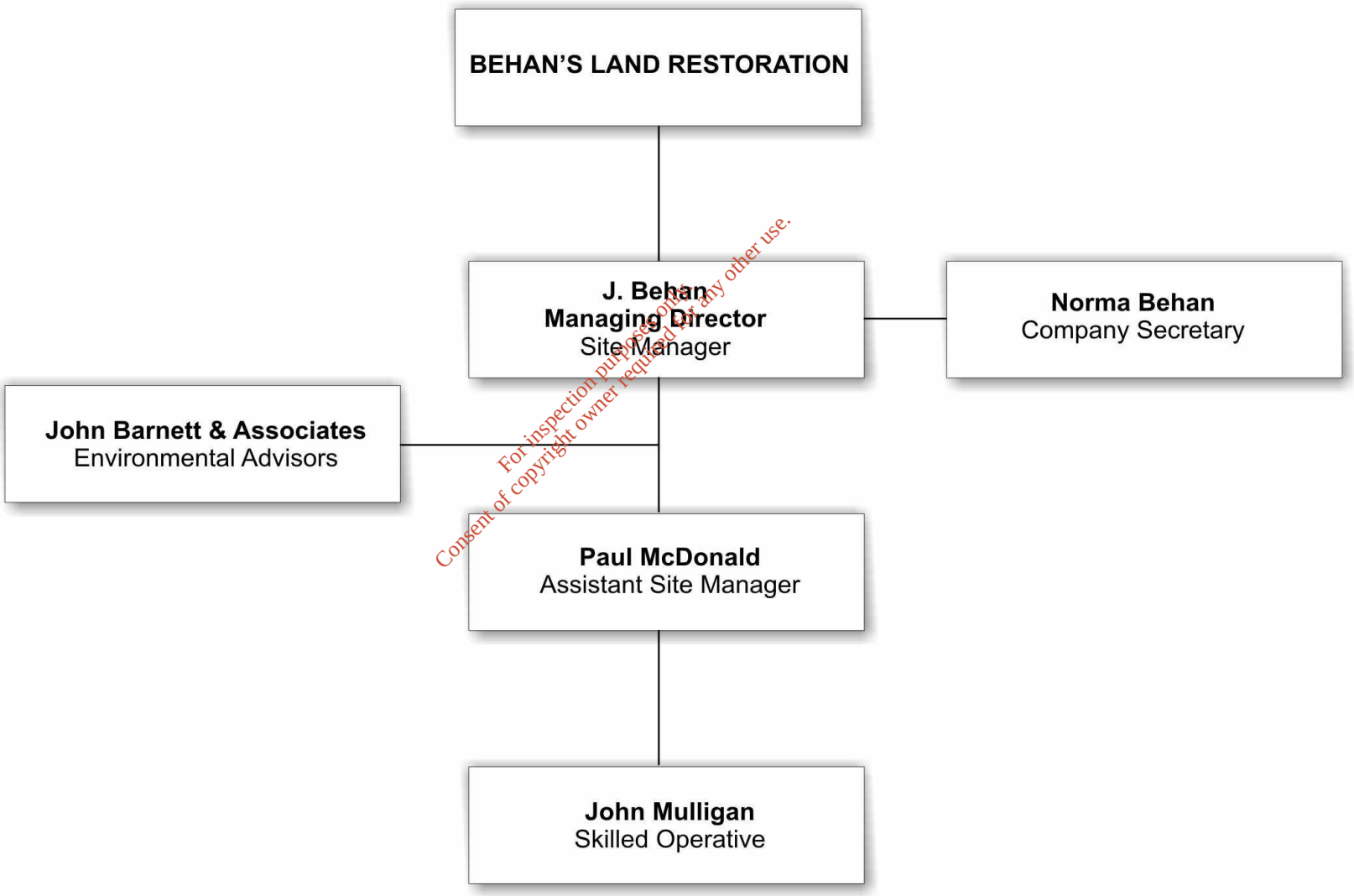
RESTORATION OF FORMER QUARRY, BLACKHALL
Waste Licence Application

Behan's Land Restoration - Management Structure



BEHANS LAND RESTORATION LTD.

RESTORATION OF FORMER GRAVEL QUARRY BLACKHALL, PUNCHESTOWN, CO. KILDARE

ENVIRONMENTAL MANAGEMENT PLAN

May 2008

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1. INTRODUCTION

1.1 Background

This Environmental Management Plan has been prepared by John Barnett and Associates in support of a Waste Licence Application for the restoration of a former gravel pit at Blackhall, Punchestown, Naas, Co. Kildare. The plan has been prepared having regard to the EPA Landfill Manual, "Landfill Operational Practices".

1.1 Purpose and Scope

An Environmental Management Plan (EMP) is a working document which accommodates the need for certain matters in respect of the ongoing restoration scheme to be determined or amended as it progresses through development and implementation stages.

While it is anticipated that ongoing restoration activities at the site will progress prior for formal approval of this EMP by the Environmental Protection Agency (the Licensing Authority), no additional site infrastructure will be built until formal approval for the EMP has been received.

It is envisaged that amendments to the EMP will either be made by the Licensee, subject to approval by the Licensing Authority, or at the request of the Licensing Authority. No operational procedure will be implemented that is not contained within the approved EMP.

A complete copy of the EMP will be kept on site and at the principal office of the Kildare County Council (the Local Authority). The Licensing Authority will be issued with a copy of the EMP and any subsequent modifications thereto.

2 SITE MANAGEMENT

2.1 Site Location and Name

The location of the site is indicated in Figure EMP1, at National Grid Reference 2933E 2158N. The facility will be known as Blackhall Inert Waste and Recovery Facility.

2.2 Licence Holder

The Waste Licence in respect of the restoration scheme is held by Behans Land Restoration Ltd. The plan extent of the licensed area is indicated in Figure 2.

2.3 Operator

The management and operational responsibilities for the facility are borne by Behans Land Restoration Ltd.

Contact: Mr John Behan (Managing Director)
Telephone: (045) 876 855 Fax: (045) 876 855

2.4 Site Description

The waste licence area comprises approximately 38.1 hectares (91.7 acres). The site comprises a worked-out sand and gravel quarry. The south-eastern quadrant of the former quarry has been almost completely backfilled to former ground level using inert natural soils in accordance with Kildare County Council waste permits Ref. Nos. 37/2001, 37/2001A and 305/2007.

The south-western quadrant has been partially backfilled and restored to agricultural grassland. This area is currently 8m to 10m below surround original ground level and drains south-westwards to a pond within a deep closed depression.

The north-eastern and north-western quadrants together comprise a large deep open void with steep, unvegetated side slopes of sand and gravel. No backfilling or restoration works have been undertaken in these areas.

2.5 Operational Hours

The site restoration works comprising

(i) importation, placement and compaction of inert soils and stones and recycled construction and demolition waste and
(ii) recovery (crushing / screening) of inert construction and demolition waste

extends from 08.00 hours to 18.00 hours each weekday (Monday to Friday) and from 08.00 hours to 14.00 hours on Saturday. No restoration or recycling activities will be undertaken on Sunday or on Bank / Public Holidays.

2.6 Permitted Waste

The inert materials to be accepted at the site for use in backfilling / recovery activities are identified by their European Waste Catalogue reference number below

EWC Code	Description
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
17 05 04	Soil and stones other than those mentioned in 17 05 03

2.7 Design Philosophy

The restoration scheme seeks to apply best environmental and landfill operational practices. To this end, maximum effort is made to ensure that only inert materials (principally construction and demolition waste) are imported to and accepted at the site and used for restoration, backfilling and recovery purposes.

Any non-hazardous or hazardous waste inadvertently mixed with the inert waste will be segregated and brought to the waste quarantine area for further examination and detailed classification. Any material which is deemed to be non-hazardous or hazardous shall be removed off-site to a suitably licensed waste disposal or waste recycling facility.

2.8 Life Expectancy

The estimated volume of material to be placed at the site is approximately 2,240,000m^3. Allowing for backfilling at a rate of approximately 550m^3 per day, equivalent to 151,250m^3 per year, the estimated lifespan of the facility is approximately 15 years. Recovery of construction and demolition waste will only continue as long as backfilling activities are undertaken at the site.

2.9 Site Management and Responsibilities

The key staff and their respective responsibilities are highlighted in the table below:-

Name	Position	Duties and Responsibilities
John Behan	Facility Manager	Liaison with Environmental Regulators Ensuring Compliance with Waste Licence Management of Site Staff (including consultants) Client Liaison Maintenance of Plant and Equipment Health, Safety and Welfare
External Consultant (TBA)	Environmental Scientist	Managing environmental monitoring programme

2.10 Record Keeping

The site records to be maintained on site for the duration of the restoration scheme include all of those listed in Section 2.3 of the EPA publication 'Landfill Manuals : Landfill Operational Practices'.

All site procedures, operational plans, environmental and legal consents, Environmental Impact Statement, contract documents (including construction drawings), staff records, external correspondence are maintained by and are the responsibility of the Facility Manager.

Records in respect of waste inspections and compliance / classification testing are maintained by and are the responsibility of the Facility Manager and/or Assistant Facility Manager.

Records in respect of waste processing / acceptance of inert waste at the site are maintained by, and are the responsibility of the Facility Manager and/or Assistant Facility Manager.

Records in respect of environmental monitoring are maintained by, and are the joint responsibility of, the Facility Manager and the external Environmental Consultant.

Site inspections are carried out by the Facility Manager or Assistant Facility Manager on a daily basis. A site inspection report form is completed by the Facility Manager or Assistant Facility Manager in respect of each daily inspection.

All records are maintained and available for inspection at the site office.

2.11 Annual Report

Behans Land Restoration, on an annual basis, in January of each year, provides the following information in an Annual Environmental Report (AER) issued to the EPA :

- Reporting period (year)
- Site name, location and licence number
- Facility Manager(s)
- Tonnage and composition of waste processed
- Rejected waste consignments
- Plans showing active and restored areas
- Environmental monitoring records
- Copy of complaints register for reporting period.
- Copy of register of pollution incidents for period
- Copy of accident / incident reports for period.

3 SITE INFRASTRUCTURE

3.1 Site Security

Access to the site can only be gained via an access road leading off the existing local road between Beggars End Crossroads and Newtown Great. All vehicular traffic accessing the site must stop at a security barrier in front of the temporary site office before gaining access by means of a swipe card. The swipe cards identify the Client forwarding the waste and facilitate electronic recording of time and date inert waste is received at the site.

Aside from the access road to the existing facility, the entire site boundary is closed off by post and wire fences and 6No. agricultural field gates. All agricultural gates are padlocked for the duration of the site restoration activities and will only be opened occasionally to facilitate agricultural related activity, principally grazing of sheep, on restored grassland within the site, remote from restoration backfilling or recovery operations.

Inert materials are accepted at the site between 08.00 hours and 18.00hours each weekday and 08.00hours to 14.00hours on Saturday. No materials are accepted at any other time.

3.2 Site Roads and Parking Areas

All trucks delivering inert waste to the site are confined within the waste licence boundary. Trucks travel over a paved road surface between the site security barriers and the existing temporary wheelwash facility before travelling over a network of unpaved internal roads to get to the active restoration area or the recycling area. Provision for employee and visitor car parking is provided on a paved area adjacent to the temporary site office, before the site security barrier.

3.3 Hardstanding Areas

A temporary hardstanding area constructed of secondary aggregate is located in the centre of the site for the recovery of inert construction and demolition waste imported to site and for separation and storage (in skips) of any separated non-inert construction and demolition wastes inadvertently mixed with it, most likely to comprise metal, timber, PVC pipes, plastic etc. The hardstanding area also provides for the storage of plant, equipment and materials.

The hardstanding area is not sealed and any rain falling over this area either percolates downwards into the underlying soils or runs-off over the exiting ground surface toward the main haul road through the site and into the groundwater pond in the closed depression at the western site boundary.

The eastern side of the existing recovery area is sealed by a 100mm thick reinforced concrete slab over 150mm of granular sub-base and is used as a waste inspection and quarantine area.

3.4 Wheelwash and Weighbridge

In order to prevent transport of soil on public roads, a temporary wheelwash facility has been installed close to the site entrance. All egressing site traffic is required to pass through the wheelwash.

A weighbridge along the internal access road, in front of the temporary site office, tracks and records the amount of material entering the site. Secondary aggregate exported off-site and any non-inert construction and demolition waste dispatched to other licensed waste disposal or recovery facilities is also weighed. Records of waste and secondary aggregate tonnages are maintained for waste auditing purposes.

3.5 Laboratory Testing

Laboratory testing of soil, surface water, groundwater and leachate is undertaken off-site at an ILAB / UKAS accredited geo-environmental laboratory (currently AlControl Laboratories, Ballycoolin, Co. Dublin). Validation testing to confirm classification of waste as inert is also undertaken by the same laboratory. All samples taken on-site are forwarded to the laboratory on the same day and test results are typically be forwarded to site within ten working days.

Environmental monitoring equipment such as pH and temperature meters, conductivity meters, flow meters and dissolved oxygen meters is brought to site by an independent environmental consultant as and when required.

3.6 Fuel and Oil Storage

No bunded fuel storage tanks are provided at the site. Fuel for plant and equipment undertaking the site restoration works and/or the construction and demolition waste recovery activity is stored in double skin bowsers located on the hardstanding area.

A small bunded tank for waste oils is provided on the concrete slab at the waste quarantine area. This tank is emptied at intervals by a licensed waste contractor and disposed off-site at a suitably licensed waste facility.

No re-fuelling of HGV trucks takes place on site. Oil and lubricant changes for wheeled or tracked plant are undertaken on-site at the existing hardstanding area.

Plant maintained on site principally comprises mechanical excavators and/or bulldozers, mobile crushing and screening plant. Both tracked and wheeled plant are serviced as necessary at the hardstanding area or, if necessary, on the concrete slab at the waste quarantine area.

3.7 Waste Inspection and Quarantine Area

A temporary waste inspection and quarantine area is constructed to the east of the existing recycling area. The waste inspection and quarantine area is sealed by a 100mm thick reinforced concrete slab over 150mm of granular sub-base and bunded to a design storm volume.

Any suspect or unacceptable waste identified in this area is placed in skips and covered with plastic sheeting in order to minimise potential contamination of surface water run-off.

Visual inspection, in-situ monitoring and testing of imported waste materials is undertaken by site staff as inert waste materials are end-tipped at the active restoration area. Should there be any concern about the nature of the waste being end-tipped, it is re-loaded onto the truck and re-directed to the waste inspection and quarantine area for closer examination and inspection. A detailed record is kept of all such inspections.

Should inspections or testing at the waste inspection area identify non-inert material which cannot be accepted and used for restoration of the site, it is segregated and temporarily stockpiled (at the quarantine area) and covered, pending removal off-site by permitted waste collectors to a suitably licensed / permitted waste disposal or recovery facility.

3.8 Traffic Control

All traffic to and from the site enters and leaves via the existing entrance which fronts onto the local road between Beggars End Crossroads and Newtown Great. All traffic travels to / from Beggars End Cross Roads.

Internally within the site, warning notices, direction signs and speed restriction signs are located along paved and/or unpaved roads leading to and from the active restoration areas and the construction and demolition waste recycling area.

All HGV traffic egressing the site is required to pass through a temporary wheelwash facility and weighbridge at the end of the paved internal road.

3.9 Sewerage and Surface Water Drainage Infrastructure

Toilet, hand washing and welfare facilities for site staff are provided at the adjoining residence of Mr. John Behan, a director of Behan's Land Restoration. A temporary portaloo is provided on the hardstanding area and is emptied / replaced as required by an approved waste Contractor.

There is no drainage infrastructure to collect and remove surface water run-off at the site other than that at the sealed concrete slab at the waste inspection and quarantine area. During the restoration works, surface water is allowed to run over the existing ground surface to collect in surface ponds and

discharge to groundwater. Some rainfall also percolates downwards through the backfilled soil to the underlying groundwater table. At no time during the restoration works will surface water run-off be directed to watercourses or ponds beyond the site boundary.

The temporary waste inspection and quarantine area is sealed by a 100mm thick reinforced concrete slab over 150mm of granular sub-base and bunded to a design storm volume. Any surface water running over the surface of the concrete slab is directed toward buried storage tanks with double skin protection located on the western side of the hardstanding area. Surface water is only collected in the buried tanks when suspect waste consignments are stored at the quarantine facility.

At all other times, surface water run-off from the sealed slab percolates directly through the ground to the underlying groundwater table or is directed over the existing ground surface to ponds in low lying areas, at which point it is effectively discharged to groundwater. As and when it is necessary to prevent high concentrations of suspended solids entering existing groundwater ponds, intermediate temporary surface water ponds are constructed to hold run-off and encourage settling out of suspended solids prior to discharge to groundwater ponds at a lower level.

Any wastewater collected in the buried tanks is emptied by licensed waste collectors and transferred to a collection tanker for disposal off-site at an approved waste water treatment facility.

3.10 Site Services

Electric power, lighting and heating are provided to the temporary site office near the entrance to the site. Personnel overseeing site backfilling and recovery operations at the site are contactable by mobile phone.

Given the lack of combustible waste materials at this site, it is considered highly unlikely that a fire will break out during backfilling and recovery operations. Fire extinguishers are kept at the site office to deal with any localised small scale fires which might occur. Additional fire-fighting capacity is provided by storing water in a mobile bowser at the hardstanding area.

The main Ballymore-Dublin water supply pipeline passes close to the north-eastern corner of the site. No other buried services are understood to occur across the site.

Overhead high voltage (220kV) electricity transmission cables traverse the north-eastern corner of the site. Lower voltage overhead distribution cables run along the north-western boundary of the site. Telegraph (telephone) cables run along the existing local road along the western site boundary. The health and safety implications of working in close proximity to the above listed cables will be addressed in implementing the phased restoration of the site.

3.11 Plant Sheds and Equipment Compounds

Plant and equipment used in the backfilling and/or recovery activities is stored on the temporary hardstanding area in the centre of the site. Given the limited access into the site, it is not necessary to provide a security fence around this area to create a secure compound.

No workshops are provided on site. Any plant or equipment which requires specialist repair or overhaul is removed off-site as required.

Small items of mobile or hand-held plant and equipment are stored in closed metal containers at the hardstanding area.

3.12 Site Accommodation

A temporary portacabin office is located at the entrance to the site. All site administration and management functions are based at this office. Changing facilities are also provided at this location. Site staff access handwashing and cooking facilities at the adjoining residence of John Behan, a director of Behan's Land Restoration Ltd.

3.13 Waste Recovery Infrastructure

Inert construction and demolition waste imported to site are recycled at the hardstanding area in the centre of the site. Any metal waste is separated and placed in a skip pending removal off site to a licensed recovery facility. Any other non-inert waste (timber, plastic etc.) is also be separated off and placed in a skip pending removal off-site by permitted waste collectors to a licensed disposal or recovery facility.

Construction and demolition waste is recycled by passing it through a mobile crushing plant in order to create a particulate, granular fill which may be used to construct hardstanding areas or temporary haul roads.

A site layout plan, showing the location of all site infrastructure is provided in Figure EMP3.

4 ENGINEERED LANDFILL DESIGN

4.1 General

The design of this landfill facility has been carried out on the basis that the waste placed within the repository is classified as inert.

4.2 Formation Levels and Gradients

The site has been sub-divided into five separate phases to facilitate progressive restoration and reinstatement of agricultural grassland. Some of these phases have been further subdivided to provide for continual ongoing restoration, refer to Figure EMP4.

Formation levels for backfilling across the site are taken to be equivalent to existing ground levels. During each restoration phase, the backfilled surface is graded so as to ensure surface water run-off falls toward a local low point. In order to prevent high concentrations of suspended solids entering existing groundwater ponds, intermediate unlined temporary surface water ponds are constructed to hold run-off and encourage settling out of suspended solids prior to discharge to groundwater ponds.

Temporary access ramps into and out of the active backfilling areas are generally constructed at a gradient of 1v:10h. Temporary side slopes are constructed at gradients no greater (steeper) than 1v:1.5h in order to ensure stability. On completion, final gradients across the restored site will be very shallow, generally no greater than 1v:15h, as indicated on Figure 2.14.

4.3 Bund Design

Given the inert nature of the materials being used to restore the site, no provision is made in the restoration scheme for construction of perimeter / containment bunds at the boundary of each restoration area.

4.4 Landfill Capacity and Lifespan

The estimated volume of material to be placed at the site is approximately 2,240,000m^3. Allowing for backfilling at a rate of approximately 550m^3 per day, equivalent to 151,250m^3 per year, the estimated lifespan of the facility is approximately 15 years. Recovery of construction and demolition waste will only continue as long as backfilling activities are undertaken at the site

4.5 Basal and Side Slope Liner Design

Given the inert nature of the materials being used to restore the site, no provision is made for installation of a basal liner or side slope liners at this facility, nor is any provision made for a drainage blanket at the base of the backfilled materials.

Groundwater ponds occur at a number of locations across the site. In order to minimise the impact of the site restoration on the groundwater table, these ponds are backfilled up to a design groundwater level using inert recovered construction and demolition waste (principally stones, concrete and brick). These materials are largely be of coarse granular (cobble and gravel) size, have a high porosity, holding groundwater in the intergranular pore space rather than displacing it (which would be the case for a fine grained fill material such as clay). The same materials also have high permeability and facilitate transmission of groundwater through and beneath the site.

4.6 Leachate Management System

Given the inert nature of the materials being used to restore the site, no provision is made for a leachate management system at this facility.

4.7 Landfill Gas Management System

Given the inert nature of the materials being used to restore the site, no provision is made for a leachate management system at this facility.

4.8 Capping and Restoration

The site will be restored on a phased basis to give a landform similar to that existed prior to extraction of sand and gravel. On completion, the final landform will be profiled to give a domed shape in order to facilitate surface water run-off into the in-situ sand and gravels along the site boundary, refer to final site contour map in Figure EMP4.

A cover layer comprising 150mm of topsoil and approximately 850mm of subsoil shall be placed over the inert backfilled materials on completion of each phase of restoration. This will be immediately planted with grass in order to promote stability and minimise soil erosion and dust generation. The lands will then be progressively returned to use as agricultural grassland.

Topsoil and subsoil will be imported to the site on a continual basis and shall not be used in the general backfilling of the site. The topsoil and subsoil shall be stockpiled pending re-use in the phased restoration of the site. They shall be stored separately within the site, away from the active backfilling area and in such location and manner as not to create any temporary adverse visual impact.

In the course of the fifth (and final) phase of the site restoration works, all mobile plant and equipment will be removed off site and any temporary site accommodation, infrastructure and services will be progressively removed off-site or decommissioned.

Wherever possible, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use in ongoing land restoration works. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

5 WASTE HANDLING AND EMPLACEMENT

Only inert, uncontaminated soils and construction and demolition waste, consistent with the European Waste Catalogue codes indicated in Section 2.6, is accepted at the site.

Inert materials are accepted at the site between 08.00 hours and 18.00hours each weekday and 08.00hours to 14.00hours on Saturday. No materials are accepted at any other time.

5.1 Backfilling / Landfilling Activities

Insofar as practicable, the source of each consignment of soil imported to site for backfilling purposes shall be identified in advance and subject to basic characterisation testing to confirm that soils at that location can be classified as inert. Limit values for inert soils shall be in accordance with those set by *Council Decision 2003/33 of 19 December 2002 establishing criteria for the acceptance of waste at landfills*. Ideally, characterisation testing should be undertaken by Clients and/or Contractor's forwarding soil to the site.

All inert soils imported to the site shall be unloaded (end-tipped) from trucks at the active backfilling face. It will be visually inspected by site personnel at that point to ensure that there is no intermixed non-hazardous or hazardous waste placed within it. Should there be any concern about the nature of the waste being end-tipped it will be segregated (if required), re-loaded onto the truck and directed to the waste inspection and quarantine area for closer inspection and classification. A detailed record will be kept of all such inspections. Should inspections and/or subsequent testing indicate that the materials are non-inert and cannot be accepted and used for restoration purposes at this site, they will be placed in skips and covered pending removal off-site by permitted waste collectors to a suitably licensed / permitted waste disposal or recovery facility.

In addition to the above, a representative sample shall be taken from one in every 200 loads of inert soil accepted at the facility and subjected to a less extensive scope of testing (compliance testing) focusing on key contaminant indicators. These data shall be used to confirm that the accepted soils are inert and comply with acceptance criteria. Compliance testing is undertaken by the Licensee.

5.2 Recovery Activities

It is envisaged that the processing and/or recovery of construction and demolition waste activities at the site will be restricted to stones, granular fill, concrete, blocks, bricks and ceramic tiles. Should any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) occur amongst the waste imported to site, it shall be separated out and temporarily stored in skips prior to removal off-site to appropriately licensed waste disposal or recovery facilities

All construction and demolition waste forwarded to the site for recovery purposes shall be pre-sorted at source and should be free of any non-hazardous / hazardous domestic, commercial or industrial wastes. Any consignments of construction and demolition waste which have such materials intermixed in them will be immediately rejected and removed off site.

6 RESTORATION AND AFTERCARE

The principal activity undertaken at the site is restoration of lands within a former gravel quarry. The site will be restored on a phased basis to give a landform which merges into the surrounding undulating pastoral landscape, refer to final site contour map in Figure EMP5. Details of the phasing plan are also provided on Figure EMP5.

On completion, the final landform will be profiled to give a domed shape in order to facilitate surface water run-off into the in-situ sand and gravels along the site boundary, refer to final site contour map in Figure EMP5. It will then be planted with grass in order to promote stability and minimise soil erosion and dust generation and the lands will be progressively returned to their former use as agricultural grassland.

All construction and demolition waste recovery activity shall cease in the course of the fifth (and final phase) of the site restoration works. All mobile plant and equipment will be removed off site and any temporary site accommodation, infrastructure and services will be progressively removed off-site or decommissioned.

Wherever possible, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to compliance testing to confirm the materials are acceptable for re-use in ongoing land restoration works. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

Following completion of the restoration and site decommissioning works, provision will be made for further, short-term (<1year) environmental monitoring of air, surface water and groundwater.

7 ENVIRONMENTAL CONTROLS

7.1 General

The ongoing restoration activities at the site require a number of environmental controls to eliminate or minimise the nuisance to the public arising from the importation, placement and compaction of inert soils, the importation and recovery of construction and demolition waste and export of processed materials from the site.

7.2 Bird Control

As the materials being placed or recovered at the site are free of putrescible (food / kitchen) waste, site activities are unlikely to attract scavenging birds such as gulls and crows for the duration of the restoration works. Accordingly, no specific bird control measures are implemented at the site.

In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately removed to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

7.3 Dust Control

In dry, windy weather conditions, the ongoing restoration and recovery activities may give rise to dust blows across, and possibly beyond the site. In order to control dust emissions, the following measures are implemented:-

(i) water from a tractor drawn bowser is sprayed on dry exposed soil surfaces (including unpaved road surfaces) as and when required;
(ii) the site is restored in a phased manner and each phase is grassed as soon as practicable after placement of cover soils in order to minimise soil erosion and potential dust emissions;
(iii) the area of bare or exposed soils is, insofar as practicable, kept to a minimum. Consideration is given to establishing temporary vegetation cover over temporary slopes pending final backfilling and restoration to original ground level.
(iv) all HGV's exiting the site are routed through a temporary wheelwash facility at the end of the paved internal access road (refer to Figure 2.2). This measure prevents transport of fines on both the paved access road and the public road network by HGVs exiting the site.
(v) Stockpiling of imported soils is minimized. Soils are ideally placed and compacted in-situ immediately after being unloaded. As and when temporary stockpiling of soils is required, they are placed as close as practicable to the centre of the site, away from nearby residences.

The amount of dust or fines carried onto the public road network is further reduced by periodic sweeping of the paved internal access road and the existing local road in front of the site.

7.4 Litter Control

As the materials being placed or recovered at this site are largely free of litter, the site restoration and recovery activities are unlikely to give rise to problems with windblown litter. Accordingly, no specific litter control measures are implemented at the site.

In the unlikely event that any litter waste is identified among imported materials, it shall be immediately removed to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

7.5 Odour Control

As the materials being placed or recovered at this site are not biodegradeable and do not therefore emit odourous gases, the site restoration and recovery activities will not give rise to odour nuisance. Accordingly, no specific odour control measures are implemented at the site.

In the unlikely event that any biodegradeable waste is identified among imported materials, it shall be immediately removed to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

7.6 Vermin Control

As the materials being placed or recovered at this site are free of putrescible (food / kitchen) waste, site activities are unlikely to attract vermin (rats) for the duration of the restoration works. Accordingly, no specific vermin control measures shall be implemented at the site.

In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately transferred to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

7.7 Fire Control

As the materials being placed or recovered at this site are free of flammable materials and biodegragdeable waste which could create a fire or explosion risk, site activities will not present a fire risk for the duration of the restoration works. Accordingly, no specific fire control measures shall be implemented at the site.

Notwithstanding this, the following operational practices are implemented in order to prevent fires at the site:

(i) smoking at the site and at the temporary site office is prohibited
(ii) any biodgradeable or flammable waste included in materials imported to site is immediately transferred to the waste quarantine area pending removal off-site to a licensed waste disposal or recovery facility
(iii) plant and equipment is removed if they exhibit signs of overheating etc.

In the unlikely event that a fire does occur, the local fire stations in Naas and/or Blessington will be contacted and emergency response procedures will be implemented. Fire extinguishers (water and foam) will be provided at the temporary site office to deal with any small outbreaks which may occur.

7.8 Road Mud Control

In order to prevent transport of mud and potential contaminants on internal and public roads, a temporary self-contained wheelwash facility is provided along the paved road leading out of the site, refer to the site infrastructure layout in Figure EMP3.

8 ENVIRONMENTAL MONITORING

8.1 General

The programme of environmental monitoring at the site complies with the requirements of the waste licence issued by the Environmental Protection Agency.

Environmental sampling, monitoring and testing will largely be undertaken by independent external consultants as required. Records of environmental monitoring and testing will be maintained on-site and will be forwarded to the EPA as required under the terms of the waste licence.

Monitoring locations are shown on Figure EMP5.

8.2 Dust Monitoring

Dust emissions from established restoration activities at the site are measured using Bergerhoff dust gauges at 3 No. locations across the site, shown on Figure EMP5. These gauges are located along the boundary of the site, close to the nearest sensitive receptors, all of which are private residential property.

The dust monitoring regime will remain in place for the duration of the site restoration works and will continue for a short aftercare period thereafter.

8.3 Ecological Monitoring

In the absence of any rare or vulnerable species of flora or fauna at, or in the immediate vicinity of the site, it is not intended to undertake any ecological monitoring during the site restoration works.

8.4 Groundwater Monitoring

Groundwater sampling and testing is undertaken by external consultants on a quarterly basis at 3 No. groundwater monitoring wells and 1 No. groundwater supply well installed within the site. Groundwater levels are also recorded on a quarterly basis. The location of existing groundwater monitoring wells is indicated in Figure EMP5.

Groundwater samples are currently tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail on these data is presented in Section 6 of the Environmental Impact Statement submitted with the Waste Licence Application.

The groundwater monitoring regime will remain in place for the duration of the site restoration works and for a short aftercare period thereafter.

8.5 Landfill Gas Monitoring

In the absence of biodegradable waste amongst the inert materials used to backfill and restore the site, no landfill gas can be generated and accordingly no provision has been made for landfill gas monitoring at this site.

8.6 Leachate Monitoring

In the absence of biodegradable waste amongst the inert materials used to backfill and restore the site, no leachate can be generated and accordingly no provision has been made for leachate monitoring at this site.

8.7 Meterological Monitoring

No meterological monitoring is undertaken at the site. Temperature, rainfall, sunshine, wind speed and direction are recorded at a nearby synoptic weather station in Naas, approximately 5km north-west of the site. Other climatic data is recorded at the weather station at Casement Aerodrome, approximately 15km north-northeast of the site. Representative meteorological data is acquired from weather stations at Naas and Casement Aerodrome, as and if required.

8.8 Noise Monitoring

Noise emissions from restoration and recovery activities are monitored on a quarterly basis (i.e. three monthly) basis at 3 No. noise sensitive sites along the boundary of the site, close to the nearest sensitive receptors, all of which are private residential property. The noise monitoring locations are indicated in Figure 5.

The noise monitoring regime will remain in place for the duration of the site restoration works and will continue for a short aftercare period thereafter.

Noise monitoring will be undertaken using a Larson Davis Model 824 Sound Level Meter, calibrated using a Larson Davies Acoustic Calibrator CAL 200 (or equivalent).

8.9 Odour Monitoring

As the materials being placed or recovered at this site are not biodegradeable and do not therefore emit odourous gases, the site restoration and recovery activities will not give rise to odour nuisance. Accordingly, no provision has been made for odour monitoring at this facility.

Site staff will report and record any odour emissions at the site in the highly unlikely event that a complaint is made about odours emanating from the site.

8.10 Surface Water Monitoring

Surface water sampling and testing is undertaken by external consultants on a quarterly basis (i.e. three monthly) basis at 3 No. locations at the site, one at the spring emergence near the north-eastern corner, another at the groundwater pond in the north-western corner of the site and another at the groundwater pond in the closed depression inside the western site boundary. The locations of the existing surface water monitoring stations are indicated on Figure 5.

Surface water samples are tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail on these data is presented in Section 6 of the Environmental Impact Statement submitted with the Waste Licence Application.

The surface water monitoring regime will remain in place for as long as these surface water bodies remain at the site (ie. until they are backfilled with inert materials).

8.11 Stability and Settlement Monitoring

On completion of each phase of restoration, a number of fixed stations are set into the ground surface across the restored area and surveyed annually in order to assess the magnitude of settlement and instability (lateral movement), if any, which subsequently arises.

Temporary slopes, both in natural in-situ soil along the perimeter of the former extraction area and in the restoration soils are visually inspected on an ongoing basis, at least once a month by site staff and a record is kept of same. Should these inspections give grounds for concern, an inspection of the affected area will be undertaken by a qualified geotechnical engineer and measures will be implemented to address any instability identified. A detailed visual inspection and stability assessment is undertaken on an annual basis by a qualified geotechnical engineer for as long as the facility remains operational.

Following completion of restoration works and closure of the facility, stability and settlement monitoring will be undertaken as required by the waste licence.

9 HEALTH AND SAFETY

Details of Health and Safety Procedures implemented during the site restoration works are contained in the Health and Safety Plan.

This plan is subject to ongoing development, revision and updating in the course of the restoration scheme. A copy of the Health and Safety Plan and any additions thereto is provided to all key staff and to sub-contractors. A copy is also available for inspection at the site office.

The Facility Manager is responsible for the on-site implementation of the Health and Safety Plan. Staff are fully briefed on the safety risks and responsibilities associated with ongoing restoration and recovery activities and shall attend relevant courses on landfill management and operations as required. The need for additional training is kept under review.

Safety meetings and briefings shall be held on site at regular intervals Particular attention is paid to the risks presented by

- moving plant and equipment
- working beneath overhead cables
- slope instability.

All site staff, sub-contractors and hauliers (either site-based or delivering materials to site) are issued with instructions to wear high visibility safety gear, helmets, steel cap boots etc. while on site. Where instructions are not obeyed, a written warning is sent to the relevant employee / sub-contractor / haulier. In the event of further breaches, the employee / sub-contractor / haulier is removed off site.

Site staff, sub-contractors and hauliers are issued with, or required to have, the following personal protective equipment

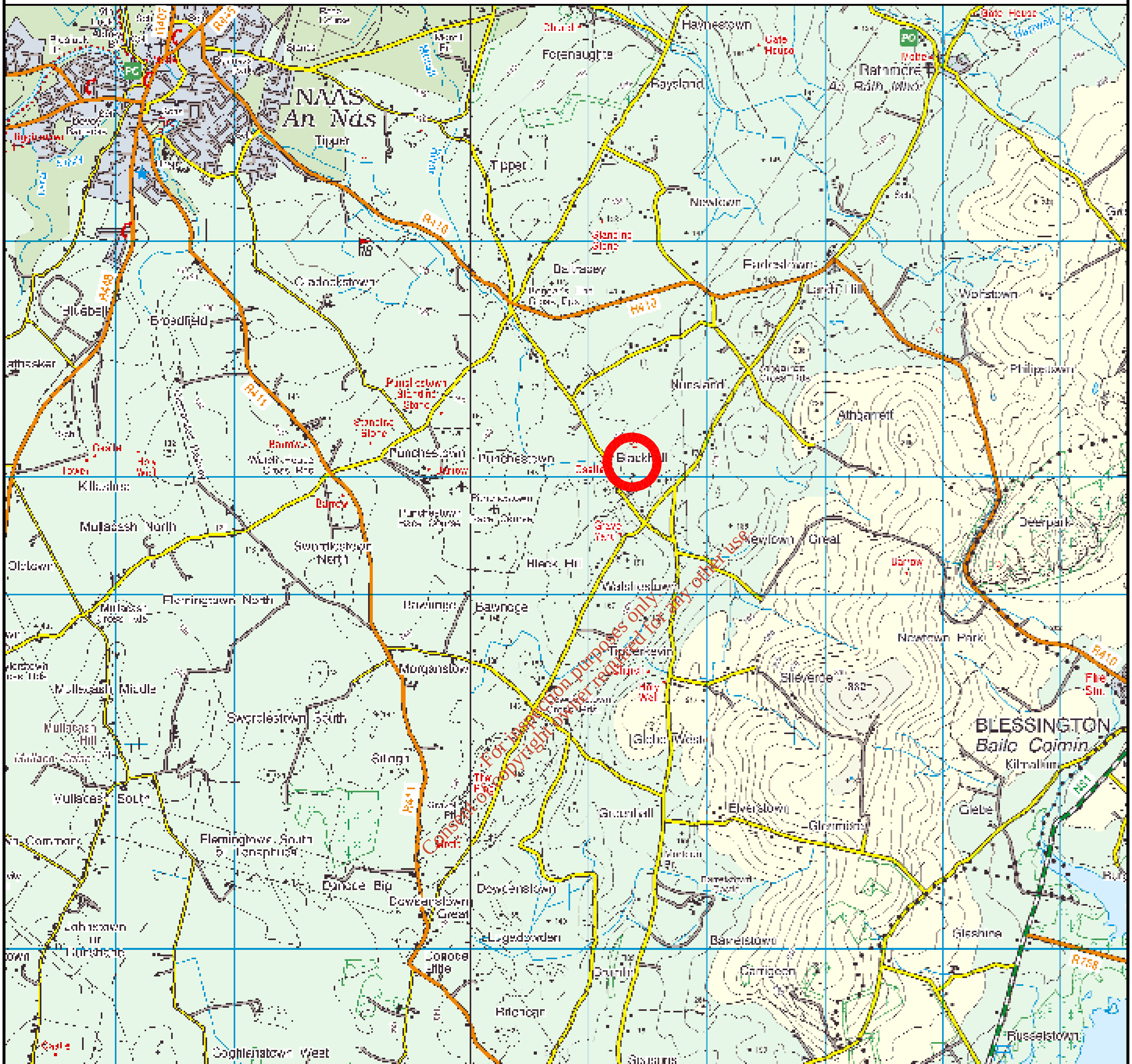
- High visibility vests
- Necessary safety boots with steel caps and soles – rubbers and leathers.
- Necessary safety hats (with anti-dust visors if necessary)
- Necessary coats / overalls
- Masks
- Goggles
- Wet Gear

In an emergency situation, the 999 emergency call-out number is used. A record book of accidents is maintained by the Facility Manager. In the event of an accident, a written report is prepared and forwarded to the relevant agencies as required by law.

A first aid box is provided on site at the temporary site office at the entrance to / egress from the site.

All personnel involved in the restoration activity are required to have injections for both Hepatitis and Tetanus.

FIGURES



Legend

Location of Site

Extract from 1:50,000 O.S. Discovery Series Map No. 56

1:50,000

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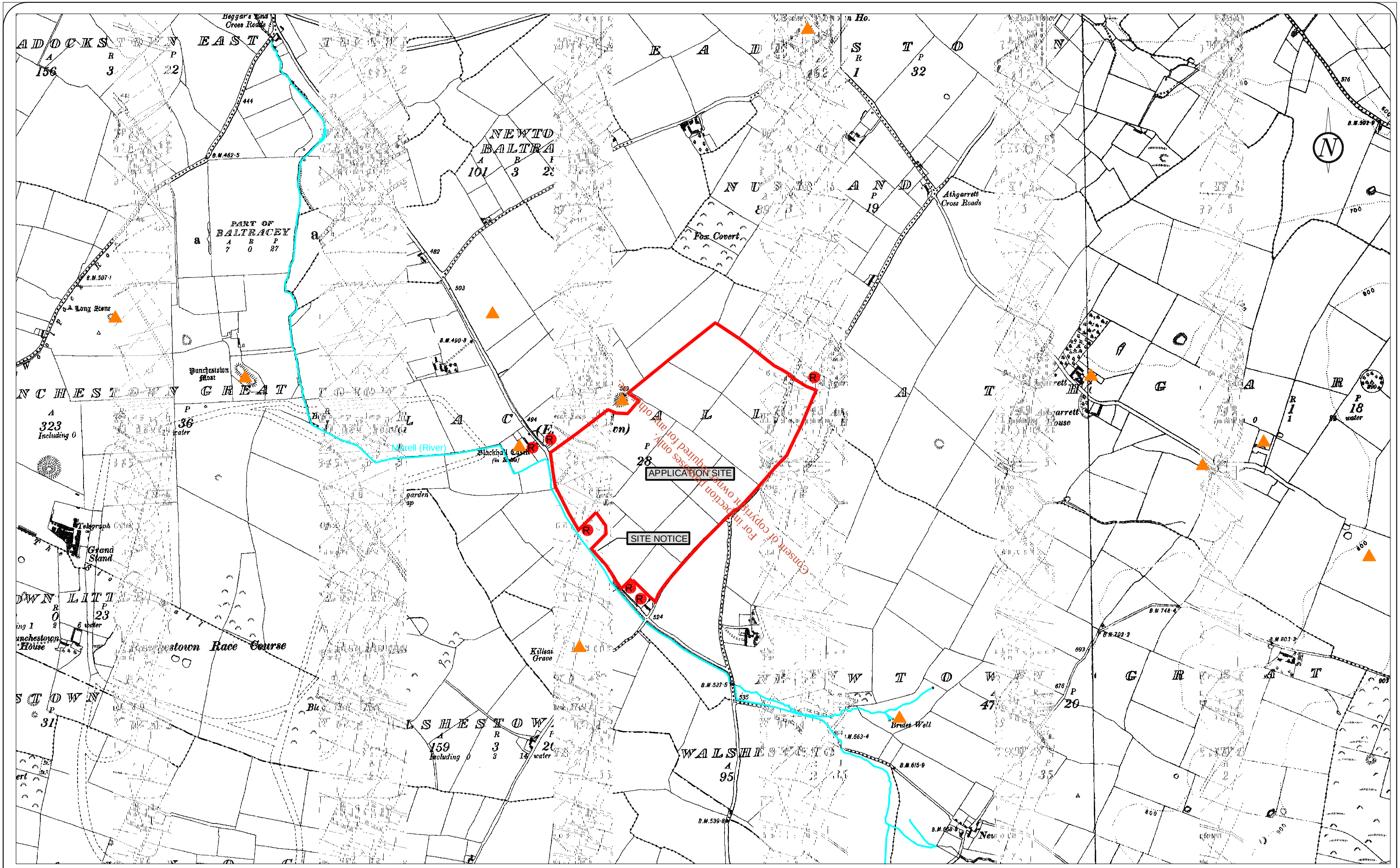
DUBLIN 14

Site:	LANDS AT BLACKHALL, CO. KILDARE
Title:	SITE LOCATION PLAN

Drawn: PM/MK	Scale: 1: 50,000	FIGURE EMP1
Job. No: 3746	Date: May 2008	



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NAAS, CO. KILDARE

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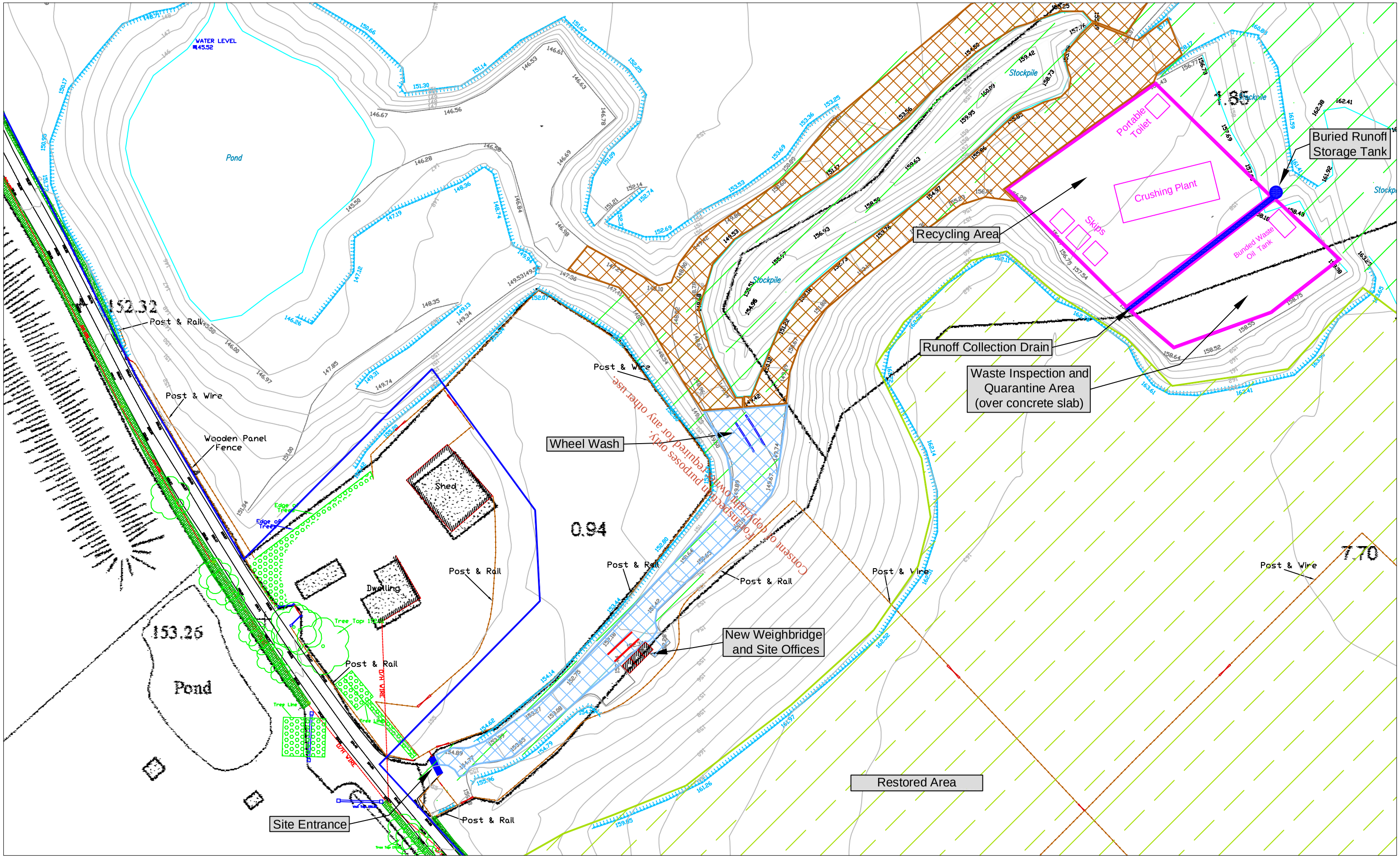
WINDY ARBOUR
DUBLIN 14

LEGEND & NOTES:
- Application Site
- R Residence
- Monuments & Listed Structures
- Watercourse

Rev.	Date	By	Description
1	FEB 08	MK	
0	FEB 08	LMC	

Site:	LANDS AT BLACKHALL, CO. KILDARE	
Project:	RESTORATION OF FORMER GRAVEL PIT	
Title:	LICENCE BOUNDARY	
Drawn: MK	Scale: 1:10,560	**FIGURE EMP2**
Job. No: 3746	Date: May 2008	



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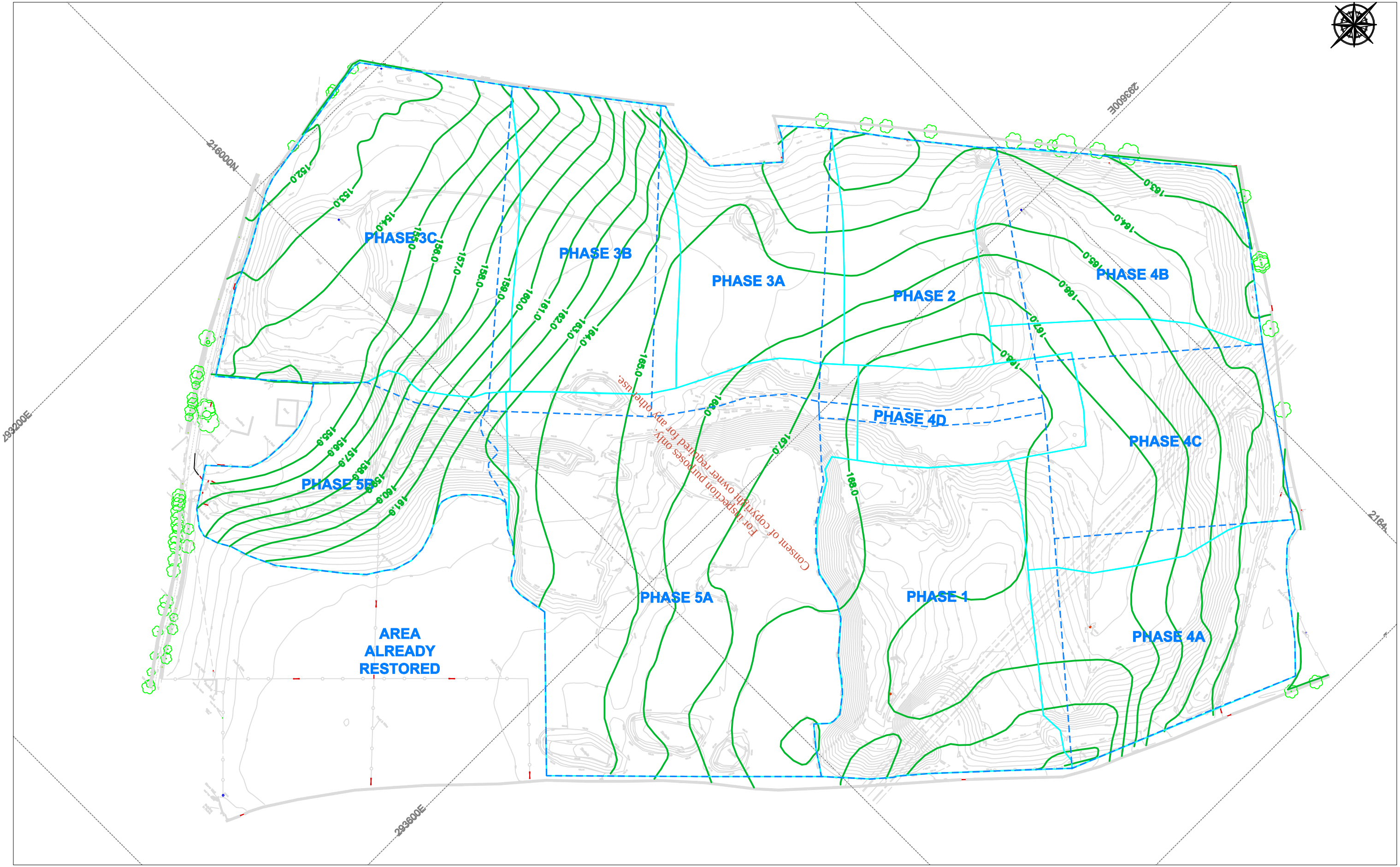
LEGEND & NOTES:
- Paved Access Track
- Unpaved Access Track
- Restored Area
- Hardstanding Area

Rev.	Date	By	Description
1	FEB 08	MK	
0	FEB 08	LMC	

Site:	LANDS AT BLACKHALL, CO. KILDARE	
Project:	RESTORATION OF FORMER GRAVEL PIT	
Title:	SITE INFRASTRUCTURE LAYOUT	
Drawn: MK	Scale: 1:1000	**FIGURE EMP3**
Job. No: 3746	Date: May 2008	



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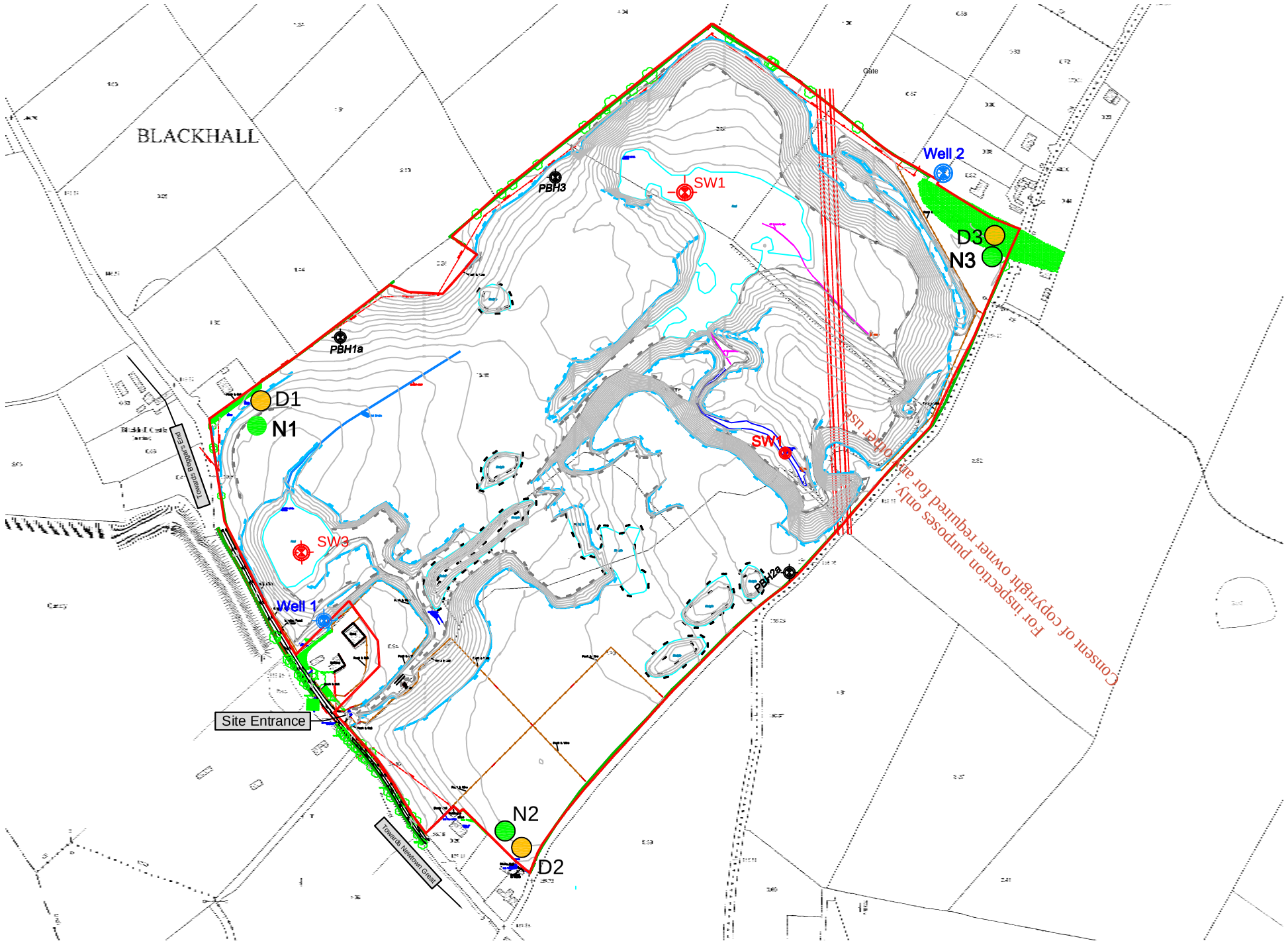
Key

- FILLING AREA
- RESTORATION AREA
- 167.0 RESTORATION CONTOURS

Rev.	Date	By	Description
2	FEB 2008	SLR/JC	TEXT CHANGES
1	FEB 2008	SLR/JC	REVISED VOLUMETRICS
0	JAN 2008	SLR/JC	VOLUMETRICS

Site:	LAND AT BLACKHALL, CO. KILDARE		
Project:	RESTORATION OF FORMER GRAVEL PIT		
Title:	RESTORATION SURFACE		
Drawn: SLR/403SW		Scale: 1:2500	**FIGURE EMP4**
Job. No: JBA/3746		Date: May 2008	



Legend

- Application Site
- Gateway
- Deciduous Tree
- Sewer Manhole and details
- Fence
- Building
- ESB/Eircom Pole and Cable
- Embankment
- Wall
- Trees
- Ditchline
- D3 Dust Monitoring Locations
- N3 Noise Monitoring Locations
- Surface Water Monitoring Locations
- Groundwater Monitoring Locations
- Groundwater Monitoring Locations

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LEGEND AND NOTES:

Rev.	Date	By	Description
1	FEB 08	MK	
0	FEB 08	LMC	

Site:	LANDS AT BLACKHALL, CO. KILDARE		
Project:	RESTORATION OF FORMER GRAVEL PIT		
Title:	ENVIRONMENTAL MONTORING LOCATIONS		
Drawn: MK		Scale: 1:5000	**FIGURE EMP5**
Job. No: 3746		Date: May 2008	

ATTACHMENT C3 – HOURS OF OPERATION

The proposed site restoration works comprising

(i) importation, placement and compaction of inert soils and stones and recycled construction and demolition waste and
(ii) recovery (crushing / screening) of inert construction and demolition waste

will extend from 08.00 hours to 18.00 hours each weekday (Monday to Friday) and from 08.00 hours to 14.00 hours on Saturday.

No restoration or recycling activities will be undertaken on Sunday or on Bank / Public Holidays.