

4.9 CULTURAL HERITAGE

4.9.1 INTRODUCTION

This section has been prepared on behalf of Roadstone Ltd. in order to assess and define the impact, if any, on the archaeological, architectural and cultural heritage resource of the importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil at Knockanemore townland, County Cork (Ordnance Survey Sheet 072, Figure 4.9-1 Site Location **Error! Reference source not found.**). The report has been prepared by Dermot Nelis.

The proposed development is located approximately 1.5km west of the village of Ovens in the valley of the Bride River, c. 7km west of the centre of Ballincollig and c. 15km west of the centre of Cork City.

The proposed development consists of restoration of part (c. 6.7 ha) of existing quarry by importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil.

The proposed Soil Recovery Facility (SRF) will utilise the permitted quarry infrastructure including internal roads, site office, welfare facilities and other ancillaries to complete the works (Refer to Figure 1.3 - Existing Site Survey Plan). Access to the site will be from the permitted main entrance on the N22 National Primary Road. A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. The total application area including the site infrastructure covers 7.9 ha of lands (Figure 4.9-2).

This desk-based study will determine, as far as is reasonably possible from existing records, the nature of the cultural heritage resource within the proposed development area using appropriate methods of study.

The study involved interrogation of the archaeological and historical background of the proposed development area. This included information from the Record of Monuments and Places (RMP) of County Cork, Topographical Files of the National Museum of Ireland, Cork County Development Plan 2014, cartographic sources, documentary records and aerial photographs. A field inspection was carried out on 18th April 2017 in an attempt to identify any previously unrecorded features and/or portable finds within the proposed development area. A study area of 1km has been imposed around the area of land take.

An impact assessment and mitigation strategy has been prepared. The impact assessment is undertaken to outline potential adverse impacts the proposed development may have on the archaeological, architectural or cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts.



Figure 4.9-1 Site Location

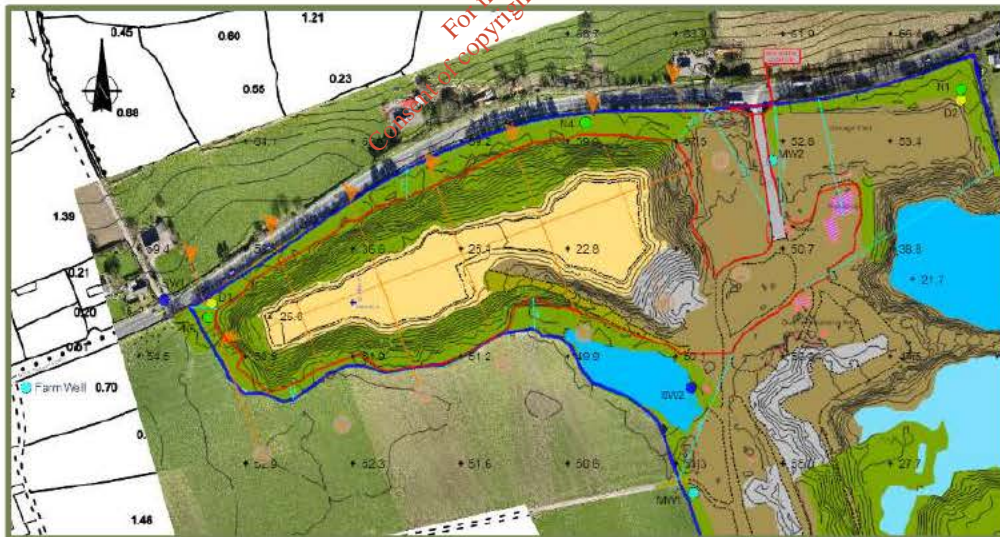


Figure 4.9-2 Site Layout

4.9.2 METHODOLOGY

Research has been undertaken in two phases. The first phase comprised a desktop survey of archaeological, historical and cartographic sources. The second phase involved a field inspection of the proposed development area.

4.9.2.1 Desk Study

4.9.2.1.1 Sources of Information

The following sources were examined, and a list of sites and areas of archaeological, architectural or cultural heritage potential was compiled:

- Record of Monuments and Places of County Cork;
- Topographical Files of the National Museum of Ireland;
- Cartographic and documentary sources relating to the study area;
- Aerial photographs of Ordnance Survey Ireland and Bing aerial photography;
- Cork County Development Plan 2014;
- National Inventory of Architectural Heritage.

Record of Monuments and Places is a list of archaeological sites known to the National Monuments Service. Back-up files of the Sites and Monuments Record (SMR) provide details of documentary sources and field inspections where these have taken place.

Topographical Files of the National Museum of Ireland is the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts, but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within an area of proposed land take, as well as providing important topographical information on sites and areas of archaeological potential. Cartographic analysis of relevant maps has been made to identify any topographical anomalies that may no longer remain within the landscape.

Documentary sources were consulted to gain background information on the historical and archaeological landscape of the proposed development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its potential to contain previously unidentified archaeological remains.

Cork County Development Plan 2014 contains Objectives on the preservation and management of archaeological, architectural and cultural heritage features. It was consulted to obtain information on sites within the proposed development area and the 1km study area.

National Inventory of Architectural Heritage (NIAH) is a section within the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DoAHRRGA). The work of NIAH involves identifying and recording on a non-statutory basis the architectural heritage of Ireland from 1700 to the present day. The NIAH website (www.buildingsofireland.ie) also contains a non-statutory register of historic gardens and designed landscapes in County Cork, and this

was assessed to look for the presence of any such features within the proposed development area and the 1km study area.

4.9.2.1.2 Policy & Legislation

4.9.2.1.2.1 The Archaeological Resource

The National Monuments Act, 1930 to 2004 and relevant provisions of the National Cultural Institutions Act, 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes.

A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Record of Monuments and Places, the Register of Historic Monuments, the placing of Preservation Orders and Temporary Preservation Orders on endangered sites and National Monuments in the Ownership or Guardianship of the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs or a Local Authority.

The Minister may acquire National Monuments by agreement or by compulsory order. The State or the Local Authority may assume Guardianship of any National Monument (other than dwellings). The owners of National Monuments (other than dwellings) may also appoint the Minister or the Local Authority as Guardian of that monument if the State or Local Authority agrees. Once the site is in ownership or Guardianship of the State, it may not be interfered with without the written consent of the Minister.

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic Monuments and archaeological areas present on the Register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the Register is illegal without the permission of the Minister. Two months notice in writing is required prior to any work being undertaken on or in the vicinity of a Registered Monument. The Register also includes sites under Preservation Orders and Temporary Preservation Orders. All Registered Monuments are included in the Record of Monuments and Places.

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs to establish and maintain a Record of Monuments and Places where the Minister believes that such monuments exist. The Record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the State. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994.

Section 12(3) of the 1994 Act provides that:

“where the owner or occupier (other than the Minister for Arts, Heritage and the Gaeltacht) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage and the Gaeltacht to carry out work and shall not, except in the case of urgent necessity and with the consent of the Minister, commence the work until two months after the giving of notice”.

4.9.2.1.2.2 Architectural and Built Heritage Resource

The main laws protecting the built heritage are the Architectural Heritage (National Inventory) and Historic Properties (Miscellaneous Provisions) Act, 1999 and the Planning and Development Act, 2000 (Amended 2010). The Architectural Heritage Act requires the Minister to establish a survey to identify, record and assess the architectural heritage of the country. The National Inventory of Architectural Heritage (NIAH) records all built heritage structures within specific counties in Ireland. As inclusion in the Inventory does not provide statutory protection, the document is used to advise Local Authorities on compilation of a Record of Protected Structures (RPS) as required by the Planning and Development Act, 2000.

The Planning and Development Act, 2000 requires Local Authorities to establish a Record of Protected Structures to be included in the County Development Plan. This Plan includes objectives designed to protect the archaeological, architectural and cultural heritage resource during the planning process. Buildings recorded in the RPS can include Recorded Monuments, structures listed in the NIAH, or buildings deemed to be of architectural, archaeological or artistic importance by the Minister. Sites, areas or structures of archaeological, architectural or artistic interest listed in the RPS receive statutory protection from injury or demolition under the 2000 Act. Damage to or demolition of a site registered on the RPS is an offence. The RPS list is not always comprehensive in every county.

The Local Authority has the power to order conservation and restoration works to be undertaken by the owner of a Protected Structure if it considers the building in need of repair. An owner or developer must make a written request to the Local Authority to carry out any works on a Protected Structure and its environs, which will be reviewed within 12 weeks of application. Failure to do so may result in prosecution.

4.9.2.1.2.3 County Development Plan 2014

The principal mechanism of providing statutory protection to the archaeological sites and monuments is through the provision of the Record of Monuments and Places (RMP), which was established by the National Monuments (Amendment) Act, 1994. The RMP for County Cork lists some 17,000 Monuments, and the corresponding maps and manuals are available for consultation at <http://archaeology.ie>. In addition, some monuments are considered National Monuments and fall under the protection of Section 14 of the National Monuments (Amendment) Act 2004. A National Monument is a monument in the ownership or guardianship of the State and or a Local Authority or monuments that are the subject of a Preservation Order.

It is an Objective of Cork County Council to:

(HE 3-1) Protection of Archaeological Sites

- a) Safeguard sites and settings, features and objects of archaeological interest generally.
- b) Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments including the Sites and Monuments Record (SMR) (see www.archaeology.ie) and the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, as amended and of sites, features and objects of archaeological and historical interest generally.

There are 17 Historic Towns identified in *The Urban Archaeological Survey of County Cork* (1995). There are no Historic Towns within the proposed development area or the 1km study area.

(HE 4-1) Record of Protected Structures

- c) Seek the protection of all structures within the County, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.
- d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.

Chapter 1 of the Cork County Development Plan (*ibid.*, Volume 2, 5 - 50) contains the *Record of Protected Structures* for the county. There are no Protected Structures recorded in the Cork County Development Plan within the proposed development area or the 1km study area.

Chapter 2 of the Cork County Development Plan (*ibid.*, 55) contains a list of *Architectural Conservation Areas* for the county. There are no Architectural Conservation Areas recorded in the Cork County Development Plan within the proposed development area or the 1km study area.

(HE 4-2) Protection of Structures on the NIAH

Give regard to and consideration of all structures which are included in the NIAH for County Cork, which are not currently included in the Record of Protected Structures, in development management functions.

There are no entries recorded on the NIAH building survey within the proposed development area. There are four entries recorded within the 1km study area:

HE 5-1: Cultural Heritage

Protect and promote the cultural heritage of County Cork as an important economic asset.

4.9.2.1.3 Designations

There are no Recorded Monuments, Protected Structures, Architectural Conservation Areas, NIAH structures or NIAH historic gardens within the proposed development area.

4.9.2.2 Field Study

Field inspection is necessary to determine the extent, character and condition of archaeological, architectural and cultural heritage remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

4.9.3 BASELINE DESCRIPTION OF RECEIVING ENVIRONMENT

4.9.3.1 Archaeological & Historical Background

4.9.3.1.1 General

During the Mesolithic period (c. 7,000–4,000 BC) people existed as hunters/gatherers, living on the coastline, along rivers and lakesides. They used flint and other stones to manufacture sharp tools and locating scatters of discarded stone tools and debris from their manufacture can sometimes identify settlements. The native landscape consisted of woodland with hazel, oak, ash and Scot's pine as the primary species, and Mesolithic hunting groups made no significant impact on the landscape.

Mesolithic material has been found as a result of fieldwork carried out in association with the construction of the M8 Motorway road scheme at Curraghprevin and Ballyoran townlands, located approximately 32km and 39km north east respectively of the proposed development area.

The population became more settled during the Neolithic period (c. 4,000-2,400 BC) with a subsistence economy based on crop growing and stock-raising. This period also saw changes in burial practices, and a tradition of burying the dead collectively and carrying out of cremations emerged.

An Early Neolithic house, located approximately 3.5km east of the proposed development area, was excavated in Barnagore townland in 2002 as a result of fieldwork associated with the construction of the N22 Ballincollig Bypass. An Early Neolithic house, along with 26 sherds of Early Neolithic pottery, were also discovered and excavated in Gortore townland in 2003, located approximately 43km north east of the proposed development area. This site was revealed through test trenching associated with the construction of the M8 Motorway road scheme.

The Bronze Age (c. 2,400-600 BC) is characterised by the introduction of metalworking technology to Ireland and coincides with many changes in the archaeological record, both in terms of material culture as well as the nature of the sites and monuments themselves. Though this activity has markedly different characteristics to that of the preceding Neolithic period, including new structural forms and new artefacts, it also reflects a degree of continuity. During this period knowledge of metalworking was acquired resulting in changes in material culture such as the introduction of metal tools and artefacts as well as the introduction of a highly decorated pottery called Beaker pottery. In addition to changes in material culture, there were changes in burial rite from communal megalithic tombs to single burial in cists.

By the 4th millennium BC, a farming economy was developing that involved forest clearance. Archaeological and pollen records show an increasingly settled landscape with some fixed field

boundaries for livestock and cereal production. While farming did spread throughout the country, the preference was for light soils and upland margins with free draining soils and light woodland cover. Bronze Age monuments from County Cork include standing stones, stone pairs, cairns, barrows and *fulachta fiadh*.

A *fulachta fiadh* (RMP CO073-093) is recorded in Knockanemore townland, 850m south of the proposed development area. It is recorded (www.archaeology.ie) as a spread of burnt material measuring approximately 24m north/south x 18m east/west in a ploughed field. (Figure 4.9-3).

Fulachta fiadh, or burnt mounds, are one of the most numerous monument types in Ireland, with over 4,500 recorded examples (Waddell 2005, 174). Their name derives from Geoffrey Keating's 17th century manuscript *FORAS FEASA AR ÉIRINN* and as a complete term it does not appear in any early manuscripts. They are generally interpreted as being used for cooking, while alternative theories include bathing, dyeing, tanning and micro-brewing.

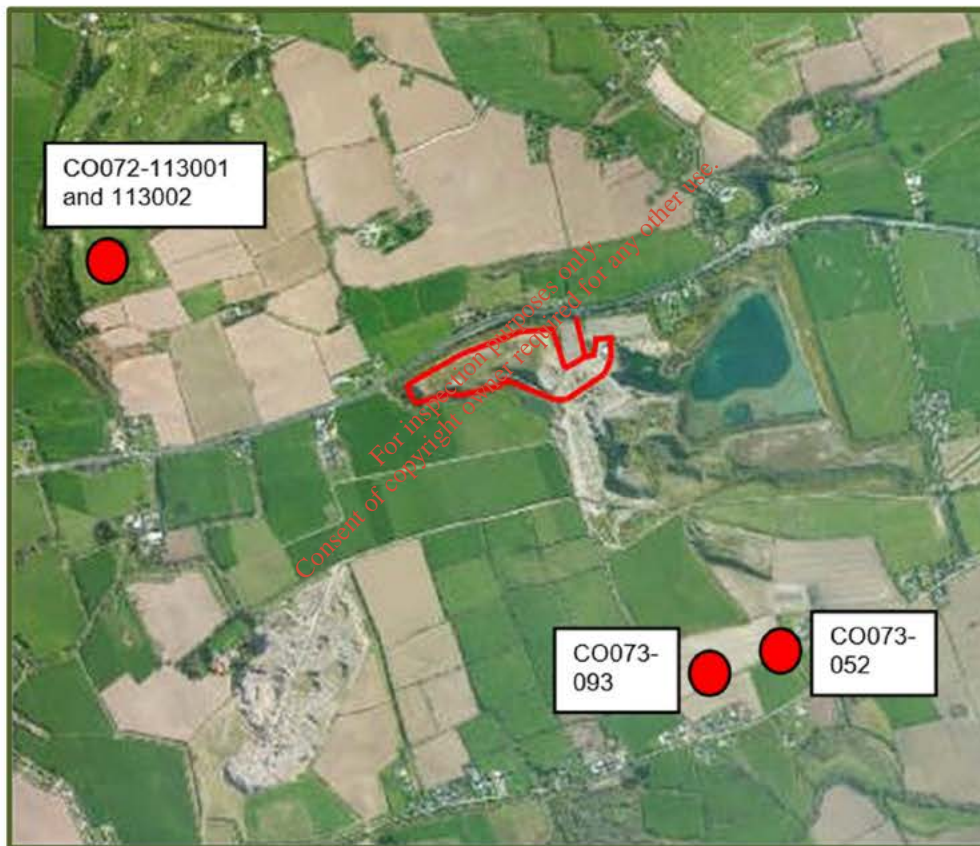


Figure 4.9-3 Aerial photograph showing RMP sites within the 1km study area

During the Iron Age (c. 600 BC-400 AD) new influences came into Ireland which gradually introduced the knowledge and use of iron, although for several centuries bronze continued to be widely used. The Iron Age in Ireland however is problematic for archaeologists as few artefacts dating exclusively to this period have been found, and without extensive excavation it cannot be determined whether several monument types, such as ring-barrows or standing stones, date to the Bronze Age or Iron Age. Most knowledge for this period stems from Irish

folklore, the epic poems and legends of warrior kings and queens that are traditionally believed to be Celtic in origin.

The Early Medieval period (c. 400-1169 AD) is depicted in the surviving sources as entirely rural, characterised by the basic territorial unit known as *túath*. Walsh (2000, 30) estimates that there were at least 100, and perhaps as many as 150, kings in Ireland at any given time during this period, each ruling over his own *túath*.

The new religious culture brought changes in settlement and agricultural patterns. The ringforts and associated field patterns of the Early Medieval period indicate a life largely based on grazing. During this turbulent period roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. They were enclosed by an earthen bank and exterior ditch and ranged from approximately 25m to 50m in diameter. The smaller sized and single banked type (univallate) was more than likely home to the lower ranks of society, while larger examples with more than one bank (bivallate/trivallate) housed the more powerful kings and lords. They are regarded as defended family homesteads and the extant dating evidence suggests they were primarily built between the 7th and 9th centuries AD (Stout 1997, 22-31). The ringfort is considered to be the most common indicator of settlement during the Early Medieval period. The most recent detailed study (*ibid.*, 53) has suggested that there is an approximate total of 45,119 potential ringforts or enclosure sites throughout Ireland.

A ringfort (RMP CO072-113001) is recorded in Clashanure townland, 950m north west of the proposed development area. It is noted (www.archaeology.ie) as a heavily overgrown circular area measuring 60m in diameter, defined by two earthen banks with an intervening ditch. (Figure 4.9-3).

Enclosure sites belong to a classification of monument whose precise nature is unclear. Often they may represent ringforts, which have either been damaged to a point where they cannot be positively recognised or are smaller or more irregular in plan than the accepted range for a ringfort. An Early Medieval date is in general likely for this site type, though not a certainty.

The classification of archaeological monuments is often made difficult by their condition, whether it be the result of deliberate destruction, trampling by livestock or natural weathering and erosion. The term “*earthwork*” is used to denote any monument or feature of artificial origin which cannot be further categorised without excavation. The term “*earthwork site*” indicates sites which were levelled before detailed archaeological inspection took place. The majority of such sites may be levelled or destroyed ringforts.

An earthwork (RMP CO073-052) is recorded in Knockanemore townland, 900m south east of the proposed development area. It is noted (www.archaeology.ie) as an oval area measuring 40m north west/south east x 30m north east/south west and raised 3.6m and 1.65m above the surrounding ground level at its west and south sides respectively. The interior is slightly saucer-shaped and is crossed by a field boundary on a north west/south east axis. According to local tradition, steps were found leading underground c. 1894, suggesting the presence of a possible souterrain. (Figure 4.9-3).

A souterrain (RMP CO072-113002) is recorded in Clashanure townland, 950m north west of the proposed development area. It is noted (www.archaeology.ie) that the site possibly exists in the south west corner of a ringfort (RMP CO072-113001), although there is no further information provided in the SMR file.

Souterrains, deriving their name from the French words *sous* (under) and *terrain* (ground), are underground structures that are often, though not exclusively, found associated with ringforts/cashels. They therefore appear to date to the second half of the first millennium AD. While the distribution of souterrains has yet to be fully investigated, it is known the pattern is uneven and that some areas, such as north Louth, possess a much larger number of sites than elsewhere (Clinton 2001, 33).

The Early Medieval period is also characterised by the foundation of a large number of ecclesiastical sites throughout Ireland in the centuries following the introduction of Christianity in the 5th century. The early churches tended to be constructed of wood or post-and-wattle. Between the late 8th and 10th centuries mortared stone churches gradually replaced the earlier structures. Many of the sites, some of which were monastic foundations, were probably originally defined by an enclosing wall or bank similar to that found at coeval secular sites. This enclosing feature was probably built more to define the sacred character of the area of the church than as a defence against aggression. An inner and outer enclosure can be seen at some of the more important sites; the inner enclosure surrounding the sacred area of church and burial ground and the outer enclosure providing a boundary around living quarters and craft areas. Where remains of an enclosure survive it is often the only evidence that the site was an early Christian foundation.

The commencement of Viking raids at the end of the 8th century and their subsequent settlement during the following two centuries marked the first ever foreign invasion of Ireland. Viking settlement evidence is scarce and has been found in Dublin and Waterford, however, excavations there have revealed extensive remains of the Viking towns. Outside these towns understanding of Viking settlement is largely drawn from documentary and place-name evidence. In addition to Dublin and Waterford, documentary sources provide evidence for the Viking foundation of the coastal towns of Limerick, Wexford and Cork (Edwards 2006, 179). Other indirect evidence which suggest Viking settlement, or at least a Norse influence in Ireland, is represented by upwards of 120 Viking-age coin hoards, possible votive offerings of Viking style objects and the assimilation of Scandinavian art styles into Irish design. Whilst the initial Viking raids would have been traumatic, the wealth and urban expansion brought into the country as a result of Viking trading would have eventually benefited the Gaelic Irish and the cultural assimilation in some parts would have been significant.

The arrival of Anglo-Normans in Ireland towards the end of the 12th century caused great changes during the following century. Large numbers of colonists arrived from England and Wales and established towns and villages. They brought with them new methods of agriculture which facilitated an intensification of production. Surplus foods were exported to markets all along Atlantic Europe which created great wealth and economic growth. Results of this wealth can be seen in the landscape in the form of stone castles, churches and monasteries.

The political structure of the Anglo-Normans centered itself around the establishment of shires, manors, castles, villages and churches. In the initial decades after the Anglo-Norman invasion a distinctive type of earth and timber fortification was constructed- the motte and bailey. Mottes were raised mounds of earth topped with a wooden or stone tower while the bailey was an enclosure, surrounded by an earthen ditch with a timber palisade, used to house ancillary structures, horses and livestock. There are no motte and baileys recorded in County Cork (www.archaeology.ie).

In certain areas of Ireland however Anglo-Norman settlers constructed square or rectangular enclosures, now termed moated sites. Their main defensive feature was a wide, often water-filled, fosse with an internal bank. As in the case of ringforts, these enclosures protected a house and outbuildings usually built of wood. They appear to have been constructed in the latter part of the 13th century, although little precise information is available. There are 138 moated sites recorded in County Cork (www.archaeology.ie).

More substantial stone castles followed the motte and bailey and moated sites in the 13th and 14th centuries. Tower houses are regarded as late types of castle and were erected from the 14th to early 17th centuries. Their primary function was defensive, with narrow windows and a tower often surrounded by a high stone wall (bawn). An Act of Parliament of 1429 gave a subsidy of £10 to "liege" men to build castles of a minimum size of 20ft in length, 16ft in breadth and 40ft in height (6m x 5m x 12m). By 1449 so many of these £10 castles had been built that a limit had to be placed on the grants. The later tower houses were often smaller, with less bulky walls and no vaulting. There are 133 tower houses recorded in County Cork (www.archaeology.ie).

The 14th century throughout north west Europe is generally regarded as having been a time of crisis, and Ireland was no exception. Although the Irish economy had been growing in the late 13th century, it was not growing quickly enough to support the rapidly expanding population, especially when Edward I was using the trade of Irish goods to finance his campaigns in Scotland and Wales. When the Great European Famine of 1315-1317 arrived in Ireland, brought about by lengthy periods of severe weather and climate change, its effects were exacerbated by the Bruce Invasion of 1315-1318. Manorial records which date to the early 14th century show that there was a noticeable decline in agricultural production. This economic instability and decline was further worsened with the onset of the Bubonic Plague in 1348.

Before the Tudors came to the throne the kings of England were also the kings of western France and so, during the 14th and 15th centuries, the various lords who ruled in Ireland were largely left to themselves. The Tudor conquest however brought a much greater interest in the affairs of Ireland. They wanted to put a stop to the raids of the Gaelic Irish on the areas under English rule. To do this, they ruthlessly put down any rebellions and even quashed inter-tribal feuds. English settlers were then brought in to settle their lands. The first of these plantations occurred in the mid-16th century in what is now Laois and Offaly. After the Desmond rising in Munster in 1585 came another plantation, and parts of south western Tipperary were planted at that time.

From 1593 until 1603, there was a countrywide war between the Gaelic Irish, who were supported by the French, and the Elizabethan English. The Irish were finally defeated and with the "*Flight of the Earls*" from Rathmullan, County Donegal in 1607, Ulster, which had previously been independent of English rule, was planted.

Expansion in the agricultural sector following a period of economic growth in Ireland from the mid-1730s led to rising prices and growth in trade. This increase in agricultural productivity resulted in growth in related industrial development throughout the country.

The proposed development area is located in Knockanemore townland, which is in barony of Muskerry East and parish of Athnowen. Lewis (1837, Vol. I, p. 89) notes that the parish:

“comprises 4660 statute acres, as applotted under the tithe act, and valued at £7594 per annum: the soil in the northern or hilly part is rather poor and stony, but in the vales extremely rich, lying on a substratum of limestone forming part of the great limestone district extending to Castlemore on the west, and to Blackrock on the east. The limestone is quarried to some extent for burning into lime for the supply of the hilly districts to the north and south for a distance of several miles”.

4.9.3.1.2 Summary of Previous Fieldwork in the Study Area

Reference to Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie) revealed that one fieldwork exercise (Reference Number 07E0659) has been carried out in Knockanemore townland, the location of the proposed development.

A single test trench measuring 13m in length was excavated in the car park of Ovens church, which is a 19th century parish church. No archaeological features or artefacts were revealed.

4.9.3.1.3 Topographical Files of the National Museum of Ireland

Information on artefact finds and excavations from County Cork is recorded by the National Museum of Ireland (NMI). Location information relating to such finds is important in establishing prehistoric and historic activity in the study area.

There is one entry recorded in the Topographical Files for Knockanemore townland.

A souterrain (no National Museum of Ireland reference) was discovered in 1970 during excavation of a gravel pit. The site was interpreted as a multi-chambered structure, constructed by excavation in to a gravel bed. It is recorded as RMP CO073-054 and is located 1.9km east of the proposed development area.

4.9.3.1.4 Cartographic Analysis

Ordnance Survey Map First Edition 1:10,560 1842 (Figure 4.9-4)

A townland and parish boundary are recorded a short distance to the west and south of the proposed development area, while a townland boundary is recorded a short distance to the north. Research suggests that:

“hoards and single finds of Bronze Age weapons, shields, horns, cauldrons and gold personal objects can all be shown to occur on boundaries” (Kelly 2006, 28).

A small north/south oriented structure in a slightly wooded setting is recorded to the south of the proposed development area and outside the area of land take. Two small structures in a slightly wooded setting are also recorded a short distance to the north of the proposed development area, and again outside the area of land take. A north/south oriented path is recorded extending across the proposed development area. The development area is recorded as being made up of medium sized fields with regular boundaries on the First Edition map.

There are no additional archaeological, architectural or cultural heritage features recorded on the First Edition 1:10,560 map within the area of proposed land take.

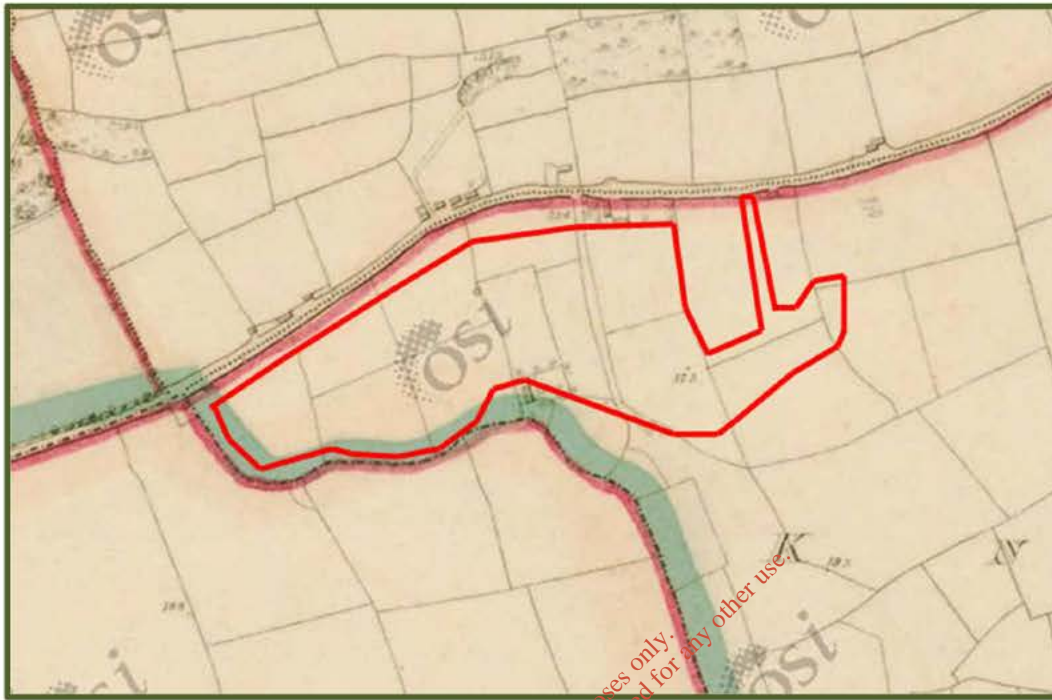


Figure 4.9-4 Extract from First Edition 1:10,560 Ordnance Survey Map (1842) showing the development area

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Ordnance Survey Map First Edition 1:2,500 1900 (Figure 4.9-5)

Four small structures are recorded a short distance to the north of the proposed development area where two structures were noted on the First Edition 1:10,560 map. A small structure is recorded immediately east of a north/south oriented path within the land take of the proposed development area, although these features no longer survive. The small north/south oriented structure recorded south of the proposed development area on the First Edition 1:10,560 map is not recorded on the First Edition 1:2,500 map.

There are no additional archaeological, architectural or cultural heritage features recorded on the First Edition 1:2,500 map within the area of proposed land take.

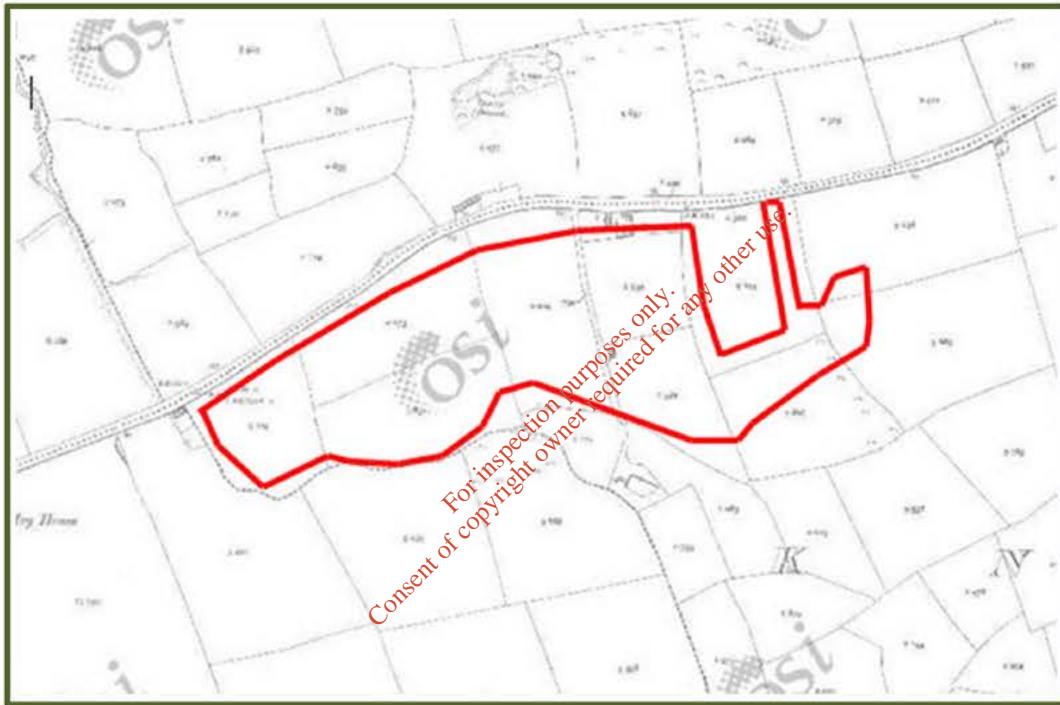


Figure 4.9-5 Extract from First Edition 1:2,500 Ordnance Survey Map (1900) showing development area

Ordnance Survey Map Third Edition 1:10,560 1934 (Figure 4.9-6)

The Third Edition Ordnance Survey map records a similar landscape within the area of proposed land take as the First Edition 1:2,500 map.

There are no additional archaeological, architectural or cultural heritage features recorded on the Third Edition 1:10,560 map within the area of proposed land take.

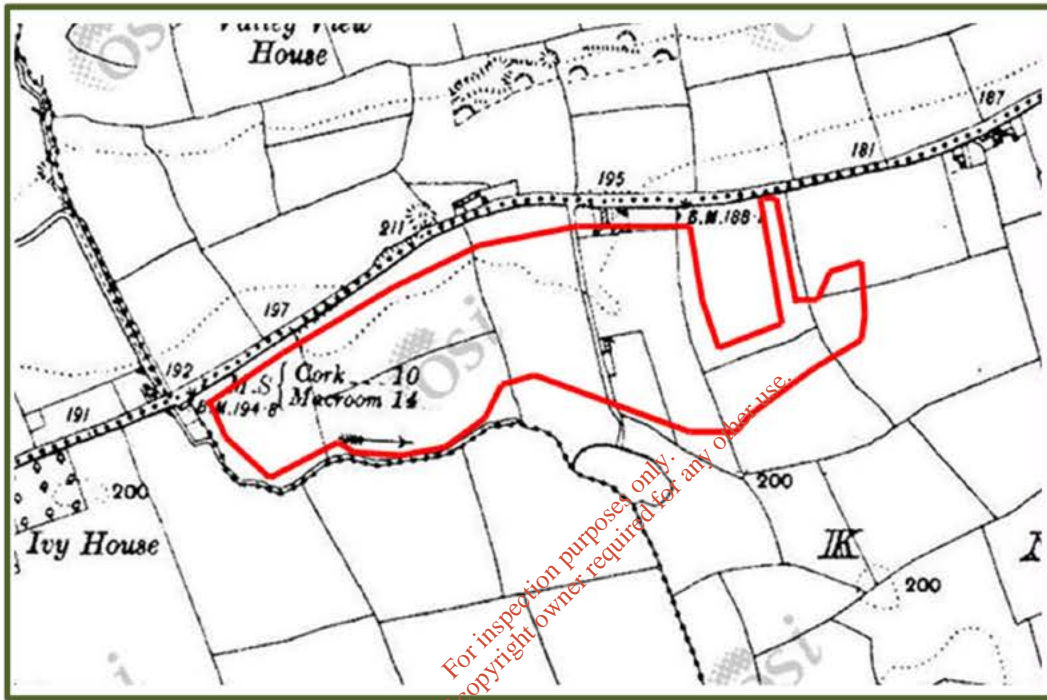


Figure 4.9-6 Extract from Third Edition 1:10,560 Ordnance Survey Map (1934) showing the development area

4.9.3.1.5 Aerial Photographs

Aerial photographs held by Ordnance Survey Ireland (www.maps.osi.ie) were consulted to look for the presence of archaeological or architectural remains within the proposed development area.

The 1995, 2000 and 2005 photographs record a broadly similar landscape to that which was noted during the walkover survey (see 0 below), with an excavated pit being noted.

The proposed development area is also recorded as an excavated pit on more recent aerial photography (www.bing.com/maps).

There was no evidence of any archaeological, architectural or cultural heritage features recorded on aerial photographs within the land take of the proposed development area.

4.9.3.1.6 National Monuments

The Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs maintains a database on a county basis of National Monuments in State Care. The term National Monument is defined in Section 2 of the National Monuments Act (1930) as:

“a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto” (www.archaeology.ie).

There are no National Monuments in State Care within the proposed development area or the 1km study area.

There are no sites with Preservation Orders or Temporary Preservation Orders within the proposed development area or the 1km study area.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed development area or the 1km study.

4.9.3.2 Architectural Heritage

4.9.3.2.1 Designated Architectural Heritage

National Inventory of Architectural Heritage (NIAH) maintains a non-statutory register of buildings, structures *etc.* recorded on a county basis. There are no entries recorded on the NIAH building survey within the proposed development area. There are four entries recorded within the 1km study area, and these are given in Table 4.9-1.

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Table 4.9-1 NIAH Building Survey

NIAH Number	Townland	Description	Rating	Distance from proposed development area
20907224*	Lackenareague	Valley View House. Detached three-bay two-storey house with dormer attic, built c.1910	Regional	c. 400m
20907226	Knockanemore	Detached three-bay single-storey house with dormer attic, built c.1900	Regional	c. 350m
20907227	Garryhesty	Elm Park. Detached five-bay two-storey house, built c.1820.	Regional	c. 900m
20907308	Knockanemore	Srelane House. Detached C-plan three-bay two-storey house, built c.1910	Regional	c. 850m

* This entry is recorded twice in two separate locations on the NIAH database

NIAH also maintains a non-statutory register of historic gardens and designed landscapes recorded on a county basis. There are no such features within the proposed development area. There are two historic gardens within the 1km study area.

Table 4.9-2 NIAH Non-Statutory Register of Historic Gardens & Designed Landscapes

NIAH Number	Name of Site	Description	Distance from proposed development area
CO-80-W-535705	Springmount	Main features unrecognisable- peripheral features visible	c. 700m at its nearest point
CO-86-W-515694	Elm Park	Main features unrecognisable- peripheral features visible	c. 500m at its nearest point

4.9.3.2.2 Folklore & History -Toponyms

Townland names are an important source in understanding the archaeology, geology, land-use, ownership and cultural heritage of an area.

Knockanemore, the location of the proposed development, translates from the Irish *An Cnocán Mór* as “great hillock” (www.logainm.ie).

4.9.3.3 Field Inspection

The field inspection sought to assess the site, its previous and current land use, the topography and any additional environmental information relevant to the report. The inspection took place on 18^h April 2017 and weather conditions were dry and bright.

The site visit confirmed the proposed development area to consist of an excavated sand and gravel pit. The proposed development area is accessed by a north west/south east oriented sloping earthen track and is an irregular sub-linear space measuring approximately 350m east/west x 100m north/south. The site has been excavated approximately 40m deeper, at its maximum point, than the surrounding ground level. Well established furze bushes and trees are situated along the pit faces, and mosses and grass are situated throughout.

No archaeological, architectural or cultural heritage features were revealed within any areas of proposed land take as a result of carrying out the walkover survey.



Plate 4.9-1 Entrance to the proposed development area, facing north west



Plate 4.9-2 North face of the proposed development area, facing north



Plate 4.9-3 Middle of the proposed development area, facing east



Plate 4.9-4 Western end of the proposed development area, facing west



Plate 4.9-5 Middle of the proposed development area, facing west

4.9.4 ASSESSMENT OF IMPACTS

The following Impact Assessment matrix provides an indication of the significance of potential effects arising during the life cycle of the development not accounting for any mitigation measures.

Table 4.9-3 Cultural Heritage - Impact Matrix			
'Do Nothing' Impacts	X		
Factors	Construction	Operation	Decommissioning
Direct Impacts	X	X	X
Indirect Impacts	X	X	X
Cumulative Impacts	X	X	X
Residual Impacts	X	X	X
'Worst Case' Impacts	X	X	X

None/imperceptible: X; Slight: ●; Moderate: ●; Significant/Very significant: ●.
Refer to Appendix 5.2 for definition of Significance

4.9.4.1 'Do Nothing' Impacts

The proposed development will involve the importation of inert waste material into part of an existing quarry from which the soils and underlying sand and gravel deposits have been excavated. As such there will be no impact on the archaeological, architectural or cultural heritage resource.

4.9.4.2 Direct Impacts

The proposed development will involve the importation of inert waste material into part of an existing quarry from which the soils and underlying sand and gravel deposits have been excavated. As a result of carrying out this Environmental Impact Assessment, the following potential archaeological, architectural and cultural heritage impacts have been identified:

There are no RMP sites within the proposed development area. There are four RMP sites within the 1km study area. There are no Protected Structures, Architectural Conservation Areas, National Monuments, sites with Preservation Orders or Temporary Preservation Orders, World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed development area or the 1km study. There are no NIAH structures within the proposed development area. There are four NIAH

structures within the 1km study area. There are no NIAH historic gardens within the proposed development area. There are two NIAH historic gardens within the 1km study area. Reference to Summary Accounts of Archaeological Excavations in Ireland revealed that one fieldwork project of no archaeological significance has been carried out in Knockanemore townland. There is one entry recorded in the Topographical Files of the National Museum of Ireland for Knockanemore townland, and it is located 1.9km east of the proposed development area. A small structure and a path are recorded on historic cartographic sources within the area of proposed land take, although these features no longer survive. There was no evidence of any archaeological, architectural or cultural heritage features recorded on aerial photographs within the proposed development area. No archaeological, architectural or cultural heritage features were revealed within the area of proposed land take as a result of carrying out the walkover survey.

In summary there are no Recorded Monuments, Protected Structures, Architectural Conservation Areas, NIAH structures or NIAH historic gardens within the proposed development area.

There will be no direct construction impact on the archaeological, architectural or cultural heritage resource.

There will be no construction or operational visual impact on the archaeological, architectural or cultural heritage resource.

There will be no construction or operational noise impact on the archaeological, architectural or cultural heritage resource.

4.9.4.3 Indirect Impacts

There will be no indirect construction or operational impacts on the archaeological, architectural or cultural heritage resource.

4.9.4.4 Cumulative Impacts

There will be no cumulative impacts on the archaeological, architectural or cultural heritage resource.

4.9.4.5 Residual Impacts

There will be no residual impacts on the archaeological, architectural or cultural heritage resource.

4.9.4.6 'Worst Case' Impacts

As the proposed development is within the worked-out area of a sand and gravel pit no mitigation measures are required and there will be no impact on the archaeological, architectural or cultural heritage resource.

4.9.5 MITIGATION MEASURES

There will be no direct or indirect construction impact on the archaeological, architectural or cultural heritage resource. As such, no mitigation measures are required.

There will be no construction or operational visual impact on the archaeological, architectural or cultural heritage resource. As such, no mitigation measures are required.

There will be no construction or operational noise impact on the archaeological, architectural or cultural heritage resource. As such, no mitigation measures are required.

Please note that all recommendations are subject to approval by National Monuments Service- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

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www.excavations.ie	Database of Irish Excavation Reports
www.logainm.ie	Placenames Database of Ireland
www.maps.osi.ie	Ordnance Survey Ireland aerial photographs

4.9.7 APPENDICES

There are a number of Appendices that have been included In Section 5.7 of this report i.e.

5.7 Cultural Heritage

5.7.1 RMP Sites Within the Study Area

5.7.2 Impact Assessment and The Archaeological Resource

5.7.3 Mitigation Measures and The Archaeological Resource

4.10 MATERIAL ASSETS

4.10.1 INTRODUCTION

This section of the EIAR is essentially an overview of the material and amenity resources within the vicinity of the proposed development, coupled with an assessment of the potential impact, if any, of the development on the existing environment in respect of these assets.

The assessment of economic assets tends to be concerned with ensuring their equitable and sustainable use, whereas the assessment of cultural assets tend to be concerned with securing their integrity and continuity, and their necessary context. Key issues of residential development, amenity, land use, roads and utility services are addressed. Natural resources of economic value (Refer to Table 4.10-1 below) which are also considered as material assets, are dealt with where necessary in their respective EIAR sections (EPA, 2015).

Material Assets is considered to include architectural and archaeological heritage and cultural heritage. For the purpose of this EIAR an assessment of the potential impact, if any of the development on the existing environment with respect to these assets is considered in EIAR Section 4.9 Section - Cultural Heritage.

Material assets may be defined as resources that are valued and that are intrinsic to specific places, and may be either human or natural origin, and the value may arise from either economic or cultural reasons (EPA, 2003, 2015). The developments utilisation of, or proximity to, the area's material assets, can directly and indirectly result in potential environmental impacts. Therefore, the objective of this assessment is to identify the material assets of the area, determine the potential impacts of the proposed Soil Recovery Facility (SRF) on these assets, and propose mitigation measures where necessary to ensure that they are addressed in an appropriate manner. This section also indicates the associated sections within the EIAR that consider these impacts and any proposed mitigation measures.

4.10.2 METHODOLOGY

The assessment of material assets has been prepared in accordance with the Advice Notes for Preparing Environmental Impact Statements, Draft, published by the EPA (EPA, 2015). Table 4.10-1 outlines the categories of assets, which the EPA suggests may need to be examined as part of the material assets study.

On the basis of categories in Table 4.10-1 and the nature of the proposed development, the material assets which potentially could be impacted by the SRF, and which have been identified for assessment are: (1) non-renewable resources (minerals, soils); (2) settlement - residential development; (3) land use; (4) transport infrastructure; (5) built services; (6) waste management infrastructure (7) cultural assets - archaeological, historic and architectural heritage; and (8) landscape and natural heritage. Most of these assets have been considered elsewhere within other sections of the EIAR, as indicated below:

- Non-renewable resources (minerals, soils) & Agronomy (Soil Management) are discussed in Section 4.3 - Soils and Geology
- Settlement, Commercial & Industrial Development, Property, Tourism & Recreational Infrastructure and land use are discussed in Section 4.1 – Population & Human Health
- Roads, as a component of Transport Infrastructure, are discussed in Section 4.11 – Roads & Traffic
- Cultural assets are discussed in Section 4.9 - Cultural Heritage
- Natural Heritage is discussed in Section 4.2 – Biodiversity
- Landscape is discussed in Section 4.8 - Landscape

Table 4.10-1 EPA's Classification of Types of Material Assets

Asset Type	
Economic Assets - Natural Origin	<ul style="list-style-type: none"> - Assimilative capacity (air, water) - Non-renewable resources (minerals, soils) - Renewable resources
Economic Assets - Human Origin	<ul style="list-style-type: none"> - Cities, towns, villages and settlements - Transport infrastructure (roads) - Major utilities (water, sewage, power, telecommunications) - Ownership and access - Agronomy - Commercial & Industrial Development - Property, - Tourism & Recreational Infrastructure
Cultural Assets – Physical Type	<ul style="list-style-type: none"> - Archaeology - Architecture - Settlements - Monuments, features and landmarks - Historic sites and structures - Landscape - Geological heritage
Cultural Assets – Social Type	<ul style="list-style-type: none"> - Language and dialects - Folklore and tradition - Religion and belief - Literary and artistic association

4.10.2.1 Desk Study

The study essentially involved a virtual, but comprehensive, aerial examination of the study area and surrounding region using Google Maps and available OSI maps to identify all the material assets. All assets identified during this survey were interrogated, described and evaluated in terms of scale and significance prior to inclusion in the study.

4.10.2.1.1 Sources of Information

The main sources of information are listed in section 4.10.6 References.

4.10.3 BASELINE DESCRIPTION OF RECEIVING ENVIRONMENT

4.10.3.1 Non-Renewable Resources

The Cork County Development Plan 2014, specifically Section 6.12.1, acknowledges that Cork has significant, but finite mineral resources, which are important to the economy of the county in terms of employment generation and providing raw materials to the construction industry. The plan specifically acknowledges that mineral and aggregate industries are important sectors of the rural and wider economy.

Cork has significant resources in terms of aggregates, a resource that had come under pressure due to increased demand prior to the collapse of the construction industry in 2008. Since aggregates can only be worked where they occur, it is important to identify the location of these resources with a view to safeguarding them. Thus, it is the aim of the plan to safeguard areas of significant resources from incompatible developments to ensure the continued viability of the extractive industry, whilst ensuring that environmental, rural, scenic and residential amenities are protected.

No geological heritage sites lie within or near the site of the quarry and proposed co-located SRF at Garryhesta. The nearest site, Killumney Moraine (IGH-7: Quaternary) is listed by GSI (2017) and Cork (2014) as an area of Geological Interest or Heritage. It consists of a glacial moraine c. 2km south of the site. It corresponds to major moraine and fluvioglacial terraces associated with a local ice-cap expansion from the Cork/Kerry mountains. It may represent a retreat position rather than a discrete ice maximum limit.

The area around Garryhesta has an established history of sand and gravel working, with extraction from the glacio-fluvial deposits from the floor of the Bride River Valley (See Figure 4.3.4). These activities, including the existing quarry have co-existed with other land uses in the area including agriculture and amenity-based uses.

The pit at Garryhesta has provided employment for local people, both directly and indirectly since the 1940s. The SRF will require one person to operate a bulldozer/excavator and one general foreman to monitor and inspect the quality and suitability, of imported materials being brought to the site for recovery and two other general site operatives. It is expected that the existing staff will take on these roles.

Sand and gravel resources still remain within the landholding, but the workable reserves within the western pit area, the subject of this application have been worked out. The planned

restoration of the minor western section through the operation of the proposed SRF will not affect the working of the remaining resources. The in-situ resources are thus preserved, extending the potential remaining active life of the quarry, such that the SRF has no negative impact on the aggregate resources.

4.10.3.2 Settlement

Although there are residences abutting the larger quarry site, there are no residences abutting the boundaries of the site of the proposed SRF co-located within the quarry. There are 10 residences within c. 250m and 19 within c. 500m of the proposed SRF site, while there are a number of residences, including several clusters of residences or hamlets/graigs, within 1km. Residential development generally consists of isolated farm dwellings and of owner occupied bungalow/houses along public roads (Refer to EIAR Figures 1.2 & 1.3).

While residential development in the area consists of scattered isolated residences, there are distinct clusters of residences that do not qualify as villages but might constitute hamlets or small settlements. Each house fronts onto the road with its own separate entranceway, in typical ribbon development. One such cluster of 8 houses is situated near the southeastern corner of the landholding, another is situated on local secondary road LS6226, known as Garryhesta Road, north of the nearby Donovan's Pit, while a third cluster lines local secondary road LS6225, known as Abbey Road, west of the nearby Dineen's Pit.

There are no large residential settlements close to the site, with the village of Ovens situated c. 1.5km to the east along the N22, the village of Farran situated c. 2km to the west along the N22, the village of Killumney is c. 2km to the southeast and the village of Aherla c. 4km to the southwest. The nearest large population centre is the town of Ballincollig c. 5.5km to the east.

With the exception of the N22 Primary National Road, the major east-west corridor in western, south central Cork, the roads in the area are of a local character and typical of a rural location.

Adequate fencing, signage and other barriers have been erected around the site for the safety of the general public and to prevent livestock straying into the development area. Large lockable gates are in place to guard against unauthorised and unsupervised entry to the site outside of working hours.

4.10.3.3 Land Use

Garryhesta is located in south central Cork between Cork City (c. 15.5km to the east) and Macroom (c. 18.5km to the west). The site lies close to a N-S trending line from roughly Ballincollig to Kilmurry, which separates two landscape types, namely the Hilly River and Reservoir Valleys (i.e., Type 8) and the Broad Fertile Lowland Valleys (i.e., Type 6a), as shown in Figure 4.8.1. (Cork 2014). The 2012 Corine Map (EPA 2017) shows that the land use only differs slightly between these two landscapes, with Type 8 dominated by pasture, while Type 6a is also dominated by pasture, but with significant amounts of tillage on non-irrigated land (211), land given over to complex cultivation patterns (242), land principally occupied by agriculture with areas of natural vegetation (243) and coniferous forest (312) increasingly to the west (Refer Figure 4.8.2).

The site lies on the western periphery of the Prominent and Strategic Metropolitan Greenbelts Areas of Cork City (Cork 2014). The site of the proposed SRF corresponds to the western extreme of these Metropolitan Greenbelt Areas (Refer Figure 4.10-1). The latter is rural area under strong urban influence and forms part of the Cork Gateway and is within close commuting distance of Cork City and Environs. Successive County Development Plans have identified the importance of protecting prominent areas of the Metropolitan Cork Greenbelt. These areas require the highest degree of protection because they are made up of the prominent open hilltops, valley sides and ridges that give Metropolitan Cork its distinctive character and the strategic, largely undeveloped gaps between the main Greenbelt settlements. It is the objective of the plan to “protect those prominent open hilltops, valley sides and ridges that define the character of the Metropolitan Cork Greenbelt and those areas which form strategic, largely undeveloped gaps between the main Greenbelt settlements” (Cork 2014).

The Ovens area, within c. 5km of the application site, is characterised by a mixed land use pattern, with near equivalent levels of pasture and tillage on non-irrigated land, and minor mineral extraction and discontinuous urban fabric. The nearest watercourse to the site is the Bride River, which flows roughly E-W c. 1km south of the site.

The land cover map for the Ovens area shows that the site of the quarry and proposed SRF is surrounded by pasture and land held in tillage, with areas of mineral extraction, discontinuous urban fabric and broad-leaved forests (See Figure 4.8.2). As the proposed SRF will be co-located within the existing quarry, it is considered that the SRF will not result in any significant change in land cover and will have an imperceptible impact on agriculture.

The applicants land holding and quarry site is shown edged blue, which covers an area of c. 77.2 hectares, whilst the proposed SRF is shown edged red on EIAR Figure 1.2. The predominant land use within the proposed site, which is to be co-located within the quarry site, is by definition that of quarrying activities related to the extraction of sand and gravel and associated operations. Prior to the commencement of quarrying in the 1940s, the lands would have been kept in low intensity agriculture. Ultimately, the site will be reclaimed in accordance with the approved quarry restoration scheme, and thus undergo a change of land use back to agricultural land.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). i.e. Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of traditional hay meadow.

4.10.3.4 Transport Infrastructure

The site is located within the Townland of Knockanemore some 5.5km west of Ballincollig on the south side of, and with direct access to, the N22 National Primary Road. The latter represents the principal east-west traffic artery running through western, central south Cork, linking Cork City with the town of Macroom, as well the towns of Killarney and Tralee further west in County Kerry. Southeast of Ballincollig, the N22 turns sharply north to Carrigohane, and

then passes sharply east, following the River Lee and circumnavigating north of much of Cork City as a perimeter road, and terminating at Cork City Centre.

The N22 road links the towns and villages of western, central Cork to the Gateway of Cork City, and from there onwards to Dublin via the N40 national Primary Road, and the M8 motorway, which constitutes one of the Strategic Radial Corridors identified in the National Spatial Strategy (DEHLG, 2002).

Other significant roads in the region include:

- N40 National Primary Road
- N71 National Secondary Road
- R168 Regional Road
- R619 Regional Road
- L2202 Local Road
- L2216 Local Road
- LS6226 Local Secondary Road, known as Garryhesta Road
- LS6225 Local Secondary Road, known as Abbey Road

Further details with respect to the road network and the impact and mitigation of traffic are contained within this report (Refer to Section 4.11).

Cork is serviced by main line railway service on Iarnrod Eireann's Cork to Dublin line, via Mallow, Thurles, Portlaoise, Newbridge, etc. A suburban railway service connects Cork City with Middleton to the east and with Cobh to the southeast. Cork Airport is the nearest airport to the site at c. 13.5km southeast of the site. Cork Harbour, situated at Cork City and further east, is recognised as one of the finest natural harbours in the world, and consequently is the loci of numerous industries.

4.10.3.5 Built Services

4.10.3.5.1 Electricity Network

Power to local residences is provided by overhead lines, which form part of ESB's country-wide, medium and low voltage, electricity distribution network. The ESB distribution line and Eir telephone line run along the northern boundary of the quarry site with the N22. The quarry site is supplied by a 3-phase connection near the northeast corner of the site.

EirGrid, the national electrical transmission operator (TSO), has a 110kV power line running from the Kilbarry 100 kV station to the Inniscarra hydroelectric station, and on to the Macroom 100kV station. The line runs approximately E-W 350m north of the site.

Eirgrid has rolled out a grid development strategy called GRID25, which governs development of the transmission infrastructure to ensure that grid reinforcements enable connection of significant amounts of renewable energy generation (Eirgrid 2012). Minor uprating of a 2.74km section of the Kilbarry-Macroom 100kV line has been identified. Despite major

projected growth in renewable energy generation in the southwest, no other major Grid infrastructure is envisaged in the area.

4.10.3.5.2 Gas Network

The Kinsale Head Gas Pipeline comes ashore at the Inch Terminal near Whitegate, Co. Cork, from which a western pipeline supplies Cork, Brandon and Baltimore, with a southern spur to Kinsale, and a northern spur to Macroom. However, there is no gas line in close proximity of the site, the nearest being in Ballincollig, which is fed from the Cork supply.

4.10.3.5.3 Water Supply Infrastructure

The mains water supply runs along the N22 roadway and services the existing site offices and workshop. There are also houses in the area served by bored wells. Most houses are serviced by septic tank systems and proprietary effluent treatment systems.

4.10.3.5.4 Telecommunications Network

There are numerous mobile masts or base stations for the transmission and reception of mobile telecommunication in the wider Ovens area (i.e., within 5km). These masts house both point to point microwave links and cellular technologies used in the provision of telecommunication services. The nearest cell mast to the Garryhesta site is located at Lee Valley Golf & Country Club, c. 1.5km north northwest of the site. The next nearest cell masts are at Ovens, c. 3km east of the site, Aherla, c. 3.5km southwest of the site, Mylane, c. 4.5km southeast of the site, Inniscarra, c. 4.5km east northeast of the site, and Old Quarter, Ballincollig, c. 5km east of the site.

4.10.3.5.5 Sewerage System

The existing welfare facilities including toilets provided in the quarry will be utilised by the proposed development. A holding tank is provided which is emptied on a routine basis by a certified waste collection contractor to an approved waste facility.

4.10.3.5.6 Waste Management Infrastructure

The proposed Soil Recovery Facility (SRF) will utilise the permitted quarry infrastructure including internal roads, site office, welfare facilities and other ancillaries to complete the works (Refer to Figure 1.3 - Existing Site Survey Plan). A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area.

Skips will be provided within the designated quarantine areas for the temporary storage of any inappropriate materials discovered. The proposed facility site layout is shown by figures 3.1 to 3.3.

4.10.3.6 Cultural Assets

The proposed development was the subject of an assessment that involved the investigation of cultural heritage including the archaeological, structural and historical background of the application area and the surrounding area using a wide range of existing information, as well as a field assessment (Refer to EIAR Section 4.9).

There are no known items of cultural heritage, archaeological sites or monuments, protected structures or non-designated structures of heritage value within the application area. The SRF will also have no indirect impact on items of cultural heritage, archaeological sites or monuments, protected structures or non-designated structures of heritage value in the vicinity of the application site area, as the nearest such structures are the ruins of Kilcrea Friary and Kilcrea Castle c. 2km southwest of the site (Refer to Figure 4.10-2).

4.10.3.7 Landscapes & Natural Heritage

Cork is home to scenic coastal and upland landscapes of international importance, particularly along the peninsulas in the southwest, which constitute invaluable elements of its natural resource base, and which need to be protected from inappropriate development. Sensitive development and conservation of this resource is essential to the underpinning of strengthened rural economies and quality of life.

The landscape of central south Cork, including the areas around Ovens, Ballincollig, Blarney, Kilmurry and Bandon is designated as Broad Fertile Lowland Valleys.

The site at Garryhesta was determined to be within Area 6a: Broad Fertile Lowland Valleys (Blarney-Ballincollig-Carrigaline-West to Dunmanway) (See EIAR Figure 4.8.1).

This landscape type stretches west and east from the environs of Cork City. The valleys in these areas are created by the rivers flowing east to west and are surrounded by low well-spaced ridges. These shallow and flat valleys wind as they follow the course of the river, rising to the north and south with gentle slopes where the valley is wide but with steeper faced slopes where the valley narrows. Further upstream to the west the broad flatness narrows and winds between low hills.

Landcover comprises highly fertile, regularly shaped fields typically of medium size and with mature broadleaf hedgerows. Agricultural use primarily involves intensive dairying as well as tillage, with farmsteads relatively well screened by the hedgerows. Some of the larger settlements include Bandon, Ballincollig and Blarney to the west of Cork City, Castlemartyr to the east and Rathcormack to the north. Major roads such as the N22 between Macroom and Cork City and the N71 between Innishannon and Bandon tend to follow the rivers, often providing distant views across the landscape.

There is only one scenic route that will be potentially affected by the proposed development (Refer to Figure 4.10.3). The L2202 is designated Scenic Route S38 and runs E-W from Classis to Coachford via Currabeg, south of the Inniscarra Reservoir, and on upland partly overlooking the Bride River Valley. The proposed development is not open to view from vantages from this route being screened by intervening topography and mature hedgerow planting. The view from this scenic route is also the far side of an east west running ridge

which screens views towards the site and south. The main view from this scenic route is northwards towards the Inishcarra reservoir on the River Lee.

The proposed site is not within a European Site, including Special Protection Area (SAC) and Special Protection Areas (SPA). Appropriate Assessment Screening has been carried out with respect to the proposed development. There is no likelihood of significant ecological effects from this development on any of the sites in the Natura 2000 network or on their conservation objectives.

The recovery of soils and dredging spoil on this site will result in a local impact on ecology but will not result in any loss of heritage values in the locality. The changes will be both negative (loss of open habitats) and positive (gain of woodland/scrub over time).

The broader locality is noted for amenities/activities such as fishing, walking, cycling and other outdoor pursuits. Despite the foregoing, there is only one scenic route that will be potentially affected by the proposed development. The L2202 is designated Scenic Route S38 and runs E-W from Classis to Coachford via Currabeg, south of the Inniscarra Reservoir, and on upland partly overlooking the Bride River Valley. The visual impact of the development is discussed in more detail in Section 4.8 - Landscape.

On completion of quarrying and material recovery activities, the entire site will be reinstated in accordance with the approved quarry restoration scheme. Thus, the site will be integrated back into the surrounding landscape in a controlled manner, with the attendant improvement to the visual amenity of the area.

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4.10.4 ASSESSMENT OF IMPACTS

The following Impact Assessment matrix provides an indication of the significance of potential effects arising during the life cycle of the development not accounting for any mitigation measures.

Table 4.10-2 Material Assets - Impact Matrix

Factors	Construction	Operation	Decommissioning
'Do Nothing' Impacts		●	
Direct Impacts	●	●	X
Indirect Impacts	X	X	X
Cumulative Impacts	X	X	X
Residual Impacts	X	X	X
'Worst Case' Impacts	●	●	X

None/imperceptible: X; Slight: ●; Moderate: ●; Significant/Very significant: ●.
 Refer to Appendix 5.2 for definition of Significance

The proposed development of an SRF arises from the continued demand of human beings to have their buildings, roads and structures, modified and improved, resulting in the generation of large volumes of excavated soil and stone. In addition, large amounts of spoil are generated during the dredging of rivers and streams to mitigate flood risk and improve their navigation. The recovery of this inert waste is essential to reduce resource utilisation and divert reusable inert waste from landfill.

The strategic location of Garryhesta on the N22 in central south Cork, renders the proposed SRF well positioned to deliver recovery of inert soil, stone and dredge spoil from a large catchment area, diverting greater volumes of waste from disposal in landfill, as required under the Waste Framework Directive 2008 (2008/98/EC).

The impact on material assets resulting from the proposed development is assessed here, and possible mitigation measures proposed to reduce any significant impacts.

4.10.4.1 'Do Nothing' Impacts

If the proposed development did not proceed, recovery of inert waste at the SRF would not occur and result in the failure to divert these volumes from disposal in landfill, as required under the Waste Framework Directive 2008. The Garryhesta site would remain as an unrestored quarry site, without the backfilling generated by the proposed SRF. As the quarry

area to be restored is currently inactive and well screened, the absence of the proposed SRF would have no significant impact on the material assets within the area.

4.10.4.2 Direct Impacts

As stated above, the SRF will allow the recovery of inert soil, stone and dredge spoil from a large catchment area, diverting greater volumes of waste from disposal in landfill.

It is expected that the potential negative impacts on material assets of the area arising from the SRF, will relate primarily to nuisance from noise, dust and traffic.

The potential impacts associated with the proposed development and any proposed mitigation measures in relation to the material assets described above are covered under relevant sections of the EIAR (see below).

Table 4.10-3 Material Assets – Potential Impacts & Mitigation

Ref.	Material Asset	Relevant EIAR Section
4.10.3.1	Non-Renewable Resources	3.4.1, 4.3
4.10.3.2	Settlement - Residential Development	3.2.1, 4.6, 4.7, 4.8, 4.11
4.10.3.3	Land Use	3.2.1, 3.3.1.1, 4.1, 4.2, 4.3, 4.8
4.10.3.4	Transport Infrastructure	3.3.3.2.3, 3.3.3.2.11, 4.1, 4.11
4.10.3.5	Built Services	3.3.3.2
4.10.3.5	Waste Management Infrastructure	None
4.10.3.6	Cultural Assets	4.9
4.10.3.7	Landscape & Natural Heritage	3.1, 4.1, 4.2, 4.6, 4.7, 4.8

Human health risks will be managed by preventing public access to the site and having appropriate health and safety measures in place for staff working on the site.

On completion of site activities, the site of the quarry and SRF will be decommissioned and left safe and secure. Furthermore, the site will be reinstated in accordance with the approved quarry restoration scheme, and thus integrated back into the surrounding landscape with the attendant improvement to the visual amenity of the area.

It is considered that following restoration and the mitigation measures incorporated in the design that there will be no significant effects in terms of material assets. The restoration of the site to beneficial after-use will result in a permanent significant positive effect in the medium term.

4.10.4.3 Indirect Impacts

Indirect impacts are dealt with where necessary under the respective topic in the EIAR.

4.10.4.4 Cumulative Impacts

Cumulative impacts associated with other developments within the area are dealt with where necessary under the respective topic in the EAR.

The interaction of the quarry and proposed SRF is seen as 'symbiotic' and positive, with no negative cumulative impacts on material assets identified.

4.10.4.5 Residual Impacts

It is considered that following restoration and the mitigation measures incorporated in the design that there will be no significant effects in terms of material assets.

4.10.4.6 'Worst Case' Impacts

There are no large residential settlements close to the site, with nearest large population centre being the town of Ballincollig c. 5.5 km to the east. The village of Farran is situated 2km to the west along the N22, while the village of Killumney is 2km to the southeast. Residential development consists of isolated farm dwellings and of owner occupied bungalow/houses along public roads (Refer to EIAR Figures 1.2 and 2.1).

Although there are residences abutting the larger quarry site, there are no residences abutting the boundaries of the site of the proposed SRF co-located within the quarry.

The site is well screened from outside views along the N22 by well-established planting (Refer to EIAR Figures 1.1 and 1.2).

It is expected that in the absence of mitigation measures (primarily noise and dust) that there will be slight negative effects with respect to local amenity and residential receptors as a result of the development of an SRF at Garryhesta.

4.10.5 MITIGATION & MONITORING

The operator has in place an Environmental Management System (EMS) which addresses such matters as Emergency Preparedness & Response in dealing with accident and emergency situations resulting in effects on the environment (Refer to EIAR Section 3.3.3.2).

Roadstone Ltd has established an on-going environmental monitoring programme on site. This programme will allow on-going monitoring of environmental emissions (noise, dust, water) from the site, thereby assisting in ensuring compliance with any future requirements or regulations. The results of this monitoring will be made available to the relevant regulatory Authorities (Local Authority and EPA) on a regular basis, where members of the public may examine it.

The future monitoring programme will be revised to include the SRF, subject to compliance with any conditions attached to any decision to grant planning permission and waste licence.

This quarry is in an area of low population density. The boundaries of the quarry are enclosed by a combination of bunds, hedgerows and fencing, which is designed to blend into the surrounding landscape. There is ongoing monitoring to ensure that site boundaries are maintained in a proper manner, and these include thickening of hedgerows, fencing of the landholding, provision and maintenance of quarry signage, routine cleaning/housekeeping and the removal of unsightly features. Appropriate warning signs to the public have been provided on the approaches to the site, and the access gate is kept padlocked shut outside of the normal working hours. It is also proposed to install CCTV subject to grant of any planning permission for a SRF to monitor and document incoming loads.

The development can be controlled and regularised in accordance with the scheme as outlined in this document, through continued environmental monitoring and by conditions imposed by the relevant regulatory authority. The development does not have a significant impact on lands, property or amenity within the area and hence there will be no significant effect on material assets.

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4.10.6 REFERENCES

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- DoELG (2002). National Spatial Strategy 2000-2020 Department of Environment & Local Government (DoELG), Dublin, Ireland.
- Eirgrid (2012). GRID25 Implementation Programme (2011-2016), Eirgrid, Dublin, Ireland.
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- Golders (2006a). Environmental Impact Statement, Garryhesta Pit, Knockanemore, Ovens, Co. Cork, Golders Associates, Naas, Co. Kildare, Ireland.
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<https://www.archaeology.ie/> National Monuments Service

<http://www.bordgaisnetworks.ie/en-IE/> Bord Gais Networks

<http://siteviewer.comreg.ie/#explore> Communication Regulator

<http://www.corkcoco.ie/co/web/Cork%20County%20Council/Departments/Planning> Planning
Dept., Cork County Council.

<http://www.cso.ie/en/census/index.html> Central Statistics Office (CSO)

<http://www.eirgridgroup.com/> Eirgrid

<http://www.epa.ie/> Environmental Protection Agency

<https://www.esb.ie/> Electricity Supply Board (ESB)

<http://www.gsi.ie/Mapping.htm> Geological Survey of Ireland Map Viewer

<https://www.google.ie/maps> Google Maps

<http://www.hse.ie/eng/> Health Service Executive (HSE)

<https://www.water.ie/> Irish Water

<http://www.buildingsofireland.ie/> National Inventory of Architectural Heritage

<https://www.npws.ie/> National Parks & Wildlife Service

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4.10.7 FIGURES

- Figure 4.10 1 Prominent and Strategic Metropolitan Greenbelt Areas Around Cork City
- Figure 4.10 2 Protected Structures in the Ovens Area
- Figure 4.10 3 Location of Scenic Routes (S37 and S38) in Wider Ovens Area
- Figure 4.10 4 SACs, SPAs, NHAs and pNHAs in the Central, South Cork Area

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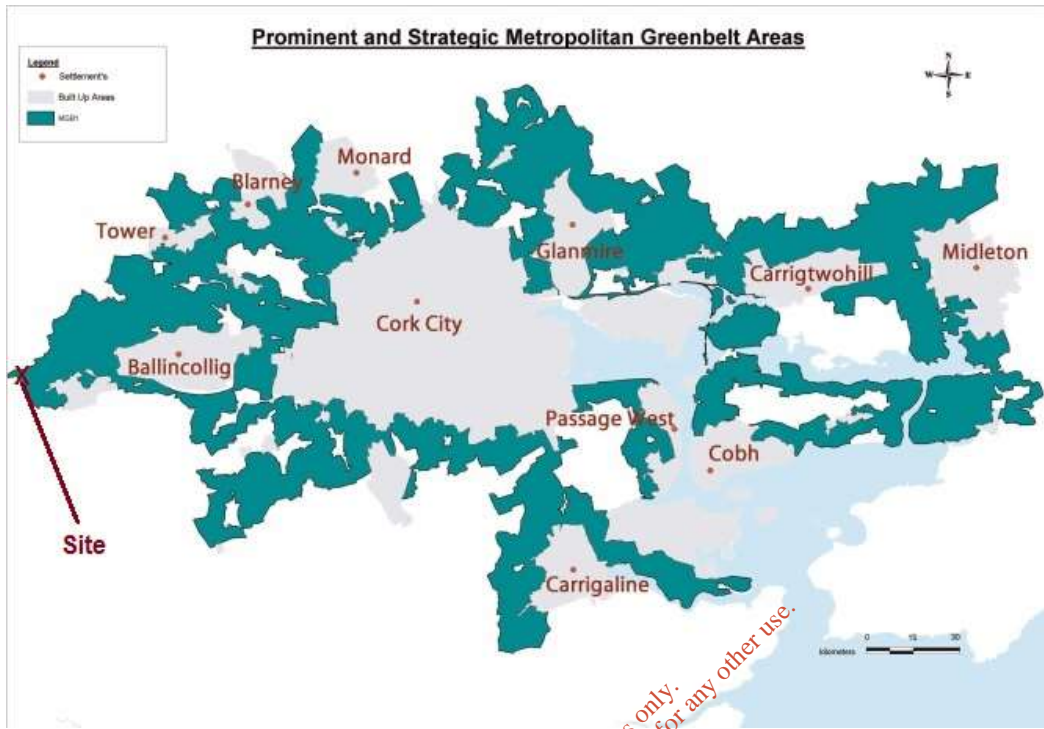


Figure 4.10-1 Prominent and Strategic Metropolitan Greenbelt Areas around Cork City

Scale Bar at bottom right. Redrawn from Cork (2014)

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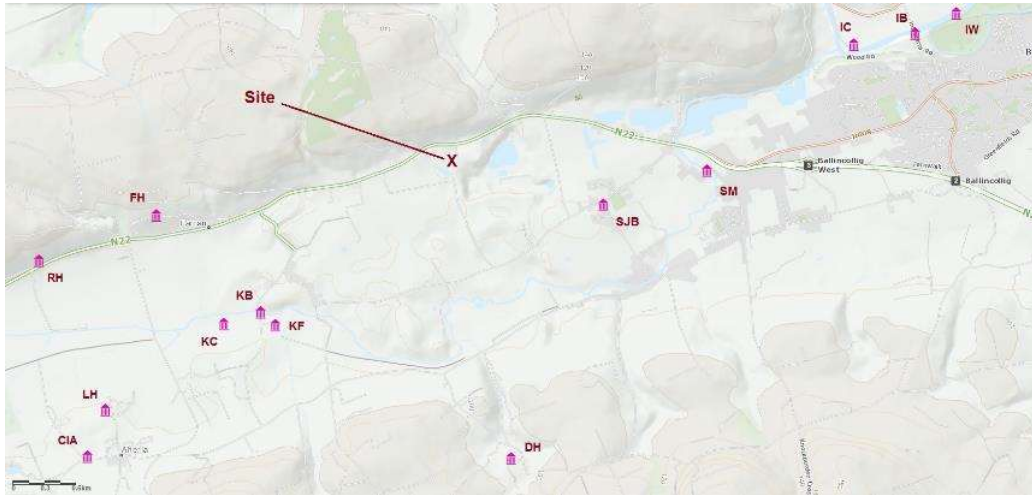


Figure 4.10-2 Protected Structures in the Ovens Area.

St. John the Baptist Church, Ovens (SJB); St. Mary's Church, Ovens (SM); Inniscarra Church (IC); Inniscarra Bridge (IB); Inniscarra Weir (IW); Farran House (FH); Rosemount House (RH); Church of Ireland, Aherla (CIA); Lodge House (LH); Kilcrea Castle (KC); Kilcrea Bridge (KB); Kilcrea Friary (KF); and Desertmore House (DM). Location of site is indicated by X. Modified from Cork (2014).

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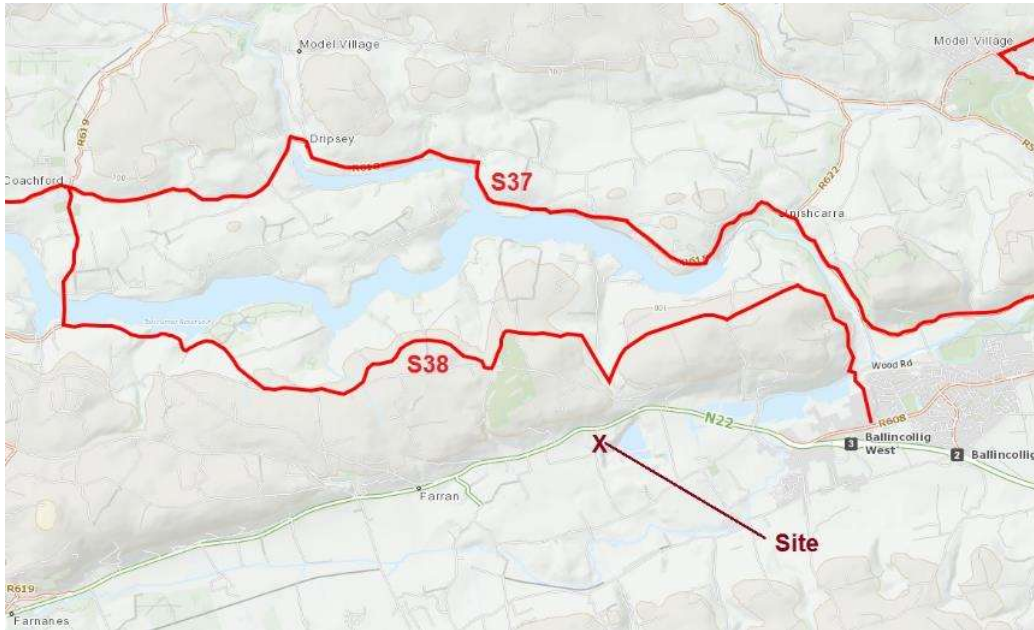


Figure 4.10-3 Location of Scenic Routes (S37 and S38) in Wider Ovens Area

Location of site is indicated by X. Redrawn from Cork (2014).

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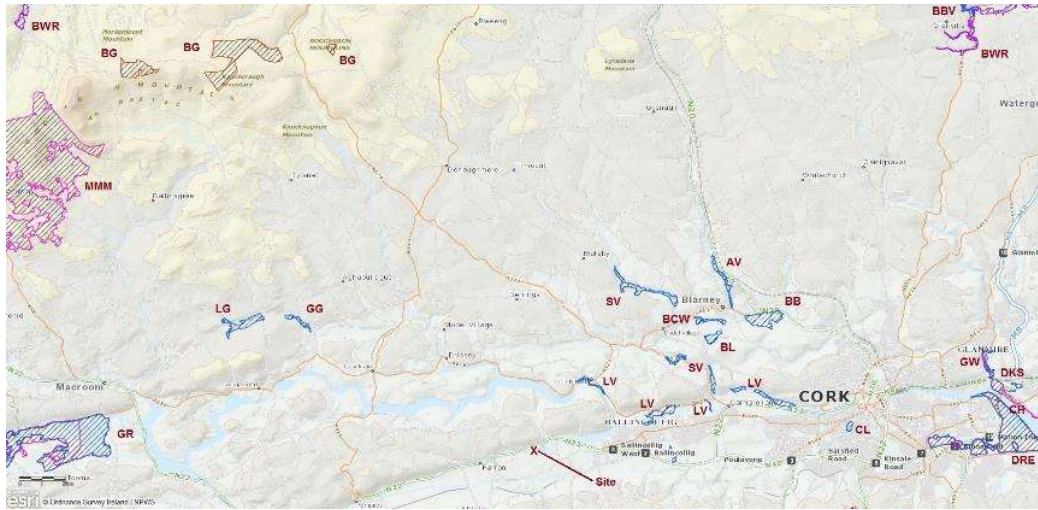


Figure 4.10-4 SACs, SPAs, NHAs and pNHAs in the Central, South Cork Area.

Boggeragh Mountains NHA (BG); Blackwater River SAC (BWR); Mullaghanish-Musheramore Mountains (MMM); The Gearagh SAC, SPA and pNHA (GR); Lough Gal pNHA (LG); Glashgarrif River pNHA (GG); Lee Valley pNHA (LV); Shournagh Valley pNHA (SV); Ardadamane Wood pNHA (AV); Blarney Bog pNHA (BB); Blarney Lake pNHA (BL); Blarney Castle Wood pNHA (BCW); Cork Lough pNHA (CL); Douglas River Estuary pNHA (DRE); Cork Harbour SPA (CH); Dunkettle Shore pNHA (DKS); and Glanmire Wood pNHA (GW). Location of site is indicated by X at lower centre. Modified from Cork (2014).

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4.11 ROADS & TRAFFIC INTRODUCTION

The proposed development consists of restoration of part (c. 6.7 ha) of existing quarry by importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil. The proposed Soil Recovery Facility (SRF) will utilise the permitted quarry infrastructure including internal roads, site office, welfare facilities and other ancillaries to complete the works (Refer to Figure 1.3 - Existing Site Survey Plan). Access to the site will be from the permitted main entrance on the N22 National Primary Road. A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. The total application area including the site infrastructure covers 7.9 ha of lands. The development will be subject to the requirements of a waste management licence.

The pit at Garryhesta operates at an extraction rate of up to c. 350,000 tonnes per annum (total output) depending on market demand.

The sand and gravel does not enter onto the public road network but is now delivered by conveyor to the nearby Roadstone facility at Classis.

A previous application on this site for extraction of sand and gravel was granted with conditions by Cork County Council and subsequently by Bord Pleanála in 2008. As part of this application a Traffic Assessment report and Road Safety Audit was completed and submitted with the application.

This report examines the traffic issues pertaining to the site and the development of a Soil Recovery Facility (SRF).

4.11.1.1 Objectives

The objectives of this chapter is to examine the existing traffic receiving environment. The generation of traffic by the current proposal and its assignment to the existing road network. To examine the impacts this assignment of traffic will have on the receiving road networks.

4.11.2 METHODOLOGY

4.11.2.1 Consultations

A meeting was held with Cork County Council Area Engineer to discuss the outline proposal and to obtain his observations.

4.11.2.2 Desk Study

4.11.2.2.1 Sources of Information

The chief sources of information were the previous work carried out in support of the previous application on this site for extraction of sand & gravel, granted with conditions by Cork County Council and subsequently by Bord Pleanala in 2008. The current Cork County Development Plan (CDP) 2014-2022. TII Automatic Traffic Counter to the east of the site. Cork National Roads Design Office site. Counts carried out in May 2017.

The traffic feasibility study has been prepared taking into consideration information contained in the publications listed in Section 4.11.6 References.

4.11.2.2.2 County Development Plan Policy

To ascertain the parameters within which the development proposed would be assessed for the granting of permission an examination of the current Cork County Development Plan (CDP) 2014-2022 was carried out.

The sections relevant to the N22 in the vicinity of the proposed development have been abstracted and detailed below. The relevant sections in relation to Impacts of Mineral Extraction are contained in Chapter 6 EE 12-3. The relevant sections in relation to development and road infrastructure are contained in Chapter 10 TM 3-1 National Road Network.

Key Regional Projects

N22 (Ballincollig – Macroom – Ballyvourney) to include Macroom Bypass.

4.11.2.3 Field Study

The field study consisted of various studies of the existing road networks, existing site access, traffic movements and traffic volumes.

4.11.3 BASELINE DESCRIPTION OF RECEIVING ENVIRONMENT

4.11.3.1 Site Location

The lands subject to this study is situated in County Cork to the c.15 km West of Cork city and 1km West of Srelane Cross in the townland of Knockanemore, fronting the southern side of the Cork to Killarney National Primary road N22. Existing Road Network

4.11.3.1.1 Network Description

The proposed facility is located to the west of Cork city and the town of Ballincollig. The proposed facility has an existing entrance located off the Southern side of the National Primary Route N22 Cork to Killarney in the townland of Knockanemore,, Co. Cork.

The N22 at the Proposed Recovery facility entrance is realigned to the Transport Infrastructure Ireland (TII) standard for a Single Carriageway National Primary Route.

The National Primary road N22 in the vicinity of the proposed facility entrance is an aligned two lane 7.5m Hot Rolled Asphalt surfaced single carriageway roadway with 2 No. 3.75m Hard Shoulders and 2 No. Grass verges of 1-2m variable width. Overall Right of way width is generally 18 m. The cross section of the N22 road at the Proposed facility is shown in Figure 4.11-1 below. The road is subject to a continuous white line with gentle bends to the east and west with generally good forward visibility.

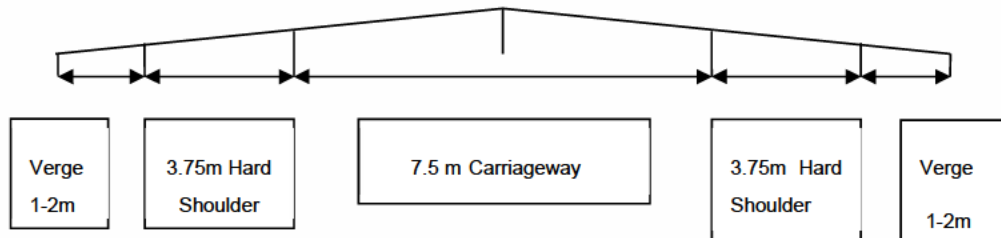


Figure 4.11-1 National Primary Road N22 Cross Section

The N22 National Primary road leads from the Cork city to Tralee in County Kerry via Macroom and Killarney. The road is the main Western artery to County Kerry from Cork City. A large number of Regional and important Local roads branch from the N22. It also serves dispersed residences and agriculture in a typical rural area.

East of the site the two lane N22 forms into a two-lane dual carriageway and continues on to join the N40 and to bypass Ballincollig on the south.

The road also acts as a major commuter route into Cork.

4.11.3.1.2 Access Visibility

The site access is located on a straight section of the N22 with bends to the east and west. The forward visibility adjacent to the site access is assessed in accordance with TII publications DN-GEO-03031 April 2017 Rural Road Link Design and DN-GEO-03060 April 2017 Geometric Design of Junctions. The bends are of a measured radius of 450m. The advised minimum radius is 720m for 100kph. However, with a one-step relaxation the allowable radius is 510m for a new rural road link design.

The Forward Stopping Sight Distance on these bends required for this road location is a Desirable Minimum of 215m however drivers in either direction have 250m visibility of the site access.

The measured existing access sight distances available at the site access are a 'y' distance along the N22 of 250m eastwards and 220m westwards at an 'x' distance 3m back from hard shoulder edge. The 'y' distance required is 215m at the 'x' distance 3m to either side of the access.

The entrance is constructed to a high standard with an 9m. gated entrance set back 15m from the rear edge of the public road hard shoulder. There are splayed stone wing walls either side of this gate. The area between the hard shoulder, gate and the wing walls is paved with Hot

Rolled Asphalt. with a gradient of 1% away from the National Primary road. (Plate 4.11-1 below).



Plate 4.11-1 Site entrance onto N22 National Primary Route

The entrance is formed at 90° with the National Primary Road within the 100km/hr. speed limit zone. The access is paved with a HRA asphalt surface.

4.11.3.2 Existing Traffic Flow Conditions

A manual count carried out at the site on Wednesday 3rd May 2017 yielded the following figures (Refer to Table 4.11-1 below).

Table 4.11-1 Daily Traffic Volume N22 Manual County

	PEAK HOUR AM TRAFFIC Eastbound	PEAK HOUR PM TRAFFIC Westbound	TOTAL PEAK HOUR TRAFFIC	AVERAGE ANNUAL DAILY TRAFFIC
FLOW	1406	1251	1905	21097
% HGV				4.0
Peak Hour	08.00 – 09.00hrs	17.00 – 18.00hrs	17.00 – 18.00hrs	

There is a permanent TII Automatic Traffic counter N22 20222 situated on the dual carriageway to the east of the site. The counts available on this site were from May 2013 to the present (Refer to Table 4.11-2 below).

Table 4.11-2 Counts Obtainable from TII Counter N22-20222

Counts Available
Average hourly AM Count Eastwards
Average hourly PM Count Westwards
Peak Hourly 2 Way Counts
Average Annual Daily Traffic
Peak hours

Information that was obtained from this counter was as shown in Table 4.11-3 below. The Average Annual Daily Traffic (AADT) on the date of the Manual traffic count (3rd May 2017) was 20581 vehicles with a 3.8% HGV content. However, over the period of 1st January 2017 to date this AADT has increased to 21920 vehicles per day.

Table 4.11-3 Average Daily Traffic Volumes on N22 from TII Counter N22-20222 for 2017 to December

	PEAK HOUR TRAFFIC	AVERAGE ANNUAL DAILY TRAFFIC
FLOW	1933	21920
S% HGV		3.7
Peak Hour	17.00 – 18.00hrs	

The traffic count carried in 2006 in support of Planning Application yielded the results shown in Table 4.11-4 below.

Table 4.11-4 Daily Traffic Volume N22 in 2006

	VOLUME	VOLUME	AVERAGE ANNUAL DAILY TRAFFIC
AM Eastbound	1053	622	
PM Westbound	527	1187	
Total Peak Hour	1580	1809	17885
% HGV			4.5
Peak Hour	08.00 – 09.00hrs	17.00 – 18.00hrs	

A comparison of all the count figures are shown in Table 4.11-5 below.

Table 4.11-5 Comparison of Daily Traffic Volume N22 in 2006 and 2017

Count	Peak AM Hour	Peak AM Hour Volume East	Peak PM Hour	Peak PM Hour Volume West	Total Peak Hour Traffic	AADT	%HCV
2006	08.00 – 09.00hrs	1053	17.00 – 18.00hrs	1187	1809	17500	4.5
Manual May 2017	08.00 – 09.00hrs	1406	17.00 – 18.00hrs	1251	1905	20561	4.0
TII Automatic May 2017	08.00 – 09.00hrs	1402	17.00 – 18.00hrs	1366	1978	20581	3.7
TII Automatic 2017 Average	08.00 – 09.00hrs		17.00 – 18.00hrs		1933	21920	3.7
Growth 2006-2017		33.5%		6.4%	6.9%	25%	
Average Annual Growth Rate 2006-2017		2.66%		0.48%	0.6%	2.07%	

There is a steady consistency in Peak Hours AM and PM. The PM peak is the higher value and is the one to be used in the analysis. There was no pedestrian traffic and some pedal cycle traffic observed in the immediate area.

The morning peak hour was determined as 08.00 – 09.00 hrs and the evening peak hour 17.00-18.00 hrs. The larger volumes in the peak hours showed eastbound in the AM peak and westbound in the PM peak. This could therefore be construed to be commuter traffic to and from Cork City. The volume of peak hour traffic is the determining factor of the impact the development will have on existing traffic. The evening peak hour will be the volume to be considered.

The growth in volumes of traffic along the N22 has occurred in the past number of years after a period of negative growth or static growth. This growth is shown in Table 4.11-6 below.

Table 4.11-6 Annual Traffic Growth N22

Year	2013	2014	2015	2016	2017	2018 (Projected)	Growth Rate %
Vehicles	18797	19272	19604	20889	21920	22775	3.9
% HGV	4.1	4	3.9	3.8	3.7	.3.7	1.1

The annual growth in traffic of 3.9% in the last 4 years exceeds the 2.07% growth rate in the last 11 years. This can be attributed to the effect of the recessionary period from 2008. Assuming the traffic continues to grow at the present rate and assuming a date of opening of the facility is 2018 the figure of 22775 is to be used in the analysis.

4.11.3.3 Proposed Trip Distribution

Under existing Planning Permission (QR19 06/11798 & PL04.225332) it was proposed to facilitate HGV traffic associated with the extraction of 350,000 tonnes per annum. Planning Permission (P.A. Ref No. 066387, PL 04.220318) was subsequently granted on 14/08/2008 for construction of 1.38km conveyor to transport material from the Garryhesta sand and gravel pit to the processing plant at Classis, Knockanemore, Ovens. Co. Cork. This had the effect, save for staff and maintenance vehicles, of reducing the HGV traffic generated by the Garryhesta pit to be practically nil.

The projected import of material to the proposed recovery facility for 2018 is estimated to be up to 300,000 tonnes per annum for a period of 8 to 10 years which will be significantly less than the 350,000 tonnes per annum permitted under Planning Permission (QR19 06/11798 & PL04.225332) as detailed above. As such there will be no cumulative impact associated with the proposed SRF and existing quarry development. Based on a 50-week year this represents an average weekly import of 6,000 tonnes or assuming an average truck payload of 20 tonne this will result in an average of 110 truck movements (laden/unladen) per day. The peak hour flow to and from the proposed recovery facility will be 35 vehicles.

Table 4.11-7 Summary of Proposed Project Traffic Generation (Vehicles) 2018

Load Type	Total per Annum	Number of Loads per Annum	Number of Trips per Annum	Number of Trips per Day
20T loads	300,000	15,000	30,000	110

Table 4.11-8 Peak Hour Flows on N22 in 2017 (Vehicles)

LINK	AADT	PEAK HOUR FLOW
N22	21920	1905

Table 4.11-9 Proposed Project Traffic Generation Peak Hour Flows on N22 in 2018 (Vehicles)

LINK	VEHICLES	PEAK HOUR FLOW
N22	22775	1933
Proposed Recovery facility Traffic	112	35

Table 4.11-10 Peak Daily Proposed Facility Traffic 2018

Vehicle Type	Number of Trips	Peak Hour
HGV	110	33
Cars	2	2

The significant effect of the facility traffic will be along the N22. The 2018 projected volume of traffic on the N22 generated by the Soil Recovery Facility will be an increase of 0.5% on total traffic volume and 1.8% on Peak Hour volume.

The N22 cross section at the facility entrance would be classified as a Type 1 Single Carriageway roadway. This has a theoretical two-way capacity of 11,600 AADT at Level of Service D. The current AADT is 21920 and with a growth rate of 3.9%, the projected volume in 2018 will be 22775. Whilst the existing N22 is operating at a capacity well above the theoretical capacity for a Level of Service D it continues to operate at a lower level of service D especially at peak flow times. The addition of 110 more vehicles i.e. average 10 vehicles per hour (or 0.5% on total traffic volume and 1.8% on Peak Hour volume) to the volumes will

have no significant effect on current capacity especially as it will be spread throughout the day. The proposed peak traffic to/from the Recovery Facility will be outside the peak hour on the N22 and therefore, the current capacity of the N22 will be able to absorb the extra traffic from the facility. However, this analysis combines the highest values of the peak hour on the N22 with the peak value traffic generated by the facility to model the worst-case scenario. The facility entrance is located within a 100 kph speed zone.

It is predicted that the proposed traffic entering/leaving the proposed Soil Recovery Facility will have a traffic split of 98% via the N22 from and to the east and 2% via the N22 from and to the west. The effect of the peak hour traffic associated with the proposed Soil Recovery facility on the existing N22 traffic will be: -

- a) Traffic entering onto the N22 from proposed recovery facility travelling east (37)
- b) Traffic entering onto the N22 from the proposed recovery facility westwards (1)
- c) Traffic exiting the N22 westbound into the proposed recovery facility (35)
- d) Traffic exiting the N22 eastbound into the proposed recovery facility (1)

The effect on the N22 traffic of (a) above will be from time to time to slow mainline traffic as the trucks exiting from the proposed recovery facility onto the N22 accelerate to operating speed and attempt to merge with mainline traffic. This will be mitigated by the use of the northern side hard shoulder as an acceleration lane to build up merging speed.

The effect on the N22 traffic of (b) above will be occasionally to slow mainline traffic as the trucks exiting onto the N22 accelerate to operating speed along the hard shoulder and attempt to merge with mainline traffic. This will be mitigated by the use of the southern side hard shoulder for acceleration.

The effect on the N22 traffic of (c) above will be to slow westbound mainline traffic as the truck decelerates onto the hard shoulder to turn left into the facility.

The effect on the N22 traffic of (d) above will be to slow eastbound mainline traffic as the truck decelerates and/or stops to turn right into the facility.

The peak hour proposed recovery facility traffic will not necessarily coincide with the AM and PM peaks on the N22. However, by applying the peak hour figures for the N22 which is the PM peak flow to the predicted traffic generated by the proposed recovery facility activity calculated above it will result in the most robust analysis of the traffic assessment.

4.11.3.4 Traffic Flow Analysis

A previous Traffic and Transport Assessment was carried out for the development in September 2006. In that analysis of the Assessment years and estimate of traffic growth the authors assumed that the facility would open in 2006 and the 5, 10 and 15-year traffic volumes were calculated and assigned. This analysis also assumed that the proposed Ballincollig to Macroom new road alignment which is to run to the south of this quarry would be completed before 2020. The present N22 would therefore have been likely to be downgraded to a Regional or Local Road.

A Picardy analysis was carried out on the 2006, +5 and the +10-year horizons. This revealed there were no issues with capacity for the junction up and until 2016.

However, the proposed Ballincollig to Macroon new road alignment has not been constructed and is currently on hold according to the Cork National Road Design Office. After considering all the available information from the TII counter N22.20222 and the Manual count the figures to be used for the assessment will be as outlined in Table 4.11-9 and Table 4.11-10 above.

The peak vehicle movements on the N22 were calculated. The increase in traffic volumes were calculated for the period 2006 – 2018 and the percentage increase factor used to predict forward the volumes to be considered. The peak hourly movements of traffic at the N22/facility junction are the combination of the Proposed Recovery facility movements plus the N22 movements. The results are shown in Table 4.11-8, Table 4.11-9, Table 4.11-10 above and Figure 4.11-2 below.

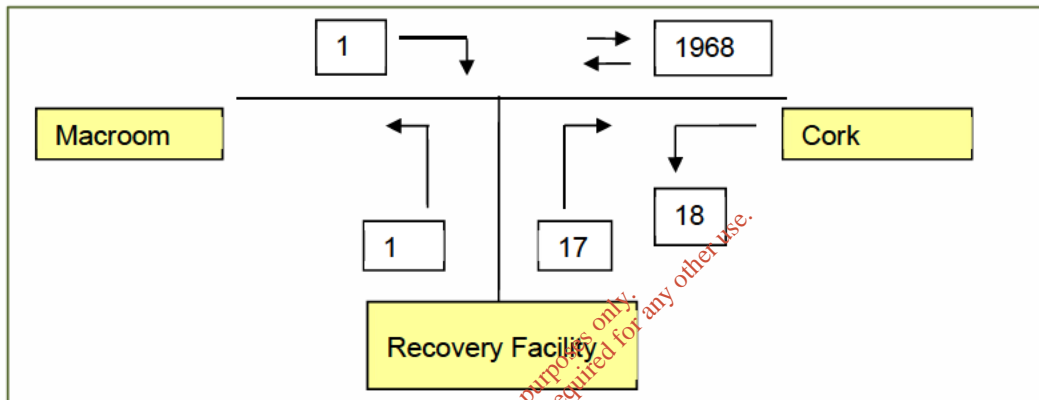


Figure 4.11-2 Assignment of Peak Hour (am) Traffic at Proposed Recovery Facility Access 2018

4.11.3.5 Traffic Assignment

The National Primary road N22 has sufficient capacity to cater for the 1.8% increase in proposed traffic generated by the Recovery facility. It is therefore proposed to examine the effect the proposed Recovery facility generated traffic will have on the Facility/N22 junction. This section assesses the traffic impacts of the proposed development on the road network adjacent to the proposed recovery facility. The traffic assessed is the traffic generated by the proposed recovery facility, the traffic independent of the proposed Soil Recovery Facility and the interaction of both.

The existing Access from the proposed Soil Recovery Facility has sufficient capacity to cater for projected peak hour traffic to use the facility. The proposed turning movements at the N22/Access junction are of sufficient low volume not to cause any major interference in the free movement of traffic flow on the N22.

The generated volume split of proposed Soil Recovery Facility related traffic will be 2% West along the N22 and 98% Eastwards along the N22. The resulting assignment of the generated two-way traffic by the Proposed Recovery facility activity along the N22 is shown in Table 4.11-11 below.

Table 4.11-11 Assignment of Average Daily Proposed Recovery Facility (Vehicles/Day) to N22 in Year 2018

Direction	Vehicle Type		
	Car/LGV	HGV	Total
To N22 West from Proposed Recovery facility 2%	0	1	1
To N22 East from Proposed Recovery facility 98%	2	54	56
Total	2	55	57
To Proposed Recovery facility N22 from West 2%	0	1	1
To Proposed Recovery facility N22 from East 98%	2	54	56

4.11.3.6 Peak Hour Traffic

The Proposed Recovery facility opening hours are 0700 to 1800 hrs. Monday to Friday. The traffic generated during the morning and evening peak was calculated. The traffic using the N22 in the evening peak was found to be the greatest and will be used for the traffic assignment. When this is added to the other vehicle daily average it yields an evening peak flow to the Proposed Recovery facility of 33 vehicles inward and 35 outwards.

Table 4.11-12 Assignment of Evening Peak Hour Proposed Facility Traffic (Veh/hr)

Direction	Vehicle Type V/H		
	LGV/Car	HGV	Total
Proposed facility to N22	2	17	19
N22 to Proposed facility	0	16	16
Total	2	33	35

The peak hour additional proposed Soil Recovery Facility traffic would increase the N22 movements by 1.8 %.

4.11.3.7 Junction Operation

An assessment of the N22/ proposed facility access was carried out and it was found that there would be an increase of 0.5% in overall traffic using the junction and 1.8% of the peak hour traffic. The traffic on the proposed facility leg of the junction is predicted to increase by 35 vehicles in the evening peak hour. The major effect and traffic delay will be on the Facility leg of the junction where there will be delay for traffic seeking gaps in the N22 mainline traffic to proceed towards Cork. The above results show the maximum traffic generated by the proposed facility development has a negligible effect on the operation of the junction and the N22.

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4.11.4 ASSESSMENTS OF IMPACTS

The following Impact Assessment matrix provides an indication of the significance of potential effects arising during the life cycle of the development not accounting for any mitigation measures.

Table 4.11-13 Traffic - Impact Assessment

Table 4.11-13 Traffic - Impact Assessment			
'Do Nothing' Impacts	X		
Factors	Construction	Operation	Decommissioning
Direct Impacts	X	●	X
Indirect Impacts	X	●	X
Cumulative Impacts	X	X	X
Residual Impacts	X	X	X
'Worst Case' Impacts	X	X	X

None/imperceptible: X; Slight: ●; Moderate: ●; Significant/Very significant: ●.
Refer to Appendix 5.2 for definition of Significance

4.11.4.1 'Do Nothing' Impacts

The 'do nothing' impacts will be none or imperceptible as the site of the proposed Recovery area will remain as it exists today. There are no impacts from the site at present and this will continue if no development is carried out.

4.11.4.2 Direct Impacts

The direct impacts from a traffic perspective of the Proposed Recovery facility development will be an increase of traffic movements at the existing access onto the National Primary N22 at Garyhesta.

There will be no impact at construction phase as the proposal does not involve any construction just the filling of an existing void area. This will require the use of earth moving machinery. This machinery will be already available on site and as such there no additional traffic associated with mobilising earthmoving equipment onto the site.

The proposed development consists of restoration of part (c. 6.7 ha) of existing quarry by importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil. This is considerably less than HGV traffic that was associated with the sand and gravel

pit (QR19 06/11798 & PL04.225332) which was permitted to export 350,000 tonnes per annum by road. Sand and gravel is now transported by overland conveyor (P.A. Ref No. 066387, PL 04.220318) c.1.38km conveyor to the processing plant at Classis, Knockanemore, Ovens. Co. Cork.

The operation impact of the proposed development will have the effect of increasing the traffic movements on the N22 by 1.8 % during peak hour during this phase of the proposal. The extent of the impact from increased traffic is detailed above.

The decommissioning impact of the proposed development will be self-contained within the site as the proposal is to cap the area when the recovery of material is complete.

4.11.4.3 Indirect Impacts

There will be no indirect impacts from a traffic perspective during the construction phase as the proposal does not involve any construction just the filling of an existing void area.

The operation impact of the proposed development will have the effect of increasing the traffic movements on the N22 to the east of the site by 1.8 % during peak hour during this phase of the proposal. The extent of the impact from increased traffic is detailed above.

There will be no indirect impacts during the decommissioning phase of the development. The impact of the proposed development will be self-contained within the site as the proposal is to cap the area when the recovery of material is complete.

4.11.4.4 Cumulative Impacts

Under existing Planning Permission (QR19 06/11798 & PL04.225332) it was proposed to facilitate HGV traffic associated with the extraction of 350,000 tonnes per annum. Planning Permission (P.A. Ref No. 066387, PL 04.220318) was subsequently granted on 14/08/2008 for construction of 1.38km conveyor to transport material from the Garryhesta sand and gravel pit to the processing plant at Classis, Knockanemore, Ovens. Co. Cork. This had the effect, save for staff and maintenance vehicles, of reducing the HGV traffic generated by the Garryhesta pit to be practically nil.

The projected import of material to the proposed recovery facility for 2018 is estimated to be up to 300,000 tonnes per annum for a period of 8 to 10 years which will be significantly less than the 350,000 tonnes per annum permitted under Planning Permission (QR19 06/11798 & PL04.225332) as detailed above. As such there will be no cumulative impact associated with the proposed SRF and existing quarry development during the construction, operation or commissioning phases of the proposed development.

4.11.4.5 Residual Impacts

It is considered that following restoration and the mitigation measures incorporated in the design that there will be no significant effects in terms of Roads and Traffic.

4.11.4.6 'Worst Case' Impacts

The worst-case impact would be if the sand and gravel pit was to transport material by road to the processing plant at Classis. However, as discussed under cumulative impacts sand and gravel is now transported by overland conveyor (P.A. Ref No. 066387, PL 04.220318) c.1.38km conveyor to the processing plant at Classis, Knockanemore, Ovens. Co. Cork.

4.11.5 MITIGATION MEASURES

The proposed recovery facility will continue to import material to the area designated to be filled.

A wheel washing facility is to be provided for all outgoing vehicles.

The parking requirements for the Proposed Recovery facility operation mainly relate to the facility employees and visitors. Provision of sufficient spaces within the proposed facility for employees and visitors will be allocated. If the maximum number of employees will be 4. Therefore, a car park provision of 4 + 25% for visitors (say 5 spaces) will be provided. There is at present car parking available within the curtilage of the quarry.

Existing hard stand areas within the existing quarry to be maintained as rest up areas for trucks.

There is the availability of visibility splays 215 x 3m on either side of the proposed facility entrance. These will be maintained free from vegetative growth on a regular basis.

Warning signposting on the approaches to the proposed facility to be provided in accordance with the Traffic Signs Manual and in consultation with the Infrastructure section of Cork County Council.

To improve the capacity of the entrance the existing hard-shoulder to the east should be converted to an auxiliary Left turning lane. The existing hard-shoulder to the west of the Facility entrance should be converted to an acceleration lane. This will provide an acceleration and deceleration lane for the facility. This will the also act as a road safety feature and increase the capacity of the junction by preventing the interruption of the free flow of the mainline traffic. This work to be provided in consultation with the Infrastructure section of Cork County Council.

4.11.6 REFERENCES

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4.12 INTERACTION OF THE FOREGOING

4.12.1 INTRODUCTION

Schedule 6 of the Planning and Development Regulations 2001 (S.I. 600/2001) sets out the requirement to consider the interrelationships of certain aspects of the environment as part of the EIA process. All environmental factors are inter-related to some extent, and this section draws attention to significant interaction and interdependencies in the existing environment.

Interactions are usually highly complex, and a change in any one factor, such as land-use or water quality, could affect all of the other interrelated factors. Although almost all environmental aspects are inter-related to some degree only the significant interactions are usually considered in an assessment.

The interactions of the impacts and mitigation measures between one topic and another, where applicable, are discussed under the respective sub-sections within Section 4, rather than in a specific "Interactions" section. Because an EIAR is typically prepared by a number of specialist consultants it is important that the interactions between the various disciplines are also considered. This section draws attention to significant interaction and interdependencies in the existing environment.

The following matrix has been generated to show where possible interactions (top of matrix) may result between the various environmental factors including brief details (bottom of matrix). For details of any interactions refer to the relevant sections of the EIAR.

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Table 4.12-1 Interaction Matrix

Factors (Interaction)	4.1 Population & Human Health		4.2 Biodiversity		4.3 Land, Soils & Geology		4.4 Water		4.5 Climate		4.6 Air Quality		4.7 Noise & Vibration		4.8 Landscape		4.9 Cultural Heritage		4.10 Material Assets		4.11 Traffic	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
4.1 Population & Human Health			●	●	X	●	X	X	X	X	●	●	●	●	●	●	X	X	●	●	X	●
4.2 Biodiversity	The activity will not result in a significant loss of heritage values in the locality. The changes will be both negative (loss of open habitats) and positive as reclamation works carried out in accordance with (GLAS).																					
4.3 Land, Soils & Geology	The SRF including the site infrastructure will be situated within the existing quarry extraction area and as such will have no impact on virgin soils, sands and gravels, which have already been stripped, disturbed or extracted. As a result of backfilling using the inert soil, stone and dredge spoil the proposed SRF will contribute to the reinstatement of the quarry site, and thus will have a permanent significant positive effect.		The impact of infilling part of this site with inert material will be significant in ecological terms since it will result in a change of habitat in this part of the site and initially reduce the level of biodiversity. However, all the habitats and species involved are common and are established in other parts of the quarry, particularly in the main quarry area to the east.																			
4.4 Water	the potential impact to groundwater quality due to the deposition of inert infill material is an indirect, negative, imperceptible, long term, low probability impact before appropriate mitigation measures are considered.		The potential impact to the Cork Harbour SPA due to the deposition of inert infill material is indirect and imperceptible.		The groundwater vulnerability rating after the fill will be improved as the additional fill will provide additional aquifer protection at the site.																	
4.5 Climate	X		X		X		X		X		X		X		X		X		X		X	
4.6 Air Quality	The impacts of any dust deposition from the operations will be direct, of short duration, temporary and largely confined to the site area.		It is expected that there will be imperceptible impact with respect to local amenity and residential receptors as a result of the development.		X		X		X		X		X		X		X		X		X	
4.7 Noise & Vibration	The only activity taking place in this section of the pit will be the restoration of the site by backfilling. Residences along this road are typically experiencing noise levels of 80 dBLAeq during daytime hours due to passing traffic on the N22.		X		X		X		X		X		X		X		X		X		X	
4.8 Landscape	As a result of backfilling using the inert soil, stone and dredge spoil the proposed SRF will contribute to the reinstatement of the quarry site, and thus will have a permanent significant positive effect.		The activity will not result in a significant loss of heritage values in the locality. The changes will be both negative (loss of open habitats) and positive as reclamation works carried out in accordance with (GLAS).		The Garryhesta site would remain as an unrestored, quarry site, without the backfilling generated by the proposed SRF		X		X		X		X		X		X		X		X	
4.9 Cultural Heritage	X		X		X		X		X		X		X		X		X		X		X	
4.10 Material Assets	The restoration of the site to beneficial after-use will result in a permanent significant positive effect in the medium term.		The activity will not result in a significant loss of heritage values in the locality. The changes will be both negative (loss of open habitats) and positive as reclamation works carried out in accordance with (GLAS).		X		X		X		X		X		X		X		X		X	
4.11 Traffic	The operation impact of the proposed development will have the effect of increasing the traffic movements on the N22 by 1.8 % during peak hour.		X		X		X		X		X		X		X		X		X		X	

Con	Construction Phase	●	Weak Interaction
Op	Operational Phase	●	Some Interaction
x	No Interaction	●	Strong Interaction

5 APPENDICES

5.1 NEED FOR DEVELOPMENT

5.1.1 GOVERNMENT POLICY

The unsustainable levels of resource utilisation and waste generation within the EU have made waste management a central issue for policy makers in the EU (EPA 2012). Consequently, the EU passed the Waste Framework Directive in 2008. One of the main objectives of the Directive is to provide a framework to transform Europe into a society with high levels of recycling and resource efficiency. The Waste Framework Directive 2008/98/EC established a legal framework for the treatment of waste within the EU, through the prevention of the harmful effects of waste generation, and through waste management. In order to effect this transformation, Member States are required to implement legislation in accordance with a hierarchy for the treatment of waste.

Of particular importance is Article 11.2 of the Directive, which states that "Member States shall take the necessary measures designed to achieve that by 2020 a minimum of 70% (by weight) of non-hazardous construction and demolition waste excluding naturally occurring material defined in category 17-05-04 in the List of Wastes shall be prepared for re-use, recycled or undergo other material recovery (including backfilling operations using waste to substitute other materials)".

The Government's strategy for the construction sector, Construction 2020, sets out a cross-government action plan to help support a sustainable construction sector over the longer term.

The Government has through the National Development Plan and the National Spatial Strategy made clear its objective to facilitate more balanced social and economic growth throughout the State. Such balanced regional growth will result in an increased requirement for social and economic infrastructure with a consequential increase in demand for recovery and re-use of inert Construction and Demolition waste.

There are two main documents which underpin the direction of spatial development in the County. Firstly, at a National level the National Spatial Strategy and secondly at a Regional level, the South West Regional Planning Guidelines (2010-2022).

The economic development of Cork can no longer be viewed in isolation from adjoining counties and regions. Ireland as a country has become an open economy and as a result the economic development of Cork must now be considered in the context of regional, national and global influences.

5.1.1.1 National Context

5.1.1.1.1 National Spatial Strategy 2002-2020

The National Spatial Strategy (NSS) was launched by the government in late 2002 and is designed to provide a framework for balanced social, economic and physical development between the regions for the next 20 years (DoELG, 2002). The strategy is based on a hierarchy of settlement; Gateways, Hubs and County Towns along with the need to support the role of smaller towns, villages and diverse rural economies.

The NSS provides a framework to promote and balanced regional development and sustainable growth. It also guides policies, programmes and investment. The strategy emphasises continued strong growth in the Greater Dublin Area (GDA), but with significant improvement in the regions outside the capital and more particularly in the nine gateway cities and nine hub towns.

The NSS recognises that quality of life is increasingly important to people and that unbalanced development affects quality of life. The growing trend of long distance commuting, and the dislocation between centres of employment and residential development are economically, socially and environmentally unsustainable. The NSS recognises that the solution lies in balanced regional development, whereby the potential of each area to contribute to the economic, social and environmental wellbeing of the State is developed. Ireland's growing population can be accommodated within existing settlements, by renewing and developing our cities, towns and villages, and ensuring that urban land is used sensitively and efficiently in order to provide attractive, sustainable compact, public transport friendly forms, whilst avoiding urban sprawl.

County Cork is within the South-West Region (incl. Cork City and counties Cork and Kerry). The strategy emphasises the critical role of 'Gateway' and 'Hubs' in delivering future economic growth, with Cork as the only city in the region, being the Gateway. There is a network of sizable urban settlements in the Region, including Hubs and County towns, each with its own hinterland and sphere of influence, and extensive services, including the presence of third and fourth level education institutes. There are the three Hubs of Mallow, Killarney and Tralee, and numerous County towns with populations over 5,000, including Ballincollig Carrigaline, Cobh, Middleton, Youghal, Bandon, Cobh, Carrigtwohill, Glanmire, Fermoy, Kinsale, and Blarney, all of which are in County Cork.

The NSS 2002-2020 was revoked in 2013, as it had failed to meet its objectives, largely due to: (1) designation of too many hubs and gateways; (2) a lack of resources due to poor fiscal position; (3) weak political buy-in, as revealed by the decentralization plan; and (4) lack of a statutory footing, which meant it received 'due regard' as opposed to 'compliance'. The Government has made clear its objective to facilitate more balanced social and economic growth throughout the State and announced it would seek a successor National Spatial Strategy. This would take account of both the need to acknowledge changed national and international circumstances and continue to set long term national planning and development aims.

5.1.1.1.2 Infrastructure & Capital Investment Plans

The National Development Plan (NDP) 2007-2013 was revoked in 2010, at the height of the recession, and was succeeded in 2011 by the Infrastructure and Capital Investment Plan 2012-2016 (DoPER, 2011). The Government agreed an exchequer capital programme amounting to €17 billion for the 5-year period 2012-2016. This large exchequer investment was directed at addressing critical infrastructure investment gaps in order to aid economic recovery, social cohesion and environmental sustainability. The sectors prioritised for investment in the Framework include education, health, jobs and enterprise.

The focus of the capital spending is to be on supporting those sectors and projects which will best contribute to sustainable job creation. The review of Infrastructure and Capital Investment 2012-16 (DoPER, 2011) assessed the existing capacity of Ireland's infrastructure and identified remaining gaps which must be addressed to aid economic recovery, social cohesion and environmental sustainability.

The approach identifies four main components of the investment strategy, namely:

- Economic infrastructure – encompassing transport networks, energy provision and telecommunications capacity.
- Investment in the productive sector and human capital – such as capital investment in education infrastructure.
- Environmental infrastructure – including our waste and water systems.
- Critical social investment – such as the health service and social housing programmes.

In September 2015, the Government launched a second Infrastructure and Capital Investment Plan 2016-2021 (DoPER, 2015), whose principal stated goal is "Building on Recovery". With steadily improving public finances, the Government was able to commit to increasing the level of expenditure on capital infrastructure gradually over the programme period, in a way that is sustainable and long term. The plan represents a €42 billion framework for infrastructure investment in Ireland over the period. The plan combines direct investment by the Exchequer of €27 billion, a third phase of PPP investments of about €500 million and State-owned sector investment of around €14.5 billion. In total, this State-backed investment package represents over 3.5 percent of GNP each year between 2016 and 2021, and it will support more than 45,000 construction-related jobs.

The Plan prioritises spending on those areas of greatest need as the economy continues its strong recovery. The considerable improvement in the public finances has allowed the Government to increase the level of expenditure on capital infrastructure gradually over the course of the next six years, in a way that is sustainable and long term in its design and focus. Economic growth is dependent on the capacity to move people and goods around the country quickly and easily, and significant strides had been made since 2000 in improving Ireland's national transport infrastructure. Nonetheless, transport is allocated the largest sectoral share of 29% of

the Exchequer Capital Envelope under the Plan. In particular, the national, regional and local road network is allocated €591 million in 2016, progressively increasing to €1,082 million in 2022, and totaling €6 billion over the period of the Plan.

Continuation of the public capital programme will have beneficial effects on the construction industry, and on the wider economy in terms of employment, continued recovery and national competitiveness. In their report Building a Better Ireland, the Construction Industry Council (2010), state that as the economy continues to grow and the population increases towards its projected 2020 level of 5,000,000, real planning for the future is vital. No successor national spatial plan has been adopted, but on February 16th 2018, the government published “Project Ireland 2040”, the new draft National Planning Framework to replace the revoked NSS.

5.1.1.1.3 Project Ireland 2040

Project Ireland 2040 is the Government’s new overarching public policy initiative, which emphasises “social outcomes and values consistent with prudent economic and budgetary policy” (DoHPLG, 2018). Project Ireland 2040 consists of the National Planning Framework to 2040 and the National Development Plan 2018-2027. These will essentially replace the revoked NSS and the Infrastructure and Capital Investment Plan 2016-2021, respectively. The key difference with all previous spatial planning policies is that it represents an alignment of the investment strategy with the strategic planning policy, to create a unified and coherent plan for the country. Insofar as the Plan is underpinned by investment and placed on a statutory footing that it will receive ‘compliance’ as opposed to ‘due regard’ it will have the force of both funds and law.

The objective of Project Ireland 2040 is to provide a “comprehensive social, economic and cultural infrastructure for all our people to flourish”. The policy seeks to achieve ten strategic outcomes, building around overarching themes of wellbeing, equality and opportunity. The ten shared priorities will ensure a consistent approach between planning objectives under the National Planning Framework and investment commitments under the National Development Plan. These are:

1. Compact Growth
2. Enhanced Regional Accessibility
3. Strengthened Rural Economies and Communities
4. Sustainable Mobility
5. A Strong Economy, supported by Enterprise, Innovation and Skills
6. High-Quality International Connectivity
7. Enhanced Amenity and Heritage
8. Transition to a Low Carbon and Climate Resilient Society
9. Sustainable Management of Water and other Environmental Resources
10. Access to Quality Childcare, Education and Health Services

5.1.1.1.3.1 National Planning Framework to 2040

The new draft National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of the country. The NPF sets out a spatial strategy for Ireland, to accommodate in a sustainable and balanced fashion, the significant projected changes in demographics, such as a population growing by an extra million, and which is increasingly aging and living in smaller family units. The NPF will guide development and investment over the next two decades and will empower each region to lead in the planning and development of their communities, based on a common set of national objectives and key principles.

The above vision will be achieved by:

- Developing a new region-focused strategy for managing growth;
- Linking the NPF to a new 10-year investment plan, the National Development Plan;
- Using state lands for certain strategic purposes;
- Supporting the NPF with more environmentally focused planning at local level;
- Backing-up the NPF in law with an Independent Office of the Planning Regulator.

Some of the key provisions are as follows:

- A roughly 50:50 distribution of growth between the Eastern and Midland region, the Southern, and the Northern and Western regions, with 75% of the growth outside of Dublin and its suburbs.
- The five cities in terms of population size (pop. > 50,000): Dublin, Cork, Limerick, Galway and Waterford, will be targeted for 50% of overall national growth between them, with Ireland's large and smaller towns, villages and rural areas accommodating the other 50% of growth.
- Major new policy emphasis on renewing and developing existing settlements rather than continual expansion and sprawl of cities and towns into the countryside, with a target of at least 40% of all new housing to be delivered within the existing built-up areas of cities, towns and villages on infill and/or brownfield sites.
- Implementation of the NPF will be fully supported by the Government's investment strategy for public capital investment and investment by the State sector in general, as outlined in the National Development Plan.
- The State owns key parts of our cities and towns, the development of which can play a vital role in reshaping those urban areas, providing homes, places of work and recreation, and a new national Regeneration and Development Agency will be established to harnessing public lands as catalysts to stimulate regeneration and investment.
- The future planning and development of our communities at local level will be refocused to enable a national transition to a competitive low carbon, climate resilient and environmentally sustainable economy by 2050, through harnessing the country's prodigious renewable energy potential.

- More strategic and co-ordinated planning of our cities and large towns across local authority boundaries will be introduced, including statutorily backed Metropolitan Area Strategic Plans in the five cities.
- The NPF will be given full legislative support within the planning system, including regular reviews and updates to reflect changing circumstances as necessary. The legislation underpinning the Framework will create a new independent Office of the Planning Regulator (OPR) to monitor its implementation of the NPF.
- For each of the three regions, the Regional Assemblies will prepare their own strategy in accordance with the framework, and these will be completed by early 2019 and will be known as Regional Spatial and Economic Strategies. County and City Development Plan review cycles will then fall in to line with their respective regional strategies, ensuring that the shared vision is carried through to the local planning level.

The NPF includes 75 National Policy Objectives, of which the following are considered particularly relevant here:

National Policy Objective 1a

The projected level of population and employment growth in the Eastern and Midland Regional Assembly area will be at least matched by that of the Northern and Western and Southern Regional Assembly areas combined.

National Policy Objective 2a

A target of half (50%) of future population and employment growth will be focused in the existing five cities and their suburbs.

National Policy Objective 3a

Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements.

National Policy Objective 3b

Deliver at least half (50%) of all new homes that are targeted in the five Cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints.

National Policy Objective 3c

Deliver at least 30% of all new homes that are targeted in settlements other than the five Cities and their suburbs, within their existing built-up footprints.

National Policy Objective 4

Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being.

National Policy Objective 5

Develop cities and towns of sufficient scale and quality to compete internationally and to be drivers of national and regional growth, investment and prosperity.

National Policy Objective 6

Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area.

National Policy Objective 12

The Government will establish a National Regeneration and Development Agency to work with local authorities, other public bodies and capital spending departments and agencies to co-ordinate and secure the best use of public lands, investment required within the capital envelopes provided in the National Development Plan and to drive the renewal of strategic areas not being utilised to their full potential. The Government will consider how best to make State lands available to such a body to kick-start its development role and to legislate for enhanced compulsory purchase powers to ensure that the necessary transformation of the places most in need of regeneration can take place more swiftly and effectively.

National Policy Objective 32

To target the delivery of 550,000 additional households to 2040.

National Policy Objective 35

Increase residential density in settlements through a range of measures including reductions in vacancy, re-use of existing buildings, infill development schemes, area or site-based regeneration and increased building heights.

National Policy Objective 56

Sustainably manage waste generation, invest in different types of waste treatment and support circular economy principles, prioritising prevention, reuse, recycling and recovery, to support a healthy environment, economy and society.

National Policy Objective 75

Ensure that all plans, projects and activities requiring consent arising from the National Planning Framework are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate.

Key future planning and development and place-making policy priorities for the Southern Region include:

- Developing and implementing comprehensive and strategic metropolitan area spatial plans for Cork, Limerick and Waterford cities that secure long-term rejuvenation-focused city development, with a special emphasis on underutilised and publicly owned, centrally located sites to boost the population and economic output levels of city centre areas as drivers for wider regions.
- Allied to strategies to deliver more compact urban development in the main cities, to enhance the efficiency and effectiveness of transport links between the cities

to enable them to function in concert and harness their complementary strengths in an increasingly networked manner.

- Measures to support the integrated development of remoter parts of this region, including the ongoing investment in the transport and communications area, and further promotion and development of the underutilised potential in the tourism and local enterprise.
- More emphasis on consolidating the development of places that grew rapidly in the past decade or so with large scale commuter driven housing development with a particular focus on addressing local community and amenity facility provision in many of the larger commuter towns.
- Preparing and implementing a regional rejuvenation priorities programme, to shape and inform delivery of the Regeneration and Development Fund and identifying significant ready-to-go city, rural town and village and rural rejuvenation priorities harnessing publicly owned land and other assets that are not being used at presently, which together with community and wider private and public sector support and investment, could deliver the transformation of both urban and rural areas in an integrated manner.
- Integrated planning, management and development of the areas along the Wild Atlantic Way to maximise the quality and integrity of the visitor experience as well as the economic benefit, especially for rural and local communities.
- Harnessing the potential of the region in renewable energy terms, including wind, solar, biomass, and wave energy, focusing in particular on the extensive tracts of publicly owned peat extraction areas in order to enable a managed transition of the local economies to the economic benefits of greener energy.
- Developing a more integrated network of greenways, blueways and peatways to support the diversification of rural and regional economies and promote more sustainable forms of travel and activity-based recreation.

As Garryhesta is located on the periphery of Cork City and Metropolitan Area (CMA), and the proposed SRF will primarily serve the construction industry within the CMA, it is noteworthy that the key future growth enablers for Cork include:

- Delivering ambitious large-scale regeneration projects for the provision of new employment, housing and supporting infrastructure in Cork Docklands as integrated, sustainable developments.
- Progressing the sustainable development of new greenfield areas for housing, especially those on public transport corridors, such as Monard.
- Identifying infill and regeneration opportunities to intensify housing development in inner city and inner suburban areas, supported by public realm and urban amenity projects.
- Development of a new science and innovation park to the west of the City, accessible by public transport.

- The continued expansion of and integration with the City's third level institutions.
- The development of a much-enhanced Citywide public transport system.
- M8/N25/N40 Dunkettle Junction upgrade and improved Ringaskiddy Port access.
- Enhanced regional connectivity through improved average journey times by road.
- Improved traffic flow around the City, which could include upgrade of the N40, and/or alternatives, possibly including enhanced public transport.
- Ensuring water supply and waste-water needs are met to enhance Corks water supply and increase waste water treatment capacity.

Improving sustainability in terms of energy, waste management, resource efficiency, and water, to include district heating and water conservation.

5.1.1.1.3.2 National Development Plan 2018 to 2027

The National Development Plan (NDP) is the companion document to the NPF and is a ten-year strategy for public capital investment of almost €116 Billion. This equates to almost €12 Billion annually and represents a substantial increase in the average annual capital budget over that envisaged in the 2nd Infrastructure and Capital Investment Plan 2016-2021. The NDP will underpin the NPF and drive its implementation, as well as driving long-term economic, environmental and social progress across all parts of the country over the next ten years.

The future success of Ireland rests on ensuring readiness for a changing world and the continued successful development of the knowledge economy, and as such on also adopting a strongly strategic approach to public capital investment in the NDP. The NDP represents a response to significant deficits in Ireland's public infrastructure and identifies the strategic priorities for public capital investment for all sectors.

There are many major challenges that form the context for the NPF and the NDP's strategic investment priorities, and these include:

- Demographic change.
- Need for Ireland to become a low-carbon, climate-resilient society.
- Brexit.
- Realising sustainable growth.

The NDP is a blueprint, setting out a strategic framework for public capital investment over the next ten years with a particular focus, beyond simply underpinning the NPF, but on achieving the following over-arching objectives:

- Meeting Ireland's infrastructure and investment needs over the next ten years through a total investment of an estimated €116 Billion over the period.
- Reforming how public investment is planned and delivered by shifting to integrated regional investment plans, stronger co-ordination of sectoral strategies to secure mutually reinforcing outcomes, and more rigorous selection and appraisal of projects to secure value-for-money.

Substantial growth is planned in public capital investment over the coming years, but this must be consistent with the fundamental requirements of overall economic and fiscal sustainability. Over the period 1995 to 2015, Gross Fixed Capital Formation (GFCF) as a share of Gross Domestic Product (GDP) in Ireland was comparable to the EU15 average of 3% over the same period. This indicates that a value of 3% of national income can be considered as an appropriate target for the long-term average level of public capital spending. Under the NDP, it is projected that public capital investment will reach 3.8% of Gross National Income (GNI) in 2021 and 4% by 2024, with sustained investment averaging 4% on an annual basis over the period 2022 to 2027. Public capital investment in Ireland will therefore become among the highest in the EU and will also ensure that public investment underpins the sustainability of economic growth but avoids contributing to economic instability and exacerbating any risks of unbalanced and inflationary growth.

Exchequer funding allocated for public capital investment over the ten-year period will amount to €91 Billion and will be supplemented with State-backed investment by commercial State owned enterprises to generate a total 10-year investment programme estimated at €116 Billion. The Exchequer resources allocated for investment under the NDP are based on projected nominal growth in national income (GNI) averaging 4% over the period 2022-2027. This is consistent with long term growth forecasts for the Irish economy produced by various international organisations. The total annual capital expenditure will thus increase from €8.4 Billion in 2018 to €14.0 Billion in 2027 under the Plan.

Indicative resource allocations for delivery of the National Strategic Outcomes, and for named Strategic Investment Priorities under each Outcome, over the period ten-year period are detailed in the Plan (See Table 3.2, p. 21-22 of NDP). These allocations will be updated and adjusted where necessary as the Plan is implemented, in light of:

- Progress achieved in relation to public capital investment priorities currently underway or planned.
- Ongoing assessment of longer-term infrastructural priorities across sectors underpinning the implementation of NPF priorities.
- Different planning horizons applying to different types of capital expenditure.

This will allow for appropriate flexibility and responsiveness of capital allocations to changing circumstances and priorities.

5.1.1.1.4 National Waste Policy

The waste policy statement entitled “Taking Stock and Moving Forward” published in April 2004 reiterates a commitment to the implementation of the internationally recognised waste management hierarchy. The integrated waste management approach is to implement maximum recycling, recovery of energy from residual waste and moving away from landfill disposal.

A policy direction WIR 04/05 was issued on 3rd May, 2005 in relation to the movement of waste. This was unforeseen in “Taking Stock and Moving Forward” and was

intended to address concerns that relevant regulatory authorities were taking an unnecessarily restrictive approach regarding the inter-regional movement of waste. This guidance is intended to provide greater clarity regarding the appropriate application of the proximity principle to facilitate the provision of environmentally sustainable and economically viable waste infrastructure in accordance with national policy.

Section 21A. (1) of the amended Waste Management Acts 1996 to 2011 states that:-

The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:

- (a) prevention;
- (b) preparing for re-use;
- (c) recycling;
- (d) other recovery (including energy recovery); and
- (e) disposal.

Measures at the top of the hierarchy have the inherent potential to be more environmentally beneficial and resource efficient. It implies that higher order strategies should be considered first and used where practicable.

Waste prevention is the top priority and when this has been exercised to its full potential then one should attempt to get the maximum benefit from the remaining waste at minimum environmental cost. This is the basis of the '**3 Rs**' which take account of the next steps in the hierarchy:

Reduction (Minimisation) is top of the list since it is the only complete way to reduce environmental impacts.

Reuse is generally better than recycling since there is no processing stage which would use energy and create its own waste.

Recycling is generally better than recovery of secondary materials or energy since it achieves a greater reduction in the demand for primary resources.

To increase the likelihood of applying the Reuse, Recycling, Recovery and Treatment strategies to the best potential it is usually important that the various components in the waste stream are segregated as much as possible to minimise contamination. This usually requires segregation at source and systems to prevent the mixing of different waste streams.

A new National Waste Management Policy was adopted in 2012, and the new Regional Waste Plans are required to reflect this new National Policy (DoECLG 2012). A key objective of waste management plans is to "*ensure self-sufficiency of waste management infrastructure within the State*". The Plan incorporates several key obligations imposed by the 2008 Waste Framework Directive:

- Application of the Waste Hierarchy as a priority in legislation and policy

- Recovery of waste where practicable, or disposal without risk to environment or human health
- Prohibition of the abandonment or uncontrolled disposal of waste
- Establishment of an integrated network of waste disposal installations and of installations for the recovery of mixed municipal waste - aiming for self-sufficiency
- A system of permits and registration for all those involved in collecting, disposing of, preparing for the recovery of, or recovering waste
- Cost of waste management borne by original waste producer, through adoption of the polluter pays principle

5.1.1.2 Regional Context

The *National Spatial Strategy (NSS)* for Ireland set out the basis on which all areas of the country will have the opportunity to develop to their potential within a national spatial planning framework for the period up to 2020 (DoEHLG, 2002). The Regional Authorities were entrusted with the important responsibility of implementing the NSS and successor spatial plans at regional level.

The Planning and Development Act, 2000 conferred on the Regional Authorities the power to make RPGs for their functional areas. The RPG, which also incorporate a socioeconomic development strategy, are intended to constitute a strategic planning framework for the period 2010-2022 for the development of each region and for inter-regional cooperation. The strategic policies and objectives set out in the RPG will form the backdrop for socio-economic planning by national and regional agencies and will constitute the policy framework within which county, city, town and local area development plans will be made. Thus, although the NSS has been revoked, its legacy persists in the Regional Planning Guidelines (RPGs), which remain in effect until 2022 or until otherwise replaced by new Regional Spatial & Economic Strategies (RSES).

In 2010, the South West (SW) Regional Authority produced Regional Planning Guidelines (RPG's) 2010-2022 (South West Regional Authority, 2010). These set out a strategic planning framework for the region consisting of counties Cork and Kerry, and these guidelines will remain in force until 2022, unless replaced by new Regional Spatial & Economic Strategies in early 2019 as proposed.

The Southern, the Northern and Western, and the Eastern and Midland Regional Assemblies were established on 1st January 2015, following on from the dissolution of the BMW and Southern & Eastern Regional Assemblies, under the Government's regional reform process as enacted in the Local Government Reform Act 2014.

5.1.1.2.1 South-West Regional Planning Guidelines 2010-2022

The South-West Regional Planning Guidelines 2010-2022 were adopted by the South-West Regional Authority (SWRA) in 2010 to cover counties Cork and Kerry. The South-West Regional Authority was subsequently dissolved in 2014 and its functions and responsibilities have been transferred to the Southern Regional Assembly. These Guidelines set out a series of recommendations to local authorities, which are clearly linked to and support national investment priorities and are designed to strengthen integrated approaches to policy making and planning at a local level, in line with regional and national planning frameworks. The South-West Regional Planning Guidelines 2010-2022 shall continue to have effect until a Regional Spatial and Economic Strategy is prepared and adopted by the Southern Regional Assembly.

The Regional Planning Guidelines (RPGs) extend the implementation of the National Spatial Strategy (NSS) down to the regional and local levels, by linking national spatial policy with planning by local authorities.

The RPGs are influenced by a wide range of international, national and regional level plans, programmes and legislation, and in turn form a framework for lower level plans and programmes (e.g., County Development Plans, Local Area Plans, etc.).

The SWRA Guidelines acknowledge the need to develop material waste recovery facilities at sustainable locations.

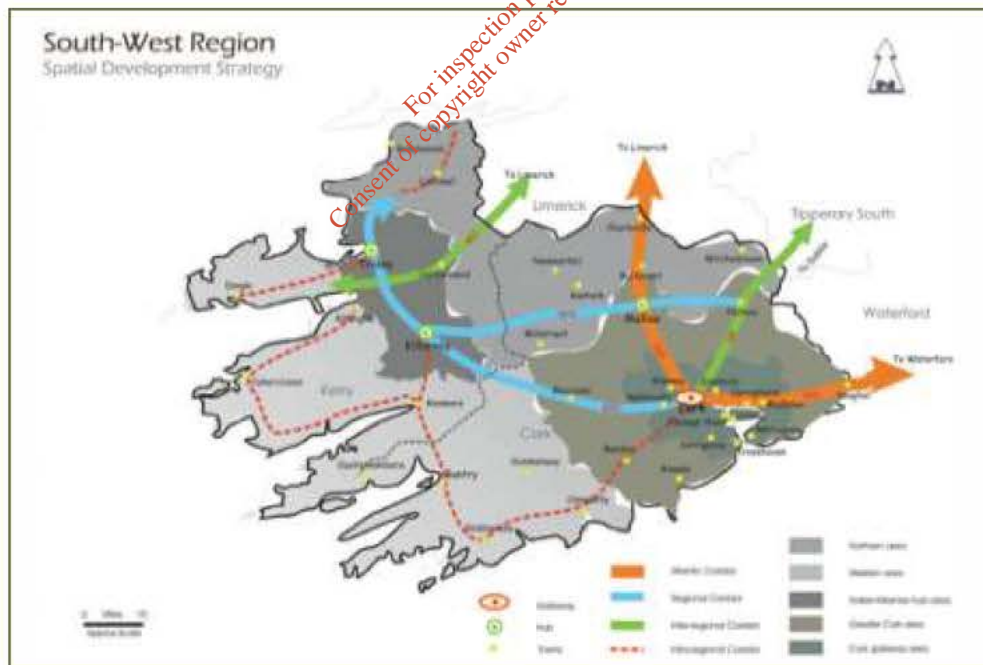


Figure 5.1-1 Extract from SWRPG (2010)

Whilst not directly relevant to this proposal it is noted in the SWRA Guidelines that:-

Ref.	Details
3.2.22	The mineral resources of the region, especially aggregates, contribute largely to the economy and operational aspects of the construction industry (buildings and infrastructure). Where appropriate, local authorities should identify and protect important strategic mineral reserves in their development plans,
3.2.23.	In relation to all natural resources there is a need to protect the sustainability of these assets against inappropriate development in order to maintain the region's high quality agricultural land and sea and fresh water resources, including biodiversity.
RTS-08	It is an objective to encourage the delivery of an effective and efficient waste management service in line with the Waste Management Acts and promote local authorities to review their respective Waste Management Plans (WMP's) during the lifetime of the guidelines.

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5.1.1.2.2 Southern Regional Waste Management Plan 2015-2021

The Southern Region (SR) is a new region in terms of managing wastes and merges a number of smaller historical waste regions.

The new region stretches from Wexford in the east to Kerry in the west and in total consists of 10 local authorities including Cork County Council.

The economic recession impacted on the generation of wastes in the region, specifically wastes from the building sector, with annual records showing a steady decline in quantities for major waste streams. Since the beginning of 2014 the economy has shown signs of sustained recovery, and this is expected to continue, which will likely lead to growth in waste generation over the period of the plan. The continued management of wastes in a safe and sustainable manner will be a real challenge into the future.

The national policy document, Changing Our Ways (1998), set a target of 85% recycling of C&D waste by 2013. More recently the 2008 EU Waste Framework Directive (WFD) set a target of 70% by weight for C&D waste, excluding natural soils and stones and hazardous C&D wastes. In 2012 the EPA reported that Ireland has exceeded this target by a considerable margin with a recovery rate of 97%.

The C&D waste arisings for the region have been consistently reported at slightly less than 1 million tonnes annually from 2010 to 2012. The national figures show a major decline over a longer period, with quantity of C&D waste collected falling from a high of almost 18 Mt in 2007 to 3 Mt by 2011. The C&D waste figure includes waste collected and deposited at permitted landfill sites in the region. As the construction sector begins to recover in the region it is imperative that construction and demolition plans for developments in excess of the specified thresholds are put in place and enforced. The appropriate processing facilities need to be in place to facilitate increased reuse, recycling and recovery of this waste stream.

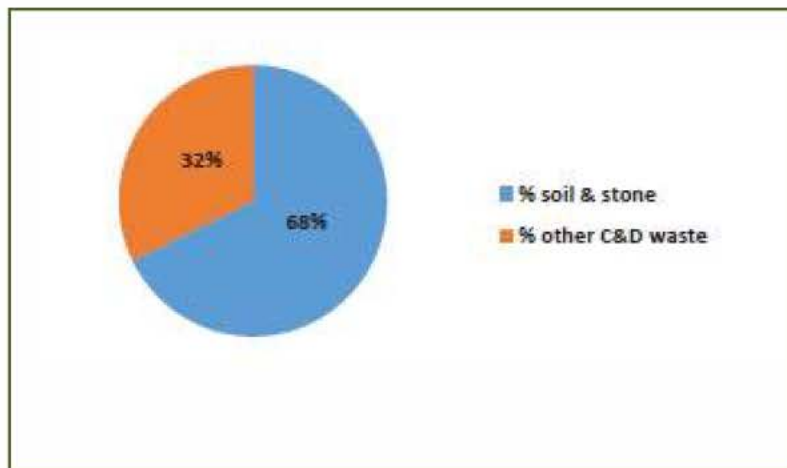


Figure 5.1-2 C&D Wastes Collected in the Region in 2012 (Source SRWMP)

The bulk of the C&D waste collected in the region is soil and stones, accounting for approximately 68%, with the remaining 32% consisting of materials such as rubble, metals, timber, plastic, glass, wood, contaminated soils and mixed C&D waste.

The soil and stone waste collected within the SR is primarily managed at local authority permitted infill sites, with the other C&D waste types primarily managed at EPA licensed activities.

Traditionally, the recovery of much of the C&D waste stream has been managed by placing it in a variety of land use applications. This treatment, collectively known as backfilling includes land reclamation, improvement or infill works. The largest fraction of the C&D waste stream arising is soil and stones, which (if uncontaminated) typically undergoes little if any treatment prior to recovery at these sites. Many sites selected for infill facilities are considered marginal agricultural land; these may include wetland habitats or lands subject to flooding. There is increasing recognition of the potential ecological and biodiversity value of these types of wetland sites. There is also a sense that at many of these sites, the deposition of waste material was the primary purpose of the activity rather than improvement or development of the land.

Given the sharp decrease in the number of operational landfills nationally, which have been a significant outlet for C&D waste in the past, alternative recovery options will be required in future years. It needs to be considered whether the placement of inert waste at many of the types of infill sites used in the past is an appropriate land use strategy or use of a potentially recyclable material. Concrete, stone and other masonry type waste can be crushed and screened and used as a substitute for virgin quarried stone material in a variety of engineering applications, if the appropriate technical criteria have been met, e.g. road construction and access tracks for agricultural or forestry holdings.

Recovery – Backfilling (SRWMP 16.4.4)

Backfilling activities (of inert waste), which meet the recovery definition and are in compliance with Articles 4 and 13 of the WFD, sit on the other recovery tier of the waste hierarchy. Local authorities in the region authorise such activities through the award of Waste Facility Permits (WFPs) and Certificate of Registrations (CoRs). Similarly, the EPA authorises significant backfilling of inert waste at large sites such as old quarries for restoration purposes.

Local authority authorised sites generally have a shorter lifespan than EPA licensed sites and operations can often cease at these sites within the life of the permit, i.e. five years. EPA authorisations cover more substantial operations with a longer lifetime capacity. Utilisation of active local authority capacity at backfilling/land improvement sites was 48% in 2012. This relatively low level of utilisation reflects the depressed activity in the construction sector in Ireland and as a result supply of capacity exceeding current demand. Activity in the sector is expected to increase over the plan period as economic recovery continues to build nationally.

In the face of increased demand for backfilling authorisations, there is a need for better coordination between local authorities in the region. This is to ensure that facilities are

planned and developed at suitable sites and do not present a risk to European designated sites and existing biodiversity and habitats. It is recommended that lead authority liaise with relevant stakeholders (including the EPA and the DAHG) to ensure that appropriate measures are in place for the control and spread of invasive alien species at backfilling sites in the region where necessary.

Policies:

- E13. Future authorisation by the local authorities, the EPA and An Bord Pleanála must take account of the scale and availability of existing backfilling capacity
- E14. The local authorities will co-ordinate the future authorisations of backfilling sites in the region to ensure balanced development serves

Environmental Protection Criteria (SRWMP 16.5)

It is strongly recommended that developers and operators consult with the regional waste office and the relevant planning and regulatory authorities prior to submitting an application for development consent. As a minimum, the criteria set out in this section must be applied in order to ensure that the impact on communities, human health, ecology and the wider environment can be avoided where possible and minimised, managed and mitigated where necessary.

Policy:

- G3. Ensure there is a consistent approach to the protection of the environment and communities through the authorisation of locations for the treatment of wastes

The environmental protection criteria are divided into (1) general environment and (2) European Sites (SPAs and SACs). In general future waste activities requiring consent will need to consider the following.

General Environment

- Avoid, as far as possible, siting waste infrastructure or related infrastructure in areas protected for landscape and visual amenity, geological heritage and/or cultural heritage value. Where it is unavoidable, an impact assessment should be carried out by a suitably qualified practitioner and appropriate mitigation and/or alternatives must be provided.
- Avoid siting waste infrastructure or related infrastructure in proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature

Reserves, Refuges for Fauna and Annex I Habitats occurring outside European designated sites;

- To prevent the spread of Invasive Alien Species (IAS), where waste material is transported from one location to another, an IAS survey of source and receptor sites will be conducted by a suitably qualified person. If IAS are found, preventative measures will be implemented to prevent the onward spread of the plant/animal material including: employment of good site hygiene practices for the movement of materials into, out of and around the site; ensuring that imported soil is free of seeds and rhizomes of key invasive plant species; adherence to any national codes of practice relating to prevention of the spread of IAS (including both Ireland and Northern Ireland Codes of Practice)
- In order to protect habitats which, by virtue of their linear and continuous structure (e.g. rivers and their banks) or their contribution as stepping stones (e.g. ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species, these features will be protected as far as possible from loss or disruption through good site layout and design;
- To protect river habitats and water quality, ensure that no development, including clearance and storage of materials, takes place within a minimum distance of 15 m measured from each bank of any river, stream or watercourse;
- Ensure that a Sustainable Drainage System (SuDS) is applied to any development and that site-specific solutions to surface water drainage systems are developed, which meet the requirements of the Water Framework Directive and associated River Basin Management Plans;
- Avoid development of waste management infrastructure in flood risk areas. Reference should be made to the Planning System and Flood Risk Management for Planning Authorities (DECLG/OPW, 2009), the National Flood Hazard Mapping (OPW) and the relevant Flood Risk Management Plan (FRMP);
- Ensure that riparian buffer zones (minimum of 15 m) are created between all watercourses and any development to mitigate against flood risk. The extent of these buffer zones shall be determined in consultation with a qualified ecologist and following a Flood Risk Assessment. Any hard-landscaping proposals shall be located outside of these buffer zones;
- Avoid geologically unsuitable areas including karst where practicable, and areas susceptible to subsidence or landslides. Due consideration should be given to the primary water source of the area and the degree of surface water/groundwater interaction;
- If there is an airport within 13 km of the proposed waste facility, the airport shall be consulted at an early stage of planning.
- Impact from a transport perspective will be assessed including road access, network, safety and traffic patterns to and from the proposed facility in

accordance with road design guidelines and/or relevant LA guidelines in relation to roads; and

- There are existing, closed or uncommenced landfills which could be used for alternative waste activities as they are considered brownfield sites; also, suitably zoned, other brownfield sites could be used for alternative waste activities. Sites that offer opportunities to integrate differing aspects of waste processing will be preferred choices. This will ensure maximum efficiency of waste processing.

European Sites

The protection of European Sites has been included in the form of environmental protection criteria which must be applied to waste related activities required to implement the policies of the waste plan.

Policy:

- G5. Ensure the implementation of the regional waste management plan does not prevent achievement of the conservation objectives of sites afforded protection under the EU Habitats and Bird Directives.

The proposed site is not within a European Site, including Special Protection Area (SAC) and Special Protection Areas (SPA). Appropriate Assessment Screening has been carried out with respect to the proposed development. There is no likelihood of significant ecological effects from this development on any of the sites in the Natura 2000 network or on their conservation objectives.

5.1.2 REFERENCES

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5.2 REPORT ON APPROPRIATE ASSESSMENT SCREENING

Proposed Infill of Quarry at Garryhesta,
Ovens, Co Cork

Ecological impacts on Natura 2000 sites

Appropriate Assessment
Stage 1 Screening

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Report prepared for Roadstone Ltd

February 2017

5.2.1 INTRODUCTION

The purpose of this report is to examine possible ecological impacts of the proposed development on the Natura 2000 site network and it is submitted to fulfil the mandatory requirement under Articles 6(3) and 6(4) of the Habitats Directive.

The report is written after a site visit in January 2017. It is part of the appropriate assessment procedure following the outline of the NPWS Guidance document (DoEHLG 2009).

The author is Roger Goodwillie, a Member of the Chartered Institute for Ecology and Environmental Management.

5.2.2 APPROPRIATE ASSESSMENT

5.2.2.1 Introduction

Appropriate assessment was introduced by the EU Habitats Directive as a way of determining if a planned project is likely to have a significant effect on one of the Natura 2000 sites so far designated (i.e. the candidate SAC's and SPA's), or their conservation objectives. In this case there are no sites within 15km, the nearest such area is the Cork Harbour SPA (Site Code 4030) which begins downriver from the City and is joined by the Great Island Channel SAC (Site Code 1058) further to the east.

Article 6(3) states

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives....

In the Irish context this has been interpreted as a three-stage process. Firstly a screening exercise (Stage 1, this document) determines if a project could have significant effects on a Natura site. If it does or the situation is unclear a Natura Impact Statement (Stage 2) is provided to the planning or regulatory authority which then conducts an Assessment of the information supplied. Examples of significant effects are loss of habitat area, fragmentation of the habitat, disturbance to species using the site and changes in water resources or quality. If negative effects come to light in the assessment, alternative solutions are investigated by the proponent (Stage 3) and modifications made unless the project is deemed to be driven by 'imperative reasons of overriding public interest' in its current form. In this case Stage 4 then deals with compensatory action.

5.2.2.2 Project Description

The proposed development consists of restoration of part (c. 6.7 ha) of existing quarry by importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil. The total infill is in the order of 2.3 million tonnes over a period of c.8 to 10 years.

The proposed application site area (for infilling) will be confined to a relatively small section of the sand and gravel pit, much of which has already been worked out. The total landholding extends to c. 77.2 ha. The proposed site for backfilling using imported inert soil and stone is located on the north-western corner of the landholding. The pit proposed for infilling is approximately 430m in length and 150m in width with a depth of up to c. 31 m below the local natural ground level. The groundwater level can temporarily rise above the level of the pit floor during very wet periods over winter. Infilling will only be completed when the groundwater level is at or below the base of the pit.

Once the quarry is re-instated it will be seeded with a suitable mix of grasses suitable for pasture in order to quickly stabilise the topsoil. Once the grass sward has become established the restored farmland can be kept either as pasture or hay meadow.

Roadstone propose to carry out the reclamation works in accordance with the principles of Tier 3 of the Green, Low Carbon, Agri-environment Scheme (GLAS). Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows and the final establishment of traditional hay meadow.

5.2.2.3 Natura Sites

The Cork Harbour Special Protection Area is designated for its bird interests, especially the wintering waterfowl listed below. It provides good quality feeding areas for a diversity of waterfowl species and is an internationally important site, regularly supporting over 20,000 wintering waterfowl. The most recent published data (Crowe *et al* 2012) show that there is an internationally important population of Black-tailed Godwit and nationally important numbers of shelduck, wigeon, teal, mallard, shoveler, red-breasted merganser, little grebe, great crested grebe, cormorant, oystercatcher, golden plover, lapwing, dunlin, bar-tailed godwit, curlew, greenshank, redshank and turnstone.

The SPA Qualifying interests are:

- A004 Little Grebe *Tachybaptus ruficollis*
- A005 Great Crested Grebe *Podiceps cristatus*
- A017 Cormorant *Phalacrocorax carbo*
- A028 Grey Heron *Ardea cinerea*
- A048 Shelduck *Tadorna tadorna*
- A050 Wigeon *Anas penelope*
- A052 Teal *Anas crecca*
- A054 Pintail *Anas acuta*
- A056 Shoveler *Anas clypeata*
- A069 Red-breasted Merganser *Mergus serrator*

- A130 Oystercatcher *Haematopus ostralegus*
- A140 Golden Plover *Pluvialis apricaria*
- A141 Grey Plover *Pluvialis squatarola*
- A142 Lapwing *Vanellus vanellus*
- A149 Dunlin *Calidris alpina alpina*
- A156 Black-tailed Godwit *Limosa limosa*
- A157 Bar-tailed Godwit *Limosa lapponica*
- A160 Curlew *Numenius arquata*
- A162 Redshank *Tringa totanus*
- A179 Black-headed Gull *Chroicocephalus ridibundus*
- A182 Common Gull *Larus canus*
- A183 Lesser Black-backed Gull *Larus fuscus*
- A193 Common Tern *Sterna hirundo*
- A999 Wetlands

The Great Island Channel SAC is an integral part of Cork Harbour with very well-developed saltmarshes and mudflats able to support the wintering birds listed above. Its qualifying habitat interests are:

- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)

5.2.2.4 Conservation Objectives

5.2.2.4.1 SPA

In each case the objective (NPWS 2014a) is to maintain the favourable conservation condition of the species in the Cork Harbour SPA which is defined by overall numbers and distribution over the feeding area, both being subject to natural variations.

5.2.2.4.2 cSAC

The objectives are similar (NPWS 2014b), i.e. to maintain or restore the favourable conservation condition of the habitats, measured by the extent and distribution of each and their natural communities of plants and animals.

The favourable conservation condition of a species is achieved when:

- population data on the species concerned indicate that it is maintaining itself
- the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future

- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Favourable conservation condition of a habitat is achieved when:

- its natural range, and area it covers within that range, is stable or increasing,
- the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

5.2.2.4.3 Likely Effects

The project site is about 17km from the boundary of the SPA and further still from the SAC. It shares no species or habitats with them and cannot act as a 'reserve' area to repopulate them in case of loss.

There are in fact no likely impacts on the Natura 2000 sites. There is no direct pathway linking Garryhesta to them; the only connection is through the groundwater which will be fully protected by the sand and gravel deposit remaining on the bed of the quarry.

5.2.3 CONCLUSIONS

There is no likelihood of significant ecological effects from this development on any of the sites in the Natura 2000 network or on their conservation objectives. Since this is the case, possible 'in combination' effects do not arise.

The further, more detailed, stages of appropriate assessment are not required.

5.2.4 REFERENCES

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- Fossitt, J.A. (2000). *A guide to habitats in Ireland*. Heritage Council, Dublin, Ireland.
- NPWS (2014a) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service (NPWS), Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2014b). Conservation Objectives: Great Island Channel SAC 001058. Version 1. National Parks and Wildlife Service (NPWS), Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

5.2.5 SITE SYNOPSES

CORK HARBOUR SPA

SITE CODE: 004030

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poul nabibe inlets. Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Redbreasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Blackheaded Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (1,896) and Redshank (2,149) - all figures given are five year mean peaks for the period 1995/96 to 1999/2000. Nationally important populations of the following 19 species occur: Little Grebe (57), Great Crested Grebe (253), Cormorant (521), Grey Heron (80), Shelduck (2,009), Wigeon (1,791), Teal (1,065), Mallard (513), Pintail (57), Shoveler (103), Red-breasted Merganser (121), Oystercatcher (1,809), Golden Plover (3,342), Grey Plover (95), Lapwing (7,569), Dunlin (9,621), Bartailed Godwit (233), Curlew (2,237) and Greenshank (46). The Shelduck population is the largest in the country (over 10% of national total). Other species using the site include Mute Swan (38), Whooper Swan (5), Pochard (72), Gadwall (6), Tufted Duck (64), Goldeneye (21), Coot (53), Ringed Plover (73), Knot (26) and Turnstone (113). Cork Harbour is an important site for gulls in winter and autumn, especially Black-headed Gull (3,640), Common Gull (1,562) and Lesser Black-backed Gull (783), all of which occur in numbers of national importance. Little Egret and Mediterranean Gull, two species which have recently colonised Ireland, also occur at this site. A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted

Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter. Cork Harbour has a nationally important breeding colony of Common Tern (102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.

GREAT ISLAND CHANNEL SAC

SITE CODE: 001058

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats

[1330] Atlantic Salt Meadows

The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algal species occur on the flats, especially *Ulva lactuca* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly.

The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass

(*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Sea Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck is the most frequent duck species with 800-1,000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island, and to the north of Fota at Killacloyne and Harper's Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and contains internationally important numbers of Black-tailed Godwit (1,181) and Redshank (1,896), along with nationally important numbers of nineteen other species. Furthermore, it contains large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 - 1996/97. Much of the site falls within Cork Harbour Special Protection Area, an important bird area designated under the E.U. Birds Directive.

While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

5.3 EXAMPLES OF ROADSTONE STANDARD OPERATING PROCEDURES

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5.3.1 WASTE INTAKE SAMPLING PROCEDURE

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Roadstone Ltd.	
EMS 02a Waste Intake Sampling Procedure Brownswood Quarry Waste License W0280-01	Revision: 0
	Date: Oct 17
	Approved By: LG

1. Policy

To ensure that **ALL** waste accepted for recovery at the Brownswood facility is controlled and handled in an appropriate manner with regard to all applicable legislation and regulations, and in compliance with the facility waste licence W0280-01 issued by the EPA.

This procedure appeases the requirements of (but are not limited to) the following conditions of the facility Licence W0280-01:

Condition	Section	Sub-section	Part
8. Materials Handling	8.4 Greenfield soil and stone	8.4.1	
		8.4.2	
		8.4.3	
	8.5 Non-greenfield soil and stone	8.5.1	
		8.5.2	
	8.6 Backfill	8.6.1	
		8.6.2	(i) (ii) (iii) (iv)
	8.13 Waste Acceptance and Characterisation Procedures	8.13.2	
8.13.6			
6. Control and Monitoring	6.1	6.1.1	
		6.1.2	
		6.1.3	
		6.1.4	
	6.2	(i) and (ii)	
	6.3		
	6.4		
6.5			
Schedule A.2	<i>Waste Acceptance Criteria for Backfill Material</i>		
Schedule A.3	<i>Waste Characterisation for non-greenfield soil and stone</i>		

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EMS 02a Waste Intake Sampling Procedure Brownswood Quarry Waste License W0280-01	Revision: 0
	Date: Oct 17
	Approved By: LG

2. Background

- Waste intake sampling is undertaken to ensure only suitable material is recovered at the facility. Suitable material is that which is compliant with both the facility waste license W0280-01 and the waste acceptance and handling plan.
- The sampling protocol adopted by the facility will be defined by whether the material is sourced from a site greater than 2000 tonnes, or less than 2000 tonnes.
- All sampling and analysis is undertaken by competent staff in accordance with CEN and ISO standards as appropriate.

3. Sampling Protocol

Sources of material >2000 tonnes

- An appropriate invasive species risk assessment will be carried out by a qualified person.
- Prior to site approval a Roadstone person will undertake a site visit and take a representative spot sample of the material for WAC analysis.
- Visual and olfactory data will be recorded on the field investigation sheet.
- For approved sites, representative spot samples are taken at the rate of 1 sample per 2000 tonnes of waste accepted.
- Visual and olfactory analysis is undertaken on all consignments arriving at the facility.

Sources of material <2000 tonnes

- An appropriate invasive species risk assessment will be carried out by a qualified person.
- A representative sample of at least one sample every 2000 tonnes of waste from the collective of single sources each of which is less than 2000 tonnes
- Visual and olfactory analysis is undertaken on each consignment arriving at the facility.

4. Sampling Methodology

Sampling methodology has been devised to reduce the likelihood of cross contamination and to ensure confidence in the sample results.

- Four sample containers are required for each sample - 400ml plastic tub, 2 x 250g glass jar and 60g jar. The second 250g jar will be kept onsite as the duplicate sample.

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- Samples from individual consignments are collected according to the following sequential process:
 1. Inspect all new sample containers prior to each use:

A full suite of sample containers for one sampling location are unpackaged and inspected to ensure that they are free from damage, and are new and unused as expected.
 2. Label all containers prior to sampling:

Prior to sampling, mark each sample container within the suite with a permanent, water resistant marker to indicate the company name (Roadstone), sample number, the sample date, and the project site.
 3. Clean all sampling equipment prior to sampling:

Make sure all sampling equipment is free from dirt and soil. Rinse with tap water and dry with paper towels. Clean the sampling equipment between sampling different sources of material with the paper towel.
 4. Pack sampling tool box:

Put all the labelled sampling jars, the sampling gloves and the sampling equipment into the sampling tool box and proceed to the consignment which is intended to be sampled.
 5. Nitrile gloves for each sampling consignment:

Ensure new nitrile gloves are used for each soil sampling location.
 6. Consignment Preparation:

The four sample containers (1 x plastic tub, 2 x large glass jars and 1 x small glass jar) and the sampling tray are brought to the intended sampling consignment.
 7. Representative Sample Collection:

Use the sample scoop to take a small sub-sample from the consignment placing the sample on the mixing tray. Repeat this process approximately 10 times until enough quantity of soil is present on the mixing tray to fill all of the sample jars. Mix the soil on the tray thoroughly.
 8. Fill the sample containers completely:

Transfer the soil from the mixing tray to the sample jars. Compact the soil into the sample jars using your thumb and ensure headspace is minimised by

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filling the containers completely. Seal the containers tightly as soon as they are filled. Return all the containers to the sampling tool box.

9. Complete intended sampling of all consignments:
Once all of the consignments which are intended to be sampled have been, return the sampling box to the sampling office.
10. Complete sampling register immediately:
Fill out the sampling register completely to include the sample date, the project site, the haulage company and the registration of the vehicle the consignment arrived at the facility in and the proof of delivery docket number.
11. Package the sample containers together:
The glass sample containers are placed into bubble wrap sleeves, and the three sample containers are taped together with fragile warning tape to reduce the likelihood of breakages. The duplicate sample jar is kept separately as this will not be transported to the laboratory.
12. Transfer the samples to the sample refrigerator immediately:
The packages of sample containers which are taped together are transferred to the sample refrigeration unit where they remain until sample transportation to the laboratory is arranged. The single duplicate jars are placed in the sample fridge also.

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Sample Transport To Laboratory.

1. Bi-weekly schedule with the laboratory:

Each Wednesday and Friday morning, the laboratory is telephoned, and the pending samples are scheduled in for receipt. A courier reference number is required for the courier, and the lab. will return the telephone call shortly with this reference number. Additional sample containers as required for the following week are ordered also.
2. The use of insulated sample boxes for transportation is mandatory:

Frozen ice packs are inserted into the boxes to maintain an average temperature of 4°C or less. The samples are transferred from the fridge to the sample box.
3. Complete Chain Of Custody Form:

The COC form is completed in its entirety ensuring 'Roadstone Huntstown WAC' is highlighted as the intended suite of parameters to be tested. The COC is placed into a plastic sleeve to protect it from water or condensation and inserted into the sample box at the top of the samples.
4. Sample Box Sealing & Labelling:

The sample box is sealed using tape labelled with fragile warning. Stickers pre-printed with the laboratory address are placed on the top and sides of the sample box. The courier reference number is also labelled on the box.
5. Sample Box Transport:

The sample box is brought to the courier before 3pm each Friday where the courier will take over the custody of the box.

5. Quality Control

Routine quality control is undertaken on all soil samples sent for laboratory analysis.

- Duplicate samples will be sent to a secondary laboratory at a rate of 10 samples per 100 which are routinely analysed.

6. Referenced Documents

- Roadstone Limited. Brownswood Inert Waste Recovery Facility. EPA Waste Licence Number W0280-01.

5.3.2 WASTE INSPECTION PROCEDURE

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Roadstone Ltd.	
EMS 02b Brownswood Waste Inspection Procedure Brownswood Inert Waste Facility W0280-01	Revision: 0
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	Approved By: LG

1. Policy

To ensure that **ALL** waste accepted for recovery at the Brownswood facility is controlled and handled in an appropriate manner with regard to all applicable legislation and regulations, and in compliance with the facility waste licence W0280-01 issued by the EPA.

This procedure appeases the requirements of (but are not limited to) the following conditions of the facility Licence W0280-01: This procedure should be read in conjunction with other procedures for facility Licence W0280-01.

Condition	Section	Sub-section	Part
8. Materials Handling	8.4 Greenfield soil and stone	8.4.1	
		8.4.2	
		8.4.3	
	8.5 Non-greenfield soil and stone	8.5.1	
		8.5.2	
	8.6 Backfill	8.6.1	
		8.6.2	(i) (ii) (iii) (iv)
	8.7 Hazardous, liquid, vector material		
	8.13 Waste Acceptance and Characterisation Procedures	8.13.3	
		8.13.4	
		8.13.5	
		8.13.6	
		8.13.7	
8.13.8			
	8.13.9		
Schedule A.2	<i>Waste Acceptance Criteria for Backfill Material</i>		
Schedule A.3	<i>Waste Characterisation for non-greenfield soil and stone</i>		

2. Permitted Wastes

Roadstone will ensure that only suitable wastes are accepted and recovered at the facility. Suitable wastes are those that comply with;

- the facility licence No. W0280-01;
- the facility waste acceptance and handling plan and

Roadstone Ltd.	
EMS 02b Brownswood Waste Inspection Procedure Brownswood Inert Waste Facility W0280-01	Revision: 0 Date: Oct 17 Approved By: LG

- are EWC 17 05 04, 20 02 02 (400,000 tonnes per annum)
- are EWC 17 01 01, 17 01 02, 17 01 03, 17 01 07 (1,000 tonnes per annum) .

3. Basic Characterisation

Each consignment of material arriving at the facility is inspected at the point of entry by trained personnel to ensure it complies with what was agreed in the pre-approval stage.

- The material undergoes both visual and olfactory analysis to ensure that it contains less than 2% contamination with non-natural solid materials.
- Non-natural materials comprise (but are not limited to) bricks, concrete, tar and plastic and are not permitted in quantities above 2%. Consignments not complying with this will be refused entry or removed from the facility.
- Material containing hydrocarbons are not permitted at the facility. These can be indicated by iridescence sheen on water, odour or discolouration.
- Sources of material containing organic carbon are not permitted at the facility – consignments containing roots, wood, grass sods etc will be refused entry.
- Material with a strong decomposing odour will be refused entry as this can indicate high levels of organic carbon in the consignment.
- If the personnel undertaking the basic characterisation is unsure if a consignment should be allowed to unload, the C&D manager or a person designated by them, will inspect the material and make a decision.
- The customer will be required to fill in the waste register which will be kept at the weighbridge; this will detail the type of waste, site of origin, vehicle license and waste permit no of the customer if applicable.
- The consignment will be weighted and a docket printed. The docket will detail the type of waste and tonnage; the customer must sign the docket confirming all details are correct and will be provided with a copy for their own records.
- Each consignment will then be directed to the correct area of the Licenced Facility.
- Basic characterisation will be undertaken a second time, upon tipping. Only after this second inspection will the waste be accepted.
- In the event that a consignment does not pass the second basic characterisation inspection, the consignment is deemed unsuitable and the material will be immediately reloaded into the vehicle and removed off site by the customer at their expense.

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- Any non-natural materials in the consignment will be manually removed where possible, and transferred to the appropriate waste skip for disposal at an appropriate facility.

4. Referenced Documents

- Roadstone Limited Brownswood Inert Waste Recovery Facility. EPA Waste Licence Number W0280-01.

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5.3.3 WASTE ACCEPTANCE / REJECTION PROCEDURES

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EMS 02c Brownswood Waste Acceptance / Rejection Procedures Brownswood Inert Waste Recovery Facility W0280-01	Revision: 0
	Date: Oct 17
	Approved By: LG

1. Policy

To ensure that **ALL** waste accepted for recovery at the Brownswood facility is controlled and handled in an appropriate manner with regard to all applicable legislation and regulations, and in compliance with the facility waste licence W0280-01 issued by the EPA.

This procedure appeases the requirements of (but are not limited to) the following conditions of the facility Licence W0280-01: This procedure should be read in conjunction with other relevant procedures.

Condition	Section	Sub-section	Part
8. Materials Handling	8.4 Greenfield soil and stone	8.4.1	
		8.4.2	
		8.4.3	
	8.5 Non-greenfield soil and stone	8.5.1	
		8.5.2	
	8.6 Backfill	8.6.1	
		8.6.2	(i) (ii) (iii) (iv)
	8.13 Waste Acceptance and Characterisation Procedures	8.13.1	
		8.13.2	
		8.13.3	
		8.13.4	
		8.13.5	
		8.13.6	
8.13.7			
8.13.8	8.13.8		
	8.13.9		
11. Notification, Records and Reports	11.2 Telephone, email or webform		(i)
Schedule A.2	<i>Waste Acceptance Criteria for Backfill Material</i>		
Schedule A.3	<i>Waste Characterisation for non-greenfield soil and stone</i>		

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2. Waste Acceptance

- Only suitable material is permitted to be accepted in the facility. Suitable material is that which complies with both the facility waste licence W0280-01, and the facility waste acceptance and handling plan.
- Material not complying with these documents is not suitable for recovery at the facility and will be rejected either at the pre-approval stage, the onsite verification stage, or before recovery stage at the customers expense.
- Material is inspected before it is recovered, any waste deemed unsuitable for recovery or is in contravention of the licence shall be immediately reloaded onto the vehicle. Or if reloading cannot occur immediately, it will be separated and moved to the quarantine area. The recycling manager will be informed immediately.

3. Pre-Approval Stage

The procedures involved in the pre-approval stage are documented in *02d Roadstone Ltd. Waste Site Pre-Approval Procedure*.

- Customers will be notified whether the material is suitable or unsuitable for recovery at the pre-approval stage.
- Material that is designated as suitable will be requested to be presented at the facility weighbridge for onsite verification.

4. Onsite Verification Stage

The procedures involved in the onsite verification stage are documented in Roadstone Ltd. Waste Inspection Procedure (EMS 02b).

- Any material that does not comply as was agreed in the Site Notification Document at the pre-approval stage will be rejected before entering the facility.
- The relevant customer will be notified by Roadstone as soon as possible and informed why the waste is being rejected. The customer will then be notified by the recycling manager that the load is being rejected detailing the reasons.
- Any loads which have been tipped and subsequently have been found to be unsuitable will be immediately reloaded onto the vehicle and directed offsite.
- In the event that the vehicle has left the facility, the material will be immediately transferred to the quarantine area pending collection by the customer at their expense.

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- The incident will be recorded in waste quarantine register by the weighbridge clerk, along with photographs and a detailed description of why the material was rejected.

5. Compliance Testing Stage

- Material accepted at the facility undergoes routine testing as detailed in the facility licence W0280-01 and as detailed in the Roadstone Waste Intake Sampling Procedure.
- Material which contains concentrations of parameters which exceed the facility waste acceptance limits is not suitable for recovery and will be removed offsite at the expense of the customer.
- The customer will be notified immediately and asked to remove the material.
- Intake of all material from the site will cease while a risk based assessment is carried out by Roadstone personnel.
- The duplicate 'B' sample held in storage at the facility will be sent to the laboratory for testing.
- A Roadstone personnel will undertake a site visit and take additional samples at source where necessary.
- If either / both the 'B' sample and the site sample return elevated concentrations of the parameter in question, all intake of material from that site will cease permanently.
- The consignment containing the elevated parameter will be excavated from the facility and returned to the customer.
- If both the 'B' sample and the site sample return concentrations of the parameter in question which are within the waste acceptance limits of the facility, then intake of the material will resume.
- Continued compliance sampling will be undertaken on all accepted material, with an additional site visit and increased soil sampling at the frequency of 1 soil sample each 1000 tonnes of material accepted from the site.
- In the event a second exceedance of any parameter is recorded from the site, all material acceptance from the site will cease permanently and the EPA will be notified via the EDEN online system as per condition 11.2 (i).

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EMS 02c Brownswood Waste Acceptance / Rejection Procedures Brownswood Inert Waste Recovery Facility W0280-01	Revision: 0
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6. Referenced Documents

- Roadstone Limited. Brownswood Inert Waste Recovery Facility. EPA Waste Licence Number W0280 -01.
- 02d Roadstone Ltd. Waste Site Pre-Approval Procedure.
- 02b Roadstone Ltd. Waste Inspection Procedure.

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5.3.4 WASTE SITE PRE-APPROVAL PROCEDURE

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EMS 02d Brownswood Waste Site Pre-Approval Procedure Brownswood Inert Waste Facility W0280-01	Revision: 0
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1. Policy

To ensure that **ALL** waste accepted for recovery at the Brownswood facility is controlled and handled in an appropriate manner with regard to all applicable legislation and regulations, and in compliance with the facility waste licence W0280-01 issued by the EPA.

This procedure appeases the requirements of (but are not limited to) the following conditions of the facility Licence W0280-01:

Condition	Section	Sub-section	Part
8. Materials Handling	8.4 Greenfield Soil and Stone	8.4.1	
		8.4.2	
		8.4.3	
	8.5 Non-greenfield soil and stone	8.5.1	
		8.5.2	
	8.6 Backfill	8.6.1	
		8.6.2	(i) (ii) (iii) (iv)
	8.13 Waste Acceptance and Characterisation Procedures	8.13.1	
		8.13.2	
		8.13.3	
		8.13.4	
		8.13.5	
		8.13.6	
		8.13.7	
	8.13.8		
	8.13.9		
Schedule A.2	<i>Waste Acceptance Criteria for Backfill Material</i>		
Schedule A.3	<i>Waste Characterisation for non-greenfield soil and stone</i>		

2. Approved Waste Recovery Contractors/ permitted customers

All hauliers bringing material on site **MUST** hold a valid waste collection permit as issued by the NWCPO, and this must be forwarded to the facility prior to bringing material onsite.

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The valid waste collection permit must have the following:

- Brownswood Facility W0280-01 must be listed in Appendix B; and
- The registration of all vehicles entering the facility must be listed in Appendix C;

A copy of the valid waste collection permit shall be kept in the waste register folder on site or will be accessed on line through the NWCPO web site, to verify.

3. Permitted Wastes and EWC Codes

Material must have been characterised with an EWC code by a competent person. Only the following EWC codes are licensed to be recovered:

- 17 05 04 Soil and Stones other than those mentioned in 17 05 03
- 20 02 02 Soil and Stone
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and Ceramics
- 17 01 07 Mixture of concrete, bricks tiles and ceramics (other than those mentioned in 17 01 06)

(as per Licence No. W0280-01 as outlined on Table A.1 on page 25); any material deemed unsuitable for recovery will be either, turned away or removed from site at the customer's expense.

4. Source Site Pre-Approval

Only material from pre-approved sites can be recovered at the facility. Clients will be notified in writing if a site has been approved for facility use.

For sources of material greater than 2000 tonnes:

- An appropriate invasive species risk assessment will be carried out by a qualified person.
- Material must be characterised by a competent person.
- The WAC results of the material, and all site investigation reports and laboratory analyses must be forwarded to the facility for review prior to material acceptance.

Roadstone Ltd.	
EMS 02d Brownswood Waste Site Pre-Approval Procedure Brownswood Inert Waste Facility W0280-01	Revision: 0
	Date: Oct 17
	Approved By: LG

- Roadstone personnel will undertake a site visit and take soil samples for WAC testing.
- A Roadstone New Site Notification sheet must be completed by a competent person.
- If the material is suitable for recovery at the facility, written notification will be given to the customer to present the material for onsite verification.
- Roadstone chain of custody booklets will be issued to site.

For sources of material less than 2000 tonnes:

- An appropriate invasive species risk assessment will be carried out by a qualified person.
- Material must be characterised by a competent person.
- All available WAC results, site investigation reports and laboratory analyses must be forwarded to the facility.
- A Roadstone New Site Notification sheet must be completed by a competent person and reviewed by Roadstone for suitability for recovery at the facility.
- A risk based assessment, based on all available information will be undertaken by the facility personnel.
- If the material is suitable for recovery at the facility, written notification will be given to the customer to present the material for onsite verification.

5. Waste Acceptance

Each consignment arriving at the facility will be inspected to ensure it complies with what was agreed in the pre-approval stage.

- Waste arriving will be visually inspected by the weighbridge clerk before being accepted according to the Roadstone waste inspection procedure.
- All loads into and out of the licence area will be weighted and issued with a docket. The docket will list the type on waste, the customer's name; the customer will sign the docket confirming all details are correct and will be given a copy of the docket for their records.
- The customer must provide all the relevant information regarding the load. This information will be recorded in the Daily Waste Log.
- Any waste deemed unsuitable for recovery, does not comply as agreed in the pre-approval stage or is in contravention of the permit/licence, will be rejected. In the event a load is tipped it will immediately reloaded onto the vehicle.

Roadstone Ltd.	
EMS 02d Brownswood Waste Site Pre-Approval Procedure Brownswood Inert Waste Facility W0280-01	Revision: 0
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- If the vehicle has left the facility it will be moved to the quarantine area before being reloaded onto the vehicle when it returns.
- The weighbridge clerk will immediately inform the relevant manager and customer. The customer will have to remove the load at their own expense.
- The weighbridge clerk will record the incident in the quarantine folder and the recycling manager will inform the EPA on or before the next working day.

Preventing of fly tipping

- The licence area is located within Brownswood Quarry, which has a fence around the perimeter.
- Outside of opening hours, gates on the access roads are locked preventing access to the site and security is present onsite at all times.
- Cameras with recording facilities are monitoring the site.

6. Waste Storage

- The loading and tipping of waste will only occur in the designated areas and protected against spillage and run-off.
- Waste will only be stored in designated areas, protected as appropriate against spillage and leachate run-off.
- The licence area will not be used for the disposal of any liquid other than rain water or for the disposal of any other waste other than does outlined in the licence.

7. Referenced Documents

- Roadstone Limited. Brownswood Inert Waste Recovery Facility. EPA Waste Licence Number W0280.

5.3.5 EMERGENCY RESPONSE PROCEDURE

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Roadstone Ltd.

Emergency Response Procedure

Doc. No. EMS/17

Revision: 08

Date: Mar 2017

Approved By: HSE Dept.

1.0 PURPOSE

The following outlines Roadstone Ltd. emergency response procedure in detail.

2.0 SCOPE

The following procedure covers all Roadstone Ltd locations and includes employees, contractors or visitors.

Generally, it also applies to all road trucks.

3.0 PROCEDURE

3.1 Fire; Staff Members

3.1.1 Staff member who discover fire or emergency

1. On discovering a fire or some such emergency, raise the alarm with all staff in the immediate area and contact the Location Manager / Supervisor.
2. Emergency services may be contacted at 112 or 999.
Identify yourself to the person on duty and inform them of:
 - The fire or emergency (Fire, Accident or major Spillage)
 - The location of it.
 - Assistance required (e.g. fire brigade, Gardai or ambulance)
3. In the event of a fire, raise the alarm with all staff in the immediate area. Assist in containing the fire using the appropriate extinguisher- only if it is safe and you are confident to do so.
NOTE: Always remember to stay on the exit side of the fire and never take risks.
4. If you can no longer contain the fire, then vacate the building/work area immediately by the nearest clear exit, closing all doors behind you.
5. Now proceed to your assembly point
6. Report to your assembly point controller and identify yourself to your assembly point controller as the person who discovered the fire or emergency.
7. Inform him of the situation at the scene of the emergency, outlining how far advanced the fire or emergency was as you left it.

3.1.2 First Aiders

1. In the event of a fire/emergency vacate the building/work area immediately by the nearest clear exit, closing all doors behind you.
2. Now proceed to your assembly point
3. After roll call report to the assembly point controller.
4. Deal with any casualties as necessary if requested by the assembly point controller.
5. Assist in the search for any missing persons under direction of the assembly point controller if required.

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3.1.3 Assembly Point Controller (Plant/Location Manager/Shift Supervisor)

1. In the event of a fire/emergency vacate the building/work area immediately by the nearest clear exit, closing all doors behind you.
2. Confirm that all staff and visitors/contractors are accounted for.
3. In the event of someone missing from the staff assembly group other than those accounted for; establish if that person or persons could be in the building/ area of emergency.
4. If it is likely that there are persons still in the building/emergency area then inform the fire brigade personnel as soon as they arrive on site.
5. After roll call, ask the trained first aiders to come forward and make themselves available if instructed to do so by the fire brigade personnel.
6. If required you may move the location of the assembly point to a safer location.
7. When the Fire Brigade indicates, you may then allow the assembly group to disperse in an orderly fashion and return to work or finish work for the day in the event of a major emergency.
8. Give a full report to the management team.

3.2 Fire; Contractors/Visitors

3.2.1 Evacuation Procedures

1. If, while on the premises, a fire or emergency is discovered, please vacate the building by the nearest exit.
2. Go directly to the designated assembly area.
3. Inform the assembly point controller of your presence.

Discovering a fire or some such emergency

1. On discovering a fire or some such emergency, raise the alarm with all staff in the immediate area and contact the Location Manager / Supervisor
2. Telephone "999" for emergency services.
3. Identify yourself to the person on duty and inform them of:
 - The fire or emergency (Fire, Accident or Major Spillage)
 - The location of it.
 - Assistance required (e.g. fire brigade, Gardai or ambulance)

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3.2.3 In the case of fire

1. Should you be willing to assist in the containing it, use the appropriate extinguisher.

NOTE: Always remember to stay on the exit side of the fire and never take risks.

2. If you can no longer contain the fire, then vacate the building/work area immediately by the nearest clear exit, closing all doors behind you.
3. Now proceed to your assembly point.
4. Report to your assembly point controller and identify yourself to your assembly point controller as the person who discovered the fire or emergency.

Emergency Spill Response Procedure

3.3.1 In the event of a major spill the Location Manager / Supervisor shall:

1. Ensure all sources of ignition are extinguished.
2. Keep the area well ventilated if the spill is in a confined space
3. Ensure that all unnecessary untrained personnel are kept well away from the scene.
4. Identify the material spilled and obtain the MSDS to ensure that handling and PPE requirements are clearly understood and that those containing the spill are wearing the appropriate PPE.
5. Stop the spill and contain it as much as possible (Note1), any pumping of water should cease and any valves on the water line should be closed until the spill is investigated and that the appropriate Local Authority has been notified, use the materials provided in the Environmental Spill Kits (Note 2) and ensure that the drains in the surrounding areas are sealed.
6. Contact the Roadstone HSE officer immediately.

NOTE 1: The main risk associated with oil or chemical spills is the potential for the spill to enter drains, watercourses, soils and the ground water system, causing contamination and/or fire or explosion risk.

NOTE 2: For contract's sites where a spill kit may not be available any suitable inert, absorbent material near to hand may be used to contain the spill i.e. sand. A spill kit should be then obtained if necessary from the nearest Roadstone Ltd location or from a supplier.

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3.3.2 Remediation

1. Depends on the impact the contaminant has on the receptor and may involve the following:
 - Aeration
 - Addition of biological surfactants
 - Restocking of fish reserves
2. Contact the appropriate authority concerned to discuss as and when required.

3.3.3 Waste Disposal

1. Any waste or contaminated materials generated during the clean up of the spill, shall be disposed of as per the Waste Management Procedure EMS/21
2. Minor spills may be dealt with in accordance with the procedure illustrated in Appendix 1.
3. Site requirements; Each location shall be equipped with an adequate number of:
 - Fire Extinguishers
 - Assembly points
 - First Aid Personnel & Kits
 - Spill kits
 - A pallet of absorbent granules

3.3.4 Reporting

1. A non conformance notice shall be completed by Location Manager or Supervisor immediately after each accident.
2. The Environmental Officer shall review this report along with the Manager concerned to ensure that any corrective action required is implemented.

3.3.5 Emergency Telephone Numbers

A list of emergency telephone numbers is on display throughout each location.

Road Vehicle Breakdown / Overturn / Spillage / Fire.

3.4.1 Road Vehicle Breakdown

1. Put on hazard lights.
2. Alert oncoming traffic of the vehicle breakdown by erecting a reflector triangle a safe distance behind the vehicle.
3. Notify the Roadstone Ltd Location and the relevant authorities.

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3.4.2 Road Vehicle Overturning

1. Put on hazard lights, if possible.
2. Notify the Roadstone Ltd Location and the relevant authorities.
3. Maintain a safe environment around the vehicle until the authorities arrive to assist with any traffic disturbances.
4. Alert oncoming traffic of the vehicle breakdown by erecting a reflector triangle a safe distance behind the vehicle.

3.4.3 Road Vehicle Material Spillage

1. Remove the vehicle from the road if safe to do so.
2. Maintain a safe environment around the vehicle until the authorities arrive to assist with any traffic disturbances.
3. Alert oncoming traffic of the vehicle breakdown by erecting a reflector triangle a safe distance behind the vehicle.
4. Notify the Roadstone Ltd Location and the relevant authorities (Gardai, Fire Service, Local Authority etc.).

3.4.4 Road Vehicle Fire

1. Use a fire extinguisher or fire blanket only if safe to do so. Do not endanger the health and safety of yourself or others.
2. Evacuate the area immediately.
3. Notify the Roadstone Ltd Location and the relevant authorities if necessary (Gardai, Fire Service, Local Authority etc.).
4. Maintain a safe environment around the vehicle until the authorities arrive to assist with any traffic disturbances.
5. Alert oncoming traffic of the vehicle breakdown by erecting a reflector triangle a safe distance behind the vehicle.

Testing of Procedure

Periodic testing of the Emergency response procedure must be tested every two years & procedure amended to suit any changes in circumstances.

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Approved By: HSE Dept.

EMERGENCY TELEPHONE NUMBERS

EMERGENCY SERVICES

112 / 999

HSE Officers: **Bernadette Azzie** – (087)1845701
Cillian Casey – (086) 3885669
Leonard Moore – (087) 1505881
Marie Kelleher – (086) 8563520
Ronan Quinn – (086) 0238915
HSE Manager: **Cormac McCarthy** – (087) 2397647

ENVA – 057 8678600

Lehane Environmental – (021) 4351020

Rilta – 01 4018000

5.4 GENERAL GUIDANCE ON BASELINE ENVIRONMENT & IMPACTS

The following guidance was extracted from EPA (2015, 2017).

The main purpose of an EIAR is to identify, describe and present an assessment of the likely significant impacts of a project on the environment.

It should contain:

“A description of the likely significant effects of the project on the environment resulting from, inter alia:

- a) the construction and existence of the project, including, where relevant, demolition works;
- b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
- c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
- d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
- e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
- f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;
- g) the technologies and the substances used.

5.4.1 DESCRIPTION OF EXISTING/RECEIVING ENVIRONMENT

Baseline information should, in the first instance, be sourced from published references to ensure reliability and objectivity.

It is important for the EIAR to draw attention to limitations about factors that may affect the reliability of baseline data. These can include the availability, completeness, accuracy, age and accessibility of data.

The need for site specific and up-to-date data is reviewed on a case-by-case basis in the context of available data and to determine whether new surveys or research are required.

Refer to Advice Notes for more detail on baseline information (EPA, 2015b).

To facilitate evaluation of the EIAR, references to recognised descriptive standards and classifications should be included, where appropriate, as well as supporting records, information and descriptions of methodologies employed.

5.4.2 BASELINE DESCRIPTION

Systematic, accurate and comprehensive descriptions include descriptions of the context, character, significance and sensitivity of the existing environment.

BASELINE DESCRIPTIONS REQUIRED	
Context	Describe the location, magnitude, spatial extent and trends of the environmental factor,
Character	Indicate the distinguishing aspects of the environment under consideration
Significance	What quality, value or designation is assigned to this aspect of the existing environment,
Sensitivity	How sensitive is this aspect of the environment to change,

5.4.3 EFFECTS/IMPACTS

The description of the likely significant effects on the "environmental factors" should cover the direct effects and any indirect/secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project."

It may be useful to consider such impacts in light of the criteria listed in Annex III of the amended Directive.

- a) the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);
- b) the nature of the impact;
- c) the transboundary nature of the impact;
- d) the intensity and complexity of the impact;
- e) the probability of the impact;
- f) the expected onset, duration, frequency and reversibility of the impact;
- g) the cumulation of the impact with the impact of other existing and/or approved projects;
- h) the possibility of effectively reducing the impact.

5.4.4 DESCRIPTIONS OF EFFECTS

Each effect usually needs to be qualified to provide a comprehensive description of the predicted effect on receptors.

The EIAR should focus on the likely, significant effects.

The extent to which the effects of major accidents and/or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other regulations, e.g., a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive plants. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required. The EIS should refer to those separate assessments while avoiding duplication of their contents.

Checklist for Information required to describe effects page 55 of EPA (2017).

<p>Quality of Effects</p> <p>It is important to inform the non-specialist reader whether an effect is positive, negative or neutral</p>	<p>Positive Effects</p> <p>A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).</p>
	<p>Neutral Effects</p> <p>No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.</p>
	<p>Negative/adverse Effects</p> <p>A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).</p>
<p>Describing the Significance of Effects</p> <p>“Significance’ is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see <i>Determining Significance</i> below.).</p>	<p>Imperceptible</p> <p>An effect capable of measurement but without significant consequences.</p>
	<p>Not significant</p> <p>An effect which causes noticeable changes in the character of the environment but without significant consequences.</p>
	<p>Slight Effects</p> <p>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.</p>
	<p>Moderate Effects</p> <p>An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.</p>
	<p>Significant Effects</p>

	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	<p>Very Significant</p> <p>An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.</p>
	<p>Profound Effects</p> <p>An effect which obliterates sensitive characteristics</p>
<p>Describing the Extent and Context of Effects</p> <p>Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.</p>	<p>Extent</p> <p>Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.</p>
	<p>Context</p> <p>Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)</p>
<p>Describing the Probability of Effects</p> <p>Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.</p>	<p>Likely Effects</p> <p>The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented</p>
	<p>Unlikely Effects</p> <p>The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.</p>
<p>Describing the Duration and Frequency of Effects</p> <p>'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.</p>	<p>Momentary Effects</p> <p>Effects lasting from seconds to minutes</p>
	<p>Brief Effects</p> <p>Effects lasting less than a day</p>
	<p>Temporary Effects</p> <p>Effects lasting less than a year</p>
	<p>Short-term Effects</p>

	Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration
	Frequency of Effects Describe how often the effect will occur. ((once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually))
	Describing the Types of Effects
Indirect Effects (a.k.a. Secondary Effects) Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.	
Cumulative Effects The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.	
'Do-Nothing Effects' The environment as it would be in the future should the subject project not be carried out.	
'Worst case' Effects The effects arising from a project in the case where mitigation measures substantially fail.	
Indeterminable Effects When the full consequences of a change in the environment cannot be described.	

	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SO _x and NO _x to produce smog).

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5.4.5 REFERENCES

EPA (2015). *Advice Notes on Current Practice for preparing Environmental Impact Statements, Draft*. Environmental Protection Agency (EPA). Johnstown Castle, Wexford, Ireland.

EPA (2017). *Guidelines on the Information to be contained in an Environmental Impact Assessment Report, Draft*. Environmental Protection Agency (EPA). Johnstown Castle, Wexford, Ireland.

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5.5 WATER DATA

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5.5.1 MONITORING WELL DRILLING LOGS

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HYDRO-ENVIRONMENTAL SERVICES

MONITORING WELL DRILLING LOG

WELL NUMBER: MW1

PROJECT NUMBER: P1380-1

DATE STARTED: 10/10/2017

EASTING: 552717

SITE: Garryhesta Quarry, Co. Cork

DATE FINISHED: 11/10/2017

NORTHING: 569673

CLIENT: Roadstone Ltd.

LOGGED BY: Brian Coffey (HES)

ELEVATION: 51.081mOD

DRILLING CONTRACTOR: Southern Pumps Ltd.

FLUSH: Air Rotary

Well Completion Description	Flush Colour	H2O Inject.	Water Strikes	Fractures	Airlift Q (gal/hr)	Comments	Elevation	Meters Below Ground Surface	Lithology	Formation Description
							51.08	0	Dark brown, slightly gravelly, sandy SILT/CLAY	Ground Surface
								5		
								15	Brown, dense, silty sandy GRAVEL (notes: fine to medium gravel, coarse sand, sub-rounded to sub-angular gravel comprising mainly sandstone and siltstone)	
							35.08	20		
							10.83	40		E.O.H. 40.25mbgl
							9.08			

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REMARKS:

Casing (datum) elevation = 51.789mOD
Groundwater level on 27/10/17 - 22.709mOD

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SCALE As shown



HYDRO-ENVIRONMENTAL SERVICES

MONITORING WELL DRILLING

WELL NUMBER: MW2

PROJECT NUMBER: P1380-1

DATE STARTED: 11/10/2017

EASTING: 552790

SITE: Garryhesta Quarry, Co. Cork

DATE FINISHED: 12/10/2017

NORTHING: 569982

CLIENT: Roadstone Ltd.

LOGGED BY: Brian Coffey (HES)

ELEVATION: 52.447mOD

DRILLING CONTRACTOR: Southern Pumps Ltd.

FLUSH: Air rotary

Well Completion Description	Flush Colour	H2O Inject.	Water Strikes	Fractures	Airlift Q (gal/hr)	Comments	Elevation	Meters Below Ground Surface	Lithology	Formation Description
							52.45	0		Ground Surface
										Dark brown, slightly gravelly, sandy SILT/CLAY
							45.45	5		
								10		Brown, dense, silty sandy GRAVEL (notes: Fine to coarse gravel, coarse sand, sub-rounded to sub-angular gravel comprising mainly sandstone and siltstone)
								15		
								20		
							22.45	25		
								30		Brown, very dense, silty, sandy GRAVEL (notes: sub-description as above).
								35		
							14.05	40		E.O.H. 38.4mbgl
							11.95			

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REMARKS:

Casing (datum) elevation = 53.286mOD
Groundwater level on 27/10/17 - 21.286mOD

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SCALE As shown



MONITORING WELL DRILLING LOG

WELL NUMBER: MW3

PROJECT NUMBER: P1380-1

DATE STARTED: 12/10/2017

EASTING: 552069

SITE: Garryhesta Quarry, Co. Cork

DATE FINISHED: 13/10/2017

NORTHING: 569322

CLIENT: Roadstone Ltd.

LOGGED BY: Brian Coffey (HES)

ELEVATION: 51.626mOD

DRILLING CONTRACTOR: Southern Pumps Ltd.

FLUSH: Air Rotary

Well Completion Description	Flush Colour	H2O Inject.	Water Strikes	Fractures	Airlift Q (gal/hr)	Comments	Elevation	Meters Below Ground Surface	Lithology	Formation Description
<p>Back fill with drilling returns</p> <p>Bentonite seal</p> <p>6" Steel casing</p> <p>50mm PVC casing</p> <p>Bentonite seal</p>							51.63	0	Brown, dense, silty, sandy GRAVEL (notes: fine to medium gravel, coarse sand, sub-rounded to angular gravel comprising mainly sanstone and siltstone)	Ground Surface
								5		
								10		
								15		
								27.63	25	Brown, very dense, silty sandy GRAVEL (notes: fine to medium gravel, coarse sand, sub-rounded to angular gravel comprising mainly sanstone and siltstone)
							16.63	35	Bedrock (notes: slightly weathered with thin layer of silt on top. No bedrock returns)	
							13.03	40	E.O.H. 38.6mbgl	
							11.13			

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REMARKS:

Casing (datum) elevation = 52.294mOD
Groundwater level on 27/10/17 - 24.004mOD

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SCALE As shown



MONITORING WELL DRILLING LOG

WELL NUMBER: MW4

PROJECT NUMBER: P1380-1

DATE STARTED: 16/10/2017

EASTING: 552325

SITE: Garryhesta Quarry, Co. Cork

DATE FINISHED: 17/10/2017

NORTHING: 569421

CLIENT: Roadstone Ltd.

LOGGED BY: Brian Coffey (HES)

ELEVATION: 52.092mOD

DRILLING CONTRACTOR: Southern Pumps Ltd.

FLUSH: Air rotary

Well Completion Description	Flush Colour	H2O Inject.	Water Strikes	Fractures	Airlift Q (gal/hr)	Comments	Elevation	Meters Below Ground Surface	Lithology	Formation Description
							52.09	0		Ground Surface
								44.09	5	Brown, dense, silty sandy GRAVEL (notes: fine to medium gravel, coarse sand, sub-rounded to angular gravel comprising mainly sanstone and siltstone)
							42.09	10		Brown, silty SAND (fine)
								15		Brown, dense, silty sandy GRAVEL (notes: fine to medium gravel, coarse sand, sub-rounded to angular gravel comprising mainly sanstone and siltstone)
							16.09	35		E.O.H. 36.0mbgl
							13.09			

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REMARKS:

Casing (datum) elevation = 52.787mOD
Groundwater level on 27/10/17 - 23.587mOD

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SCALE As shown

5.5.2 SURFACE WATER & GROUNDWATER ORIGINAL LABORATORY REPORTS

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ANALYSIS REPORT

CUSTOMER:	ROADSTONE WOOD LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Castlemore, Crookstown, County Cork	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	MARIE KELLEHER Environmental Officer (South)	DATE SAMPLED:	03 February 2017
SAMPLED BY:	Danny O' Leary, Southern Scientific Services Ltd	DATE RECEIVED:	03 February 2017
SAMPLING PT:	GARRYHESTA	DATE ANALYSED:	03 February – 06 March 2017
ORDER NO.:		DATE REPORTED:	07 March 2017
		WORK NO.:	37106 C

TABLE OF RESULTS

Method:	Parameter	Units	C17-Feb 103 Roadside Lake	C17-Feb 104 Roadside River
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.8	7.9
SCP 015	BOD	mg/L	1.3	1.3
SCP 027a	Total Ammonia	mg/L N	0.05	0.05
SCP 010	Suspended Solids	mg/L	16	6
SCP 043	Total Nitrogen	mg/L N	5.4	5.8
SCP 044	Total Phosphorus	mg/L P	0.10	0.04
**5520F	* DRO	µg/L	<10	<10

Ruth Murphy
Ruth Murphy
Chemistry Laboratory Manager

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registered in ireland no 323196 | vat reg no IE 6343196 M

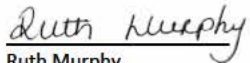


ANALYSIS REPORT

CUSTOMER:	ROADSTONE WOOD LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Castlemore, Crookstown, County Cork	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	MARIE KELLEHER Environmental Officer (South)	DATE SAMPLED:	06 March 2017
SAMPLED BY:	Danny O' Leary, Southern Scientific Services Ltd	DATE RECEIVED:	06 March 2017
SAMPLING PT:	GARRYHESTA	DATE ANALYSED:	06 – 15 March 2017
ORDER NO.:		DATE REPORTED:	16 March 2017
		WORK NO.:	37367 C

TABLE OF RESULTS

Method:	Parameter	Units	C17-Mar 283 Roadside Lake	C17-Mar 284 Roadside River
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	8.1	8.0
SCP 015	BOD ^{Note 4}	mg/L	<1.0	<1.0
SCP 027a	Total Ammonia	mg/L N	<0.02	<0.02
SCP 010	Suspended Solids	mg/L	9	<2
SCP 043	Total Nitrogen	mg/L N	4.8	6.0
SCP 044	Total Phosphorus	mg/L P	0.05	<0.04
**5520F	* DRO	µg/L	<10	<10


Ruth Murphy
Chemistry Laboratory Manager

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(F)	Analysis carried out at our Farranfore Laboratory.
Note 4	The handling of the sample within the laboratory did not comply with the laboratories policy on holding times & handling instructions. As a result, it is possible that the results may have been compromised.

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email: info@elsltd.com



Contact Name	David Broderick	Report Number	119209 - 1
Address	Hydro-Environmental Services 22 Lower Main Street, Dungarvan,	Sample Number	119209/001
Tel No	058 44122	Date of Receipt	01/11/2017
Customer PO	Per Batch	Date Started	01/11/2017
Quotation No	QN007097	Received or Collected	Hand
Customer Ref	SW 1 - Garryhesta	Date of Report	17/11/2017
		Sample Type	Surface Waters

CERTIFICATE OF ANALYSIS

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
BOD									
BOD			EW001	1.0		1.1	mg/L	INAB	
Gallery Plus-Suite A									
Total Oxidised Nitrogen (TON) as N			EW175	0.15		6.5	mg/1N	INAB	
Phosphate (Ortho/MRP) as P			EW175	0.005		0.008	mg/1P	INAB	
Micro -Total & Faecal (Sub 1)									
Faecal coliforms		*	Default	0		>80	MPN/100ml	YES	
Suspended Solids									
Suspended Solids			EW013			<5	mg/L	INAB	
Total Nitrogen									
Total Nitrogen			EW140	1.0		11.9	mg/L	INAB	
Total Kjeldahl Nitrogen-TKN (CalcGallery)									
Total Kjeldahl Nitrogen-TKN (CalcGallery)			EW010	1.0		5.5	mg/1N		

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Domenico Giliberti-Technical Manager

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Contact Name	David Broderick	Report Number	119209 - 1
Address	Hydro-Environmental Services 22 Lower Main Street, Dungarvan,	Sample Number	119209/002
Tel No	058 44122	Date of Receipt	01/11/2017
Customer PO	Per Batch	Date Started	01/11/2017
Quotation No	QN007097	Received or Collected	Hand
Customer Ref	SW2 - Garryhesta	Date of Report	17/11/2017
		Sample Type	Surface Waters

CERTIFICATE OF ANALYSIS

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
BOD									
	BOD		EW001	1.0		1.5	mg/L	INAB	
Gallery Plus-Suite A									
	Total Oxidised Nitrogen (TON) as N		EW175	0.15		5.5	mg/lN	INAB	
	Phosphate (Ortho/MRP) as P		EW175	0.005		<0.005	mg/lP	INAB	
Micro -Total & Faecal (Sub 1)									
	Faecal coliforms	*	Default	0		2	MPN/100ml	YES	
Suspended Solids									
	Suspended Solids		EW013			<5	mg/L	INAB	
Total Nitrogen									
	Total Nitrogen		EW140	1.0		7.2	mg/L	INAB	
Total Kjeldahl Nitrogen-TKN (CalcGallery)									
	Total Kjeldahl Nitrogen-TKN (CalcGallery)		EW010	1.0		1.8	mg/lN		

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17/11/2017

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Contact Name	David Broderick	Report Number	119040 - 1
Address	Hydro-Environmental Services 22 Lower Main Street, Dungarvan,	Sample Number	119040/001
Tel No	058 44122	Date of Receipt	27/10/2017
Customer PO	Per Batch	Date Started	27/10/2017
Quotation No	QN007097	Received or Collected	Hand
Customer Ref	Farm Well	Date of Report	06/11/2017
		Sample Type	Ground Waters

CERTIFICATE OF ANALYSIS

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
BOD									
BOD			EW001	10		<10	mg/L	INAB	
Coliforms									
Total Coliforms			MIC133	0		0	MPN/100ml	INAB	
<i>Analyst Micro Comment: The start date for this micro test is 27/10/17</i>									
Gallery Plus-Suite A									
Ammonia as N			EW175	0.005		<0.005	mg/l N	INAB	
Total Oxidised Nitrogen (TON) as N			EW175	0.25		8.5	mg/l N	INAB	
Nitrate as N			EW175	0.25		8.5	mg/l N	INAB	
Phosphate (Ortho/MRP) as P			EW175	0.005		<0.005	mg/l P	INAB	
GCFID TPH Split									
TPH >C10 - C20 (DRO)			EO063	10		<10	ug/L		
TPH >C6 - C10 (PRO)			EO063	10		<10	ug/L		
TPH >C6-C40 (TPH)			EO063	10		<10	ug/L		
Metals-Dissolved									
Iron-Dissolved			EW188	20		<20	ug/L	INAB	
Manganese-Dissolved			EW188	10		<10	ug/L	INAB	
Cadmium-Dissolved			EW188	0.1		<0.1	ug/L	INAB	
Copper-Dissolved			EW188	0.003		0.005	mg/L	INAB	
Lead-Dissolved			EW188	0.3		<0.3	ug/L	INAB	
Magnesium-Dissolved			EW188	0.3		14.9	mg/L	INAB	
Nickel-Dissolved			EW188	0.5		<0.5	ug/L	INAB	
Zinc-Dissolved			EW188	10		25	ug/L	INAB	
Titralab									
pH			EW153	0.0		7.0	pH Units	INAB	
Total Dissolved Solids (TDS)									
Total Dissolved Solids (TDS)			EW046	15		166	mg/L	INAB	
Total Kjeldahl Nitrogen-TKN (CalcGallery)									
Total Kjeldahl Nitrogen-TKN (CalcGallery)			EW010	10		2.1	mg/l N		
Total Nitrogen									
Total Nitrogen			EW140	10		10.6	mg/L	INAB	

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Contact Name	David Broderick	Report Number	119040 - 1
Address	Hydro-Environmental Services 22 Lower Main Street, Dungarvan,	Sample Number	119040/002
Tel No	058 44122	Date of Receipt	27/10/2017
Customer PO	Per Batch	Date Started	27/10/2017
Quotation No	QN007097	Received or Collected	Hand
Customer Ref	Garyhesta MW 2	Date of Report	06/11/2017
		Sample Type	Ground Waters

CERTIFICATE OF ANALYSIS

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
BOD									
BOD			EW001	1 0		<1 0	mg/L	INAB	
Coliforms									
Total Coliforms			MIC133	0		240	MPN/100ml	INAB	
Gallery Plus-Suite A									
Ammonia as N			EW175	0 005		0 097	mg/1 N	INAB	
Total Oxidised Nitrogen (TON) as N			EW175	0 15		7 3	mg/1 N	INAB	
Nitrate as N			EW175	0 15		7 3	mg/1 N	INAB	
Phosphate (Ortho/MRP) as P			EW175	0 005		<0 005	mg/1 P	INAB	
GCFID TPH Split									
TPH >C10 - C20 (DRO)			EO063	10		<10	ug/L		
TPH >C6 - C10 (PRO)			EO063	10		<10	ug/L		
TPH >C6-C40 (TPH)			EO063	10		<10	ug/L		
Metals-Dissolved									
Iron-Dissolved			EW188	20		140	ug/L	INAB	
Manganese-Dissolved			EW188	1 0		180	ug/L		
Cadmium-Dissolved			EW188	0 1		<0 1	ug/L	INAB	
Copper-Dissolved			EW188	0 003		<0 003	mg/L	INAB	
Lead-Dissolved			EW188	0 3		<0 3	ug/L	INAB	
Magnesium-Dissolved			EW188	0 3		12 5	mg/L	INAB	
Nickel-Dissolved			EW188	0 5		3 4	ug/L	INAB	
Zinc-Dissolved			EW188	1 0		11	ug/L	INAB	
Titralab									
pH			EW153	0 0		6 9	pH Units	INAB	
Total Dissolved Solids (TDS)									
Total Dissolved Solids (TDS)			EW046	15		201	mg/L	INAB	
Total Kjeldahl Nitrogen-TKN (CalcGallery)									
Total Kjeldahl Nitrogen-TKN (CalcGallery)			EW010	1 0		<1 0	mg/1 N		
Total Nitrogen									
Total Nitrogen			EW140	1 0		8 1	mg/L	INAB	

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Contact Name	David Broderick	Report Number	119040 - 1
Address	Hydro-Environmental Services 22 Lower Main Street, Dungarvan,	Sample Number	119040/003
Tel No	058 44122	Date of Receipt	27/10/2017
Customer PO	Per Batch	Date Started	27/10/2017
Quotation No	QN007097	Received or Collected	Hand
Customer Ref	Garyhesta MW 1	Date of Report	06/11/2017
		Sample Type	Ground Waters

CERTIFICATE OF ANALYSIS

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
BOD									
BOD			EW001	1 0		<1 0	mg/L	INAB	
Coliforms									
Total Coliforms			MIC133	0		21	MPN/100ml	INAB	
Gallery Plus-Suite A									
Ammonia as N			EW175	0 005		<0 005	mg/1 N	INAB	
Total Oxidised Nitrogen (TON) as N			EW175	0 15		4 7	mg/1 N	INAB	
Nitrate as N			EW175	0 15		4 7	mg/1 N	INAB	
Phosphate (Ortho/MRP) as P			EW175	0 005		0 006	mg/1 P	INAB	
GCFID TPH Split									
TPH >C10 - C20 (DRO)			EO063	10		<10	ug/L		
TPH >C6 - C10 (PRO)			EO063	10		<10	ug/L		
TPH >C6-C40 (TPH)			EO063	10		<10	ug/L		
Metals-Dissolved									
Iron-Dissolved			EW188	20		<20	ug/L	INAB	
Manganese-Dissolved			EW188	1 0		1 2	ug/L	INAB	
Cadmium-Dissolved			EW188	0 1		<0 1	ug/L	INAB	
Copper-Dissolved			EW188	0 003		<0 003	mg/L	INAB	
Lead-Dissolved			EW188	0 3		<0 3	ug/L	INAB	
Magnesium-Dissolved			EW188	0 3		10 2	mg/L	INAB	
Nickel-Dissolved			EW188	0 5		0 8	ug/L	INAB	
Zinc-Dissolved			EW188	1 0		8 0	ug/L	INAB	
Titralab									
pH			EW153	0 0		7 6	pH Units	INAB	
Total Dissolved Solids (TDS)									
Total Dissolved Solids (TDS)			EW046	15		254	mg/L	INAB	
Total Kjeldahl Nitrogen-TKN (CalcGallery)									
Total Kjeldahl Nitrogen-TKN (CalcGallery)			EW010	1 0		<1 0	mg/1 N		
Total Nitrogen									
Total Nitrogen			EW140	1 0		4 6	mg/L	INAB	

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5.5.3 SURFACE WATER & GROUNDWATER QUALITY DATA

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Table 1
Groundwater Laboratory Data
Roadstone, Garryhesta, Co. Cork

Parameter	Limit of Detection	MW-01 27/10/2017	MW-02 27/10/2017	Farm Well 27/10/2017	Units	EPA IGV*	GW Regs TV (S.I. 9 of 2010)	Drinking Water Regs (S.I. 122 of 2014)
Dissolved Cadmium	0.1	<0.1	<0.1	<0.1	ug/l	5	3.75	5
Dissolved Copper	0.003	<0.003	<0.003	0.005	mg/l	30	1.5	2
Dissolved Iron	20	<20	140	<20	ug/l	200	-	200
Dissolved Lead	0.3	<0.3	<0.3	<0.3	ug/l	10	18.75	10
Dissolved Manganese	0.3	10.2	12.5	14.9	mg/l	50	-	-
Dissolved Manganese	1	1.2	180	<10	ug/l	50	-	50
Dissolved Nickel	0.5	0.8	3.4	<0.5	ug/l	20	15	20
Dissolved Zinc	1.0	8.0	11.0	25.0	ug/l	100	-	-
TPH >C10 - C20 (diesel)	10	<10	<10	<10	ug/l			
TPH >C6 - C10 (Petrol)	10	<10	<10	<10	ug/l			
TPH >C6-C40 (TPH)	10	<10	<10	<10	ug/l			
Total Dissolved Solids (TDS)	15	254	201	166	mg/l			
Ammonia as N	0.005	<0.005	0.097	<0.005	mg/l N	0.15	0.065-0.175	0.3
Total Oxidised Nitrogen (TON) as N	0.15	4.7	7.3	8.5	mg/l N			
Nitrate as N	0.15	4.7	7.3	8.5	mg/l N	5.65	8.475	11.3
Total Kjeldahl Nitrogen - TKN	1	<1.0	<1.0	2.1	mg/l N			
Total Nitrogen	1	4.6	8.1	10.6	mg/l			
Phosphate (Ortho/MRP) as P	0.005	0.006	<0.005	<0.005	mg/l P			
BOD	1.0	<1.0	<1.0	<1.0	mg/l			
Total Coliforms	0	21	240	0	MPN/100ml	0		

* Towards Setting Guideline Values for the Protection of Groundwater in Ireland - Interim Report (EPA, 2003)

NAC - No abnormal change

Bold - exceeds IGV value

Bold Italics - exceeds GW Regs (SI 9 of 2010) TV value

Bold Italics Underlined - exceeds Drinking Water Reg (SI 122 of 2014) parameter value

Table 2
Surface Water Quality Data (Sampling on 01/11/2017)
Garryhesta, Co. Cork

Test Parameter	SW1	SW2	Units	SW Regs S.I. 272 of 2009		Drinking Regs S.I. 122 of 2014
				High Status	Good Status	
BOD (Surface Water)	1.1	1.5	mg/L	≤ 1.3 (Mean)	≤ 1.5 (Mean)	-
Nitrogen (Total Kjeldahl)	5.5	1.8	mg/L as N	-	-	-
Nitrogen (Total Oxidised) Surface Water	6.5	5.5	mg/L as N	-	-	50*
Nitrogen (Total)	11.9	7.2	mg/L as N	-	-	
Ortho-Phosphate (P)	0.008	<0.005	mg/L as P	≤ 0.025 (Mean)	≤ 0.035 (Mean)	-
Solids (Total Suspended)	<5	<5	mg/L	-	-	-

*Nitrate limit as NO₃.

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5.6 NOISE MONITORING

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Noise Survey

for

Roadstone Ltd

Garryheasta

Co. Cork

Quarter 3 2017

Requested By:	Roadstone Ltd
Report Prepared By:	Paul Byrne Southern Scientific Services Ltd
Monitoring Carried out By:	Sinead Fagan Southern Scientific Services Ltd
Date of Monitoring:	24 th July 2017
Date Reported:	17 th August 2017
Our Reference:	14P 060

Issue Date	Revision	Comment
17/08/2017	00	Final report issued to client

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1. INTRODUCTION

Southern Scientific Services Ltd was commissioned by Roadstone Ltd to undertake a noise survey at their quarry facility at Garryheasta, Co. Cork. This facility is regulated by Cork County Council and conditions of planning permission for the facility place a daytime noise limit of 55dB(A) at the nearest sensitive receptors. Appendix 1 shows the position of each of the noise monitoring locations (N1-N5) previously agreed with Cork County Council. In the absence of landowner permission to access locations N2 & N3, alternative roadside positions have been selected and are also illustrated in Appendix 1. Noise monitoring is required for a period of 30 minutes at each of these locations on a quarterly basis. This report has been prepared in fulfilment of this monitoring requirement.

2. SURVEY DETAILS & METHODOLOGY

2.1 Survey Details

Project Reference: 14P 060
 Purpose: Compliance Monitoring
 Monitoring Locations: Refer to Appendix 1 and Table 1

Table 1: Noise Monitoring Locations

I.D.	Location
N1	Boundary position at north east of site
N2	Boundary position at south east of site
N3	Boundary position at east of site
N4	Boundary position at north of site (west of quarry entrance)
N5	Boundary position at north of site (further west of N4)

Date of Survey: 24th July 2017
 Weather Conditions: Dry with 30% cloud cover
 North westerly wind 0.5m/s – 2.0m/s at 2m;
 Temperature: 20°C
 Atmospheric Pressure: 1013 hPa

2.2 Equipment

Instrument: Brüel & Kjaer (Type 2250-L with Type 4950 microphone).

Instrument Serial No: 2654679

Microphone Serial No: 2652929

Instrument Last Calibrated: 27/10/2016

This instrument conforms to the following standards:

IEC 61672-1, Class 1

IEC 61260 1/3 Oct. Band Class 0

IEC 60651, Type 1

IEC 60804, Type 1

Sound Calibrator: Type 4231

Sound Calibrator Serial No.: 3001116

Sound Calibrator Calibration Date: 27/10/2016

Utility Software: BZ – 5298 Version 4.5

2.3 Monitoring Methodology

Noise monitoring was carried out with reference to:

- International Standard ISO 1996 – Acoustics – Description, measurement and assessment of environmental noise – Parts 1-3
- Guidance Note for Noise (NG4) – EPA 2016

Noise measurements were carried out at least 3.5m from any reflecting structure (other than the ground) following calibration of the instrument. The instrument was checked again after monitoring with the calibrator. The microphone, which was fitted with a windshield, was located 1.5m above ground level. Tonal analysis was undertaken following the simplified method described in Annex D of ISO 1996 (Part 2), 2007. In this method, a prominent discrete tone is identified as present when the sound pressure level in the one-third-octave band of interest exceeds the sound pressure levels of both adjacent one-third-octave bands as follows:

1. 15 dB in the low frequency one-third-octave bands (25Hz – 125Hz)
2. 8dB in the middle frequency bands (160Hz – 400Hz)
3. 5dB in the high frequency bands (500Hz – 10, 000Hz)

2.4 Measurement Parameters/Terminology

- A-weighted:** The adjustment applied to sound level recordings to approximate the non-linear frequency response of the human ear. The A-weighting is denoted by the suffix A in the parameters listed below such as L_{Aeq} , L_{A10} .
- Decibel (dB):** The scale in which sound pressure level is expressed and is based on a logarithmic scale.
- Impulsive Noise:** A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
- Tonal Noise:** Noise caused by the dominance of one or more frequencies which may result in increased noise nuisance.
- Interval:** The time period, t , over which noise monitoring is carried out.
- $L_{Aeq\ t}$:** The equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level.
- L_{A10} :** The A-weighted sound level which is exceeded for 10% of the measurement interval, usually used to quantify traffic noise.
- L_{A90} :** The A-weighted sound level which is exceeded for 90% of the measurement interval, usually used to quantify background noise. This may also be used to describe the noise level from a continuous steady or almost steady source.
- 1/3 Octave Band Analysis:** Frequency Analysis of sound such that the frequency spectrum is subdivided into bands of one-third of an octave each. An octave is taken to be a frequency interval, the upper limit of which is twice the lower limit.

3. RESULTS

Table 2 outlines the results of the noise monitoring carried out on the 24/07/2017.

Table 2: Results of Noise Survey

I.D.	Time	L _{Aeq} (30 mins) dB(A)	L _{A10} dB(A)	L _{A90} dB(A)	Description of Noise
N1	12:08 – 12:38	48.2	50.7	43.0	Traffic on the adjacent N22 was the predominant source of noise. No quarry activity could be heard at this location. Light air craft flying overhead. 1No.4x4 entered ESB yard at 12:34. Rural noises included birdsong, bees and the breeze rustling vegetation in background.
N2	10:54 – 11:24	59.1	50.3	43.4	Traffic on the adjacent N22 was constant while the local road network was the predominant source of noise at this location. Quarry activity, the conveyor belt and warning siren was faintly heard at this location. Local road traffic count included 4No. Cars, 1No. Van, 3No. 4 x4's and 1No. Truck. Rural noises included cows in field opposite monitoring location, breeze in vegetation, birdsong and bees in background.
N3	11:28 – 11:58	52.7	52.4	45.7	Traffic on the adjacent N22 was the most dominant noise source at this location. Local road traffic passed close to noise monitor. Conveyor belt could be heard in lulls in traffic. Rural noises included birdsong, tractor at work in field opposite monitoring location, breeze through vegetation, birdsong and occasional dog barking in background. Local road traffic count - 10No. Cars and 2No. 4 x4's. Airplane flew overhead at 11:57
N4	12:43 – 13:13	78.9	83.0	60.9	Traffic on the adjacent N22 was the dominant noise source at this location. Quarry activity was not noted at this point. Estimated traffic included: 435No. Cars; 40No. Trucks; 57No. 4x4; 48No. Vans; 6No. Motorb kes; 3No. Tractors and 3No. Buses. Birdsong and breeze in vegetation were heard during occasional lulls in traffic.
N5	13:24 – 13:54	77.2	81.8	52.7	Traffic on the adjacent N22 was clearly audible at this location and the dominant noise source. No quarry activity could be heard at this location. Estimated traffic included: 417No. Cars; 66No. Trucks; 90No. 4x4; 72No. Vans; 3No. buses. Background rural noise (birdsong, breeze in vegetation) was only heard during rare lulls in traffic. A lawnmower at an adjacent house could also be heard during lulls in traffic.

One third octave band frequency spectra are presented in Appendix 2. These demonstrate that there was no significant tonal component to the noise at any of the monitoring locations when assessed following Annex D of ISO 1996 (Part 2), 2007.

4. DISCUSSION & CONCLUSION

The L_{AF10} & L_{AF90} noise parameters along with the audible noise sources recorded during the survey assist in providing an understanding of the sources and nature of the noise in the area. The L_{A10} is the A-weighted sound level, which is exceeded for 10% of the measurement interval and is usually used to quantify traffic noise or other short duration/passing events. The L_{A90} is the A-weighted sound level that is exceeded for 90% of the measurement interval and is usually used to quantify background noise. The L_{Aeq} is the equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level. This facility is regulated by Cork County Council and conditions of planning permission for the facility place a daytime noise limit of 55dB(A) at the nearest sensitive receptors.

The results in Section 3 demonstrate the measured day time L_{Aeq} was within 55dB(A) at N1 and N3 but exceeded 55dB(A) at N2, N4 and N5. Noise generated from traffic on the N22 significantly impacts the noise levels measured at monitoring locations N4 & N5, which are located immediately adjacent to this road. Noise from the quarry could not be heard at these locations. Noise from local road traffic impacted on noise measured at N2. Noise from quarry activities, were faint at this location. One third octave band frequency spectra demonstrate that there was no significant tonal component to the noise measured at any of the monitoring locations.

Appendix 1

Noise Monitoring Locations

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Noise Monitoring Locations N1 – N5

★ Alternative Locations

Appendix 2

One-third-octave frequency spectra

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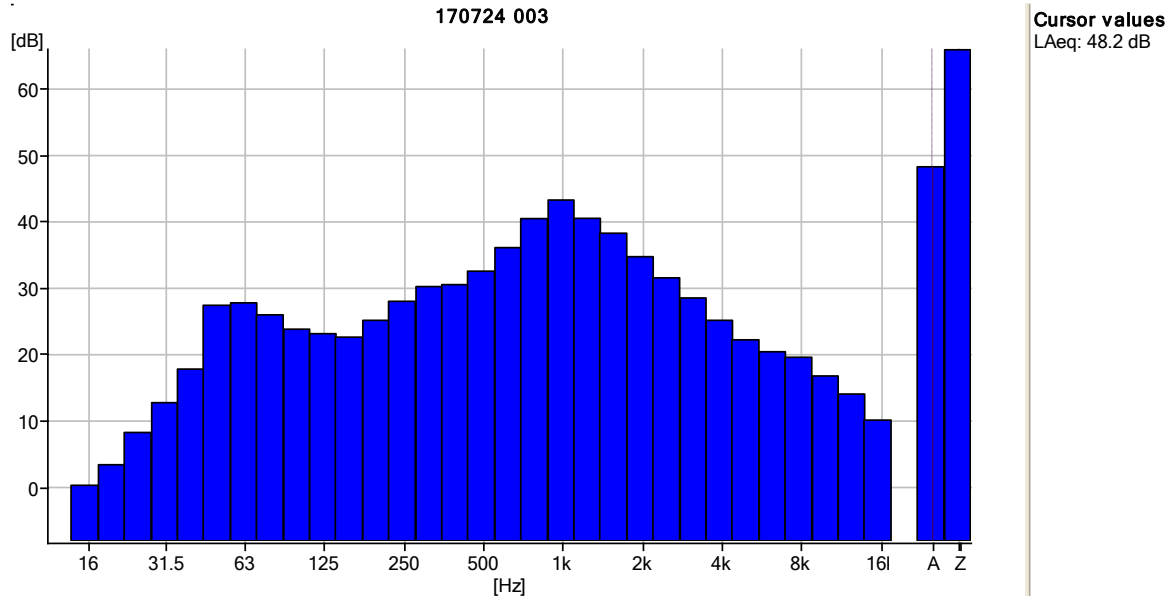


Figure A2.1: One third octave frequency spectra at N1

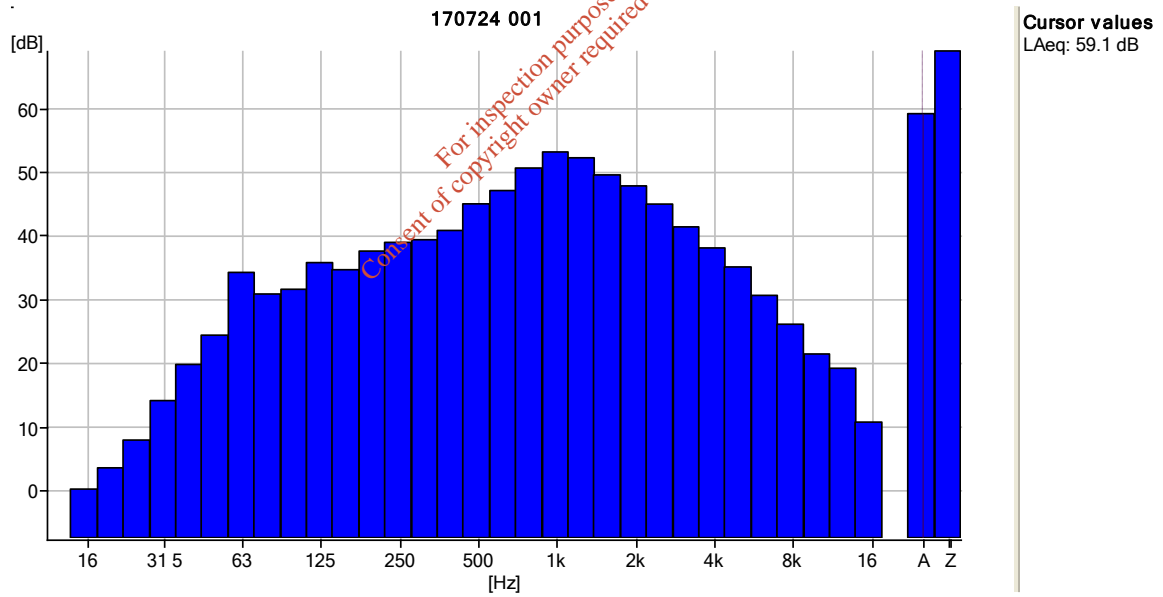


Figure A2.2: One third octave frequency spectra at N2

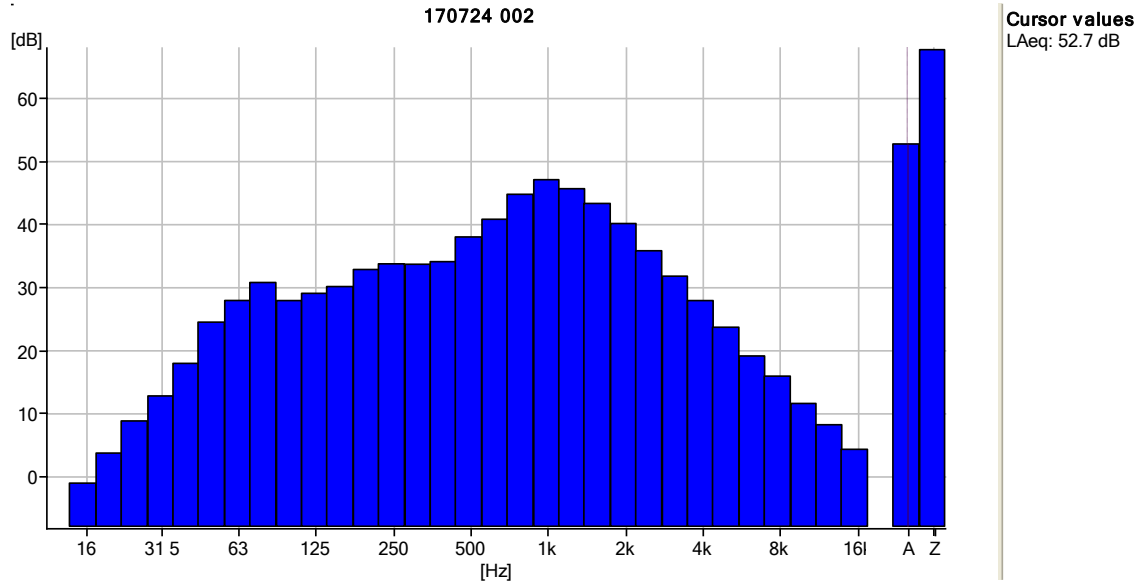


Figure A2.3: One third octave frequency spectra at N3

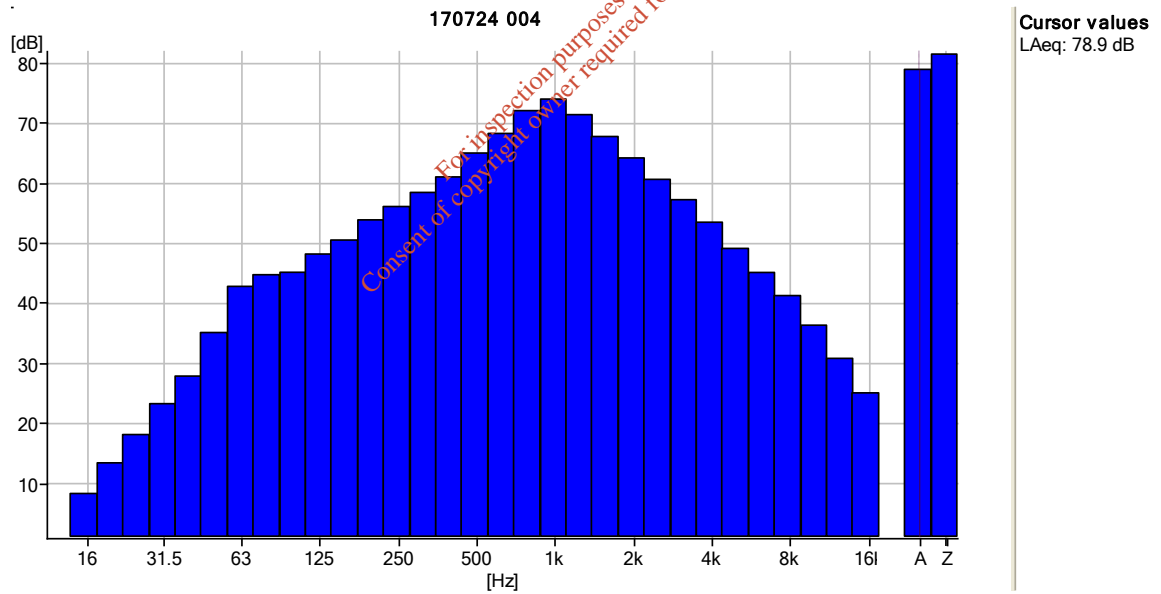


Figure A2.4: One third octave frequency spectra at N4

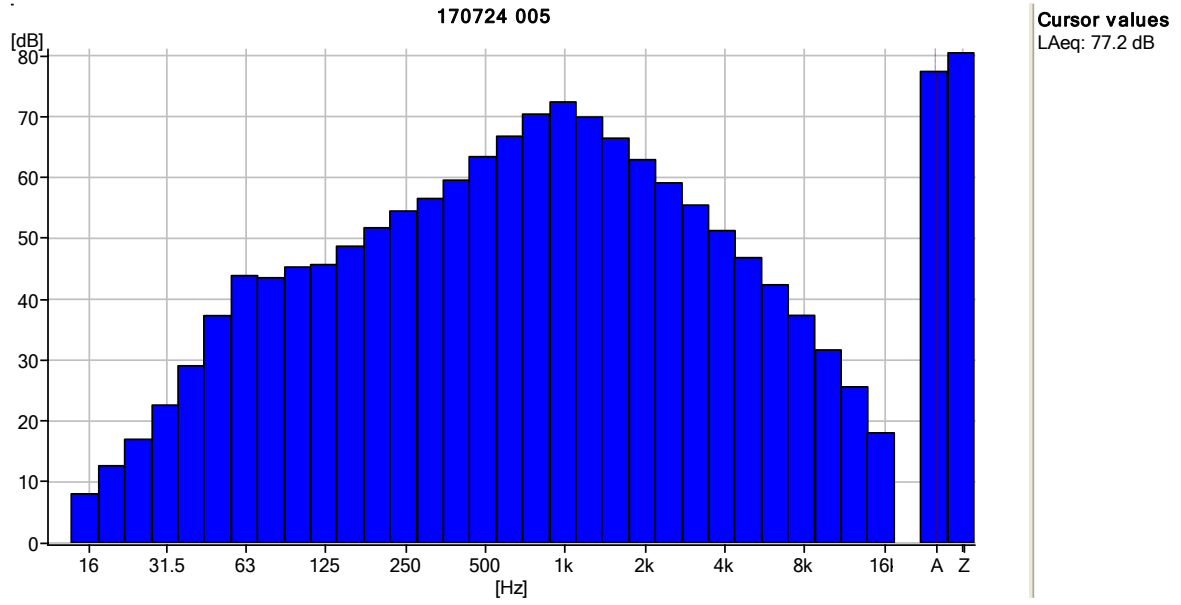



Figure A2.5: One third octave frequency spectra at N5

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Appendix 3


Calibration Certificates

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The Calibration Laboratory
Skodsborgvej 307, DK-2450 Nærum, Denmark





CAL Reg No. 307
Member of EA MLA

CERTIFICATE OF CALIBRATION

No: CDK1607221

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CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250 Light	No: 2654679 Id: -
Microphone:	Brüel & Kjær Type 4950	No: 2652929
Preamplifier:	Brüel & Kjær Type ZC-0032	No: 23415
Supplied Calibrator:	Brüel & Kjær Type 4231	No: 3006120
Software version:	BZ7130 Version 2.4	Pattern Approval: PTB1.63-4061063
Instruction manual:	BE1853-11	

CUSTOMER

Southern Scientific Services Ltd
4Park Business Centre
Farranfore
Kerry
County Kerry, Ireland.

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C
 Environment conditions: See actual values in *Environmental conditions* sections.

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 Light has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international unit system SI.

PROCEDURE


The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 6.0 - DB: 6.01) by using procedure B&K proc 2250-L-4950 (IEC61672).

RESULTS


Calibration Mode: **Calibration as received.**
 The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-10-27

Date of issue: 2016-10-28



Lene Petersen
Calibration Technician



Erik Bruus
Approved Signatory

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The Calibration Laboratory
5 Skindborgvej 307, DK-2850 Nærum, Denmark





CAL. Reg. No. 907
Member of EA MRA

CERTIFICATE OF CALIBRATION

No: CDK1607218

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CALIBRATION OF

Calibrator:	Brüel & Kjær Type 4231	No: 3006120 Id: -
1/2 Inch adaptor:	Brüel & Kjær Type UC-0210	
Pattern Approval:	PTB-1.61-4057176	

CUSTOMER

Southern Scientific Services Ltd
4 Park Business Centre
Farranfore
Kerry
County Kerry, Ireland

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C
 Environment conditions: Pressure: 102 kPa. Humidity: 41 % RH. Temperature: 23.1 °C.

SPECIFICATIONS

The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC60942:2003 Annex B Class 1. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær acoustic calibrator calibration application software Type 7794 (version 2.5) by using procedure P_4231_D07.

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-10-27

Date of issue: 2016-10-27



Susanne Jørgensen
Calibration Technician



Erik Bruus
Approved Signatory

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5.7 CULTURAL HERITAGE

5.7.1 RMP SITES WITHIN THE STUDY AREA

RMP No.:	CO072-113001
Townland:	Clashanure
Classification:	Ringfort
Description:	In tillage. Heavily overgrown circular area (diameter 60m) defined by two earthen banks (inner bank: H 2m; outer bank: H 1m) with intervening fosse. According to Hartnett (1939, 132), entrance to south east. Possible souterrain (CO072-113002) in interior.
RMP No.:	CO072-113002
Townland:	Clashanure
Classification:	Souterrain
Description:	Inside ringfort (CO072-113001). Hartnett (1939, 132) noted 'to the SW of the centre of this fort is what I was told was a souterrain which has been closed up'. No visible surface trace.
RMP No.:	CO073-052
Townland:	Knockanemore
Classification:	Earthwork
Description:	In tillage, atop a N-S ridge, in Bride River valley. Oval raised area (40m NW-SE; 30m NE-SW) raised 3.6m and 1.65m above surrounding ground level at W and S side respectively. Interior slightly saucer shaped; crossed by field boundary on NW-SE axis; according to local information steps found leading underground in c. 1894. Field boundary respects N edge of platform
RMP No.:	CO073-093
Townland:	Knockanemore
Classification:	Fulacht fiadh
Description:	Spread of burnt material (c. 24m N-S; c. 18m E-W) noted in ploughed field.

5.7.2 IMPACT ASSESSMENT AND THE ARCHAEOLOGICAL RESOURCE

5.7.2.1 Potential Impacts on Archaeological Remains

Impacts can be identified from detailed information about a project, the nature of the area affected, and the range of archaeological resources potentially affected. Development sites can affect the archaeological resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape;
- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation;
- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits;
- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value;
- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow;
- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluvium or peat deposits;
- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, service trenches etc;
- Although not widely appreciated, positive impacts can accrue from permitted developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

5.7.2.2 Predicted Impacts

There is no standard scale against which the severity of impacts on the archaeological and historic landscape may be judged. The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape feature and its existing environment. Severity of impact can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
- Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
- Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.

Impacts are defined as:

“the degree of change in an environment resulting from a development”
(Environmental Protection Agency 2002, 30).

Impacts are described as imperceptible, not significant, slight, moderate, significant, very significant or profound on archaeological, architectural and cultural heritage remains (Details with respect to Significance Criteria are provided in Appendix 5.3).

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5.7.3 MITIGATION MEASURES AND THE ARCHAEOLOGICAL RESOURCE

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative impacts.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse impacts can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse impacts is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

5.7.3.1 Definition of Mitigation Strategies

The ideal mitigation for all archaeological sites is preservation *in situ*. This however is not always a practical solution, and a series of recommendations are therefore offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Archaeological excavation involves the scientific removal and recording of all archaeological features, deposits and objects to the level of geological strata or the base level of a given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material and where avoidance of the site is not possible.

Archaeological test trenching is defined as:

“that form of excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development” (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 27).

Archaeological monitoring:

“involves an archaeologist being present in the course of the carrying out of development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works” (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 28).