Can involve destruction of some of the existing landscape, such as a hill, distant view or skyline	The site should have a 'good housekeeping' policy which seeks to keep the site tidy and well-maintained, including paintwork	<p>This may be mitigated as part of a restoration plan.</p> <p>Operators should seek to consult on landscaping requirements with the planning authority</p> <p>Consider use of screen planting, retention of existing visual/screen features, construction and planting up of screening mounds and management of vegetation once established. (Landscape and noise screen mounds may be combined)</p>		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
LV4	Site Entrances	Site entrances are often the most visible part of an operations		Keep entrances clean with well maintained fencing and planting schemes as appropriate, signage should be well kept, roads surface cleaned, verges are kept cut and tidy and debris, litter, old plant etc removed from view.		
LV5	Good House Keeping			Have well maintained fencing and planting schemes as appropriate, signage should be well kept, roads surface cleaned, verges are kept cut and tidy and debris, litter, old plant etc removed from view.		

6.10 NOISE

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
N1	General Site Operations			Develop operational plans and appropriate improvement strategies to ensure noise impacts from static and mobile plant are minimised. Where they exist, noise-related planning conditions will be the basis of the site control measures. Where plans do not exist they should be developed.		
Static Plant and Operations						
N2	Drilling	Likely to cause particular irritation to local residents	Incorporate buffer zones between extraction and processing activities and sensitive receptors.	Undertake drilling operation at times least likely to cause nuisance. Use well maintained silenced equipment. Install portable acoustic barriers if in sensitive locations.		
N3	Draglines, excavators and conveyors		Take advantage of natural topography and quarry faces to screen noise.	Keep all draglines and conveyors well maintained and lubricated to reduce noise. Fit appropriate silencers to all diesel engines.		
N4	Pumping	Likely to be left on overnight, so may cause particular problems	Install acoustic screening	If pump operation is likely to be an issue, ensure the pump is suitably acoustically insulated. Locate away from sensitive receptors.		
N5	Engine noise		Select low-noise plant, possibly electric-powered.	Fit appropriate silencers. If appropriate, locate plant in acoustically insulated enclosures		
N6	Crushing and Screening	Likely to be particularly noisy and may not meet noise limits for normal operations	If possible, locate plant as far away as possible from sensitive receptors. Regularly maintain plant – especially	Locate plant away from sensitive receptors. Make maximum use of natural topography to screen plant. Use acoustically insulated enclosures in sensitive areas.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
N7	Erection, maintenance and movement of plant		lubrication of bearings and sharpening of cutting edges. Limit working hours	Undertake at times least likely to cause nuisance. Where out of hours activity is necessary, avoid early starts or late working and control activities to minimise noise generation within sensitive locations.		
Mobile Plant and Operations						
N8	Trucks, dozers, scrapers, loaders - general engine noise	Likely to cause particular irritation to local residents	Limit working hours	Select low-noise plant. Fit silencers. Maintain plant in accordance with manufacturers' recommendations. Lubricate tracked vehicles regularly to avoid squeal.		
N9	Internal Haul Roads	Uneven roads can increase noise emitted from mobile plant		Keep roads smooth to avoid bounce.		
N10	Audible reversing alarms	Likely to cause particular irritation to local residents		Use alternative alarm systems, such as "smart" alarms which monitor the ambient noise levels and only emit an alarm 10 dB(A) above this level. Radar controls and directional alarms are also available.		
N11	Other whistles and sirens	Likely to cause particular irritation to local residents		Ensure sirens and whistles are appropriate to their purpose, position so that disturbance of sensitive receptors is minimised.		
N12	Body slap of empty vehicles	Likely to cause particular irritation to local residents		Limit working hours.		

6.11 OIL / CHEMICAL STORAGE AND HANDLING

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
OCS1	Bulk oil and chemical storage facilities	Poorly maintained storage facility without secondary containment may leak and cause pollution.	Tanks should be of good integrity and housed within suitable secondary containment. Tanks and drums should be sited away from areas at risk of impact and from surface water systems.	Provide adequate secondary containment of all fixed chemical and oil tanks with a minimum capacity of 110% of the volume of the tank. Secondary containment should be constructed in line with guidance PPG02. Where underground pipework exists it should be regularly pressure tested.		
OCS2	Bulk oil and chemical delivery to tank	Risk of spillage during delivery of bulk oils and chemicals to storage tanks	All storage and filling should be on impermeable hard standing. Spill kits should be placed near areas of risk. All oil storage should be protected from potential vandalism.	Notice giving details on safe delivery procedures and what to do in an emergency, near delivery point (available from EHS). Fill pipe located within the secondary containment. Automatic cut off pipes, spill kits in vicinity, delivery supervised, filling areas isolated from surface water system using ramps, roll-overs and bunds etc.		
OCS3	Location of oil storage facilities	Locating oil storage close to sensitive receptors e.g. water courses, or on permeable ground, shortens the pollution pathway and will reduce the time available to contain any spillage.		Oil storage facilities should be sited away from surface water drainage systems, controlled waters and boreholes (minimum 10m from a watercourse and 50m from a borehole), on an impermeable base with suitable secondary containment to prevent migration of any spill.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
OCS4	Use of mobile bowsers	Bowsers left in areas at high risk of impact e.g. in routes used by mobile plant. Could potentially be punctured by impact. Poorly maintained bowsers and careless use could result in a pollution incident.		All bowsers should have appropriate secondary containment e.g. double-skinned. They should always be sited away from sources of potential risk e.g. routes used by mobile plant and have shut-off valves/trigger guns fitted. All bowsers should be locked outside of operational hours		
OCS5	Manual handling of Oils and Chemicals	Careless handling and inadequate equipment increase the risk of spillage. Undertaking handling activities near surface waters or on permeable ground increases the risk of pollution		Where practical hand pumps should be used for extraction of liquids from drums. Filling should take place on impermeable hard standing. Guidance on handling is contained in PPG11.		
OCS6	Signage on Bulk oil and chemical tanks and stores	Failure to provide signage may result in tanks being used or filled incorrectly. This could result in a pollution incident.		All tanks should be clearly marked as to their contents. Delivery procedures should also be placed on the tank next to the point of delivery.		
OCS7	Storage of drums	Poor storage of drums and intermediate bulk containers without secondary containment may lead to leakages and cause pollution		Drums stored on an impermeable base ideally banded. Drum storage areas should be sited away from areas of risk from impact from mobile plant, watercourses and drains. Drums and IBCs should be stored in accordance with PPG26.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
OCS8	Pollution incident response	Poor pollution response plans, inadequate spill kits and lack of staff training can result in ineffectual pollution control. This could lead to pollution of controlled waters and land contamination		Spill kits, trained staff, spill procedure, incidents logged and corrective actions put in place. Guidance available in PPG21. Incidents should be reported to the EHS Water Management Unit on the free phone hotline (0800 80 70 60)		
OCS9	Security and Vandalism	Unauthorised operation and vandalism could result in discharge of polluting matters to controlled waters.		Oil storage facilities should be as resistant as possible to unauthorised interference and vandalism. Any permanent taps or valves should be locked shut when not in use.		

6.12 RESTORATION AND AFTERCARE

Issue No	Component of Reclamation and Potential Issues	Possible Management Measure(s)	Audit Score	Audit Comments
R1	Restoration Scheme	This should ideally be considered at the project inception, and show a vision of the final result anticipated and the processes required to achieve it. There should be an up-to-date copy of the Reclamation Scheme in the site management office; it should reflect what reclamation works are expected to be undertaken, not simply what was originally planned. The Reclamation Scheme should be fully integrated with the Working Scheme		
R2	Proposed After-use	Any proposed after use must take account of physical characteristics, adjacent land uses, setting, planning designations, local opinion and the desire of any interested parties.		
R3	Progressive Restoration	Progressive restoration is preferable to leaving reclamation works to the end of the operational site life, because it reduces the site's environmental impacts more quickly. The rate of progressive reclamation should be roughly equal to the rate of mineral extraction		
R4	Financial Provisions for Restoration Works	Only in rare cases will a Mineral Planning Authority require financial guarantees to ensure reclamation. The proposed European Directive on the Management of Waste from the Extractive Industries sets out significant changes to the current regime in this area.		
R5	Regulatory Authority Consultation	Consultation is vital		
R6	Public Consultation Regarding Restoration	Public involvement is preferential, and can assist in raising the public image of the company. It can help define appropriate after-uses and identify any potential socio-economic benefits that may be derived from the scheme.		

6.13 SECONDARY AGGREGATE USAGE

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
SA 1	No decrease in use of virgin aggregate	Virgin aggregates are a finite resources and will be exhausted if alternative resources are not developed and used.		Retain evidence of efforts to source recycle material. Retain evidence of advising potential suppliers of capacity to take in recycle material. Installation of recycling equipment. Acquisition of any additional permits required to take in recyclable/recoverable materials. Retain evidence of tonnages of recycle incorporated into aggregate products.		
SA2	No increase in use of recyclates and recovered aggregates.	No decrease in the amount of construction and demolition waste sent to landfill.				

6.14 SURFACE WATERS

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
SW1	Consent to discharge	Discharges to surface waters are strictly controlled through a permit system. Discharging without consent is an offence and without tight environmental controls may lead to pollution of surface waters.	Design surface water systems so that all run off from the site is channelled through a settling process to remove particulates and oil interceptors before it is discharged. Any discharge of Trade effluent to a water course should have consents.	If a consent for any discharge to surface waters exists; strict adherence to the conditions set out in the consent is mandatory.		
SW2	Settling of particulates	Failure to settle out particulates before discharge may lead to pollution of water courses.	Conditions of any consent should be adhered to. Try to minimise use of mains supplied water and maximise the use of surface run off in processes e.g. damping down.	Particulates should be settled out in sumps and lagoons before discharge. These should be of an adequate size to cope with storm increases and should be suitably shielded from the wind to prevent material being 'stirred up'		
SW3	Oil interceptors and scum removal	Without interceptors discharge from the site may be contaminated with oils.		Interceptors should be installed before final discharge. Interceptors should be well maintained and emptied as required (The contents should be treated as special waste). Detergents should not be in the surface water system, as these will negate the effect of an interceptor.		
SW4	Water consumption minimisation	Water is a valuable natural resource. Mains water has undergone an energy intense process of cleaning and as such has extra impacts.		Minimise the use of mains water on sites through the use of recycling and run-off water in processes.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
SW5	Erosion	Erosion around the site will increase the level of suspended particulate matter. This may place increased pressure on the settling systems and could increase the risk of silt pollution.		Vegetate exposed areas, cover mounds of soil, overburden and waste either physically or with vegetation. Progressively restore areas and line water channels.		
SW6	Site Drainage / Water Management Plan			Where practical clean water run-off (such as from roofs) should be separated from dirty water and discharged directly from site (or collected if required). Drainage plans should be held for the site indicating where all site run-off reports. Where formal foul and surface water systems exit on site these should be shown on a site plan and any appropriate drain covers marked to indicate where foulds or surface exit.		

6.15 TRANSPORT (OFF-SITE EFFECTS)

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
T1	Ingress to and egress from site	Can cause disturbance to local community, and impacts may be especially bad during early morning, late evening and at night	Sensitive routing should, if possible, be adopted in order to avoid residential or other sensitive areas. The local Highways Agency could issue Weight Restriction Orders on particular routes, or Routing Agreements could be signed by mutual undertaking.	Review site access and establish whether effects on congestion etc. are significant. Consideration should be given to sensitive routing (see General Possible Improvement Measures)		
T2	Dirt on vehicles leaving site	May create dust, which can cause both a nuisance and adverse impacts on ecology and water resources Can also be classified as 'litter' – the deposit of which is an offence. In large quantities it could also cause a hazard to other motorists	Consideration should be given to alternative means of transportation, such as rail for long distance movements (if facilities are available), or conveyor systems to adjacent sites if applicable. Additional care should be taken to inform drivers unfamiliar with the site of any relevant local environmental considerations	Ensure that vehicles leaving the site are wheel-washed		
T3	Accidental spillage of aggregate on roads	Can be classified as 'litter' – the deposit of which is an offence. In large quantities it could also cause a hazard to other motorists		Loads should be properly loaded, trimmed and sheeted as appropriate.		
T4	Poor parking facilities on site	If vehicles are forced to park on local roads instead of within the site, this can create congestion and parking problems (particularly overnight)		Sufficient car parking should be provided on site. If not, off site parking should take account of the likely effects on local residents		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
T5	Aggressive driving, convoying, and other inconsiderate activities	Can antagonize local residents		<p>Site should have written policy on conduct and controls expected from drivers.</p> <p>Drivers should drive according to the Highway Code, and should take particular care during early morning, late evening and at night.</p> <p>Horns should not be used unless absolutely necessary</p>		
T6	Backhaul materials	Road Traffic		Where materials are being imported to a site, backhaulage should be adopted to minimise road traffic generated by the site.		

6.16 WASTE MANAGEMENT

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
WM1	Waste minimisation	Minimising the amount of waste disposed to landfill can cut bottom line cost and reduce environmental risk	<p>All waste management and transfers should be in accordance with the Duty of Care.</p> <p>Waste should be kept in a suitable container that prevents it escaping including as a result of vandalism.</p>	<p>With all waste look to apply the waste hierarchy:</p> <ol style="list-style-type: none"> 1. Reduce the amount of waste 2. Re-use as much as possible 3. Recycle 4. Dispose of responsibly to landfill 		
WM2	Mineral working waste	Poorly stored and managed mineral working waste can cause nuisance through dust and intrusion into visual amenity. It may also cause pollution if contaminated.	<p>It should also prevent rain water infiltration of the facility as this could result in pollutants being 'leached out'.</p> <p>Waste storage facilities should be on areas of hard standing away from surface water drains and water courses.</p> <p>Waste should only be transferred to carriers licensed to take the particular type of waste being consigned. All transfer notes should be retained for a minimum of 2 years.</p> <p>Special waste i.e. material that is considered difficult to treat, keep or dispose of, should be managed in accordance with the special</p>	<p>Operators must develop an appropriate waste management plan for all non-saleable arisings from the workings.</p> <p>Use uncontaminated mineral waste for landscaping.</p> <p>Try to vegetate waste heaps.</p> <p>Ensure that waste mineral working material is stored within the site and that it is located in an area to reduce visual intrusion to sensitive properties.</p> <p>Where practical ensure it is contained within the sites water management system so that run off is subject to the same controls as other water on the site.</p>		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
WM3	Waste containers	Inadequate waste containers may allow waste to escape into the environment via natural processes or through vandalism.	waste regulations. Categories of special waste should not be mixed and special waste should not be mixed with general controlled waste. Special waste should be stored in suitable containers.	Waste containers should be robust and suitable for the material to be stored in them. They should prevent waste escaping into the environment and should not allow water to leach out pollutants. They should deter vandalism i.e. be lockable or be located in a secure area.		
WM4	Siting of waste storage facilities	Facilities stored on permeable ground or near surface water systems will reduce the length of the pollution pathway and increase the probability of pollution being caused.		Waste facilities should be stored on hard standing of sound integrity, away from surface water systems. Flammable waste should not be sited next to buildings.		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
WM5	Waste management / carriers licences (As & when the Waste Management Licensing regime is introduced)	The Duty of Care and Special Waste regulations place an obligation on consignors to ensure that third parties are competent and will manage waste on their behalf in accordance with regulations. Unlicensed contractors may not adhere to the regulations and waste may cause pollution e.g. fly tipping. This could in turn result in prosecution of the consignor.		<p>Ensure all waste management contractors and carriers used are licensed to manage the wastes that are to be consigned.</p> <p>Obtain copies of their licences.</p> <p>Verify licenses with the regulator.</p> <p>Ensure a waste management licence is gained for any process that may require licensing. If the process is exempt ensure there is written confirmation of the exemption.</p>		
WM6	Waste transfer notes and consignment notes	Correctly completed controlled waste transfers and consignment notes detail what wastes have been consigned. They provide valuable evidence in proving compliance with the regulations.		<p>Ensure controlled waste transfer notes and consignment notes are collected.</p> <p>Ensure they are completed correctly, including an accurate description of waste consigned.</p> <p>Ensure that the description adequately covers all the waste types in the skip.</p> <p>Retain transfer notes for a minimum of 2 years and consignment notes for a minimum of 3 years.</p>		

Impact No	Source of Environmental Risk(s)	Specific Potential Environmental Impact(s)	General Possible Improvement Measure(s)	Specific Possible Improvement Measure(s)	Audit Score	Audit Comments
WM7	Waste segregation	Failure to segregate waste could result in Special waste being co-disposed with non-special waste in a facility not able to cope with hazardous material. This may lead to contamination and pollution.		<p>Special waste should be handled and stored separately from non-special controlled waste.</p> <p>Different categories of special waste should not be mixed.</p> <p>Ideally active and inactive wastes should be segregated.</p>		

7. USEFUL CONTACTS

The following list gives postal, telephone, email and website contacts for organisations and bodies referred to in the Code of Practice.

Name	Postal Address	Telephone & Fax	Email	Website
DOE (Environmental Policy Group) Aggregates Levy Credit Scheme Contact: Maureen Chambers	20-21 Donegall Street Belfast BT1 2GP	P: 02890 544526 F: 02890 544520	Maureen.chambers@doeni.gov.uk	
Her Majesty's Customs and Excise Contact Elaine Crawley	Custom House Custom House Square Belfast BT1 3ET	P: 02890 562771 F: 02890 562975	Elaine.crawley@hmce.gsi.gov.uk	
Environment and Heritage Service Water Management Unit Contact: John McCartney	Calvert House 23 Castle Place Belfast BT1 1FY	P: 02890 254748 F: 02890 254865	EP@doeni.gov.uk	http://www.ehsni.gov.uk/
DOE Planning Service Contact: Lucy Lomas	Minerals Unit Clarence Court 10-18 Adelaide Street Belfast BT2 8GB	P: 02890 540634	Lucy.lomas@doeni.gov.uk	http://www.planningni.gov.uk/

Name	Postal Address	Telephone & Fax	Email	Website
Quarry Products Association NI Contact: Gordon Best	143 Malone Road Belfast BT9 6SU	P:02890 877151	g.best@cefni.gov.uk	
Institute of Environmental Management and Assessment (IEMA)	St Nicholas House 70 Newport Lincoln LN1 3DP	P: 01522 540069 F: 01522 540090	info@iema.net	www.iema.net
Chartered Institute of Arbitrators	International Arbitration Centre Bloomsbury Square London WC1A 2LP	P: 020 7421 7444 F: 020 7404 4023	info@arbitrators.org	www.arbitrators.org
Ordnance Survey NI	Colby House Stranmillis Road Malone Lower Belfast BT9 5BJ	P: 02890 255755 F: 02890 255700	osni@osni.gov.uk	http://www.osni.gov.uk