

A black and white photograph of an industrial facility. In the foreground, a metal walkway with a grid pattern leads into the distance. To the right of the walkway is a railing made of vertical posts and horizontal bars. Above the railing, numerous large, white, curved pipes run horizontally across the frame. The background shows more of the industrial structure under a clear sky.

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Chapter 3

Description of Project

3. Description of the Project

3.1 The proposed residual waste treatment facility comprises a number of integrated built elements as shown in Figure 3.1.

3.2 These include:

- A weighbridge complex;
- A Mechanical and Biological Treatment (MBT) facility;
- A Refuse Derived Fuel (RDF) Bale Storage building;
- An Energy from Waste (EfW) Thermal Treatment facility;
- An Incinerator Bottom Ash (IBA) Treatment facility;
- An Administration/Visitor Centre; and
- Upgrading/widening of the Boghill Road and related junction improvements.

3.3 The application site area extends to 52.4 hectares.

3.4 The site has been designed to accept and treat up to 300,000 tonnes of waste in any given year, which will be split between both the MBT facility (capacity 300,000 tonnes) and EfW facility (estimated capacity 68MW_{TH}). For the year 2030, the expected first full year of operation, based on the assumed waste composition and projected waste tonnages the site is expected to accept and treat 241,319 tonnes of Authority Waste and 23,879 tonnes of Third Party Waste, giving a total of 265,198 tonnes. These are illustrative throughputs and compositions and the actual tonnage and composition may increase or decrease from these nominal volumes.

3.5 The majority of the Authority waste to be received at the facility will be classified as mixed Municipal waste under the European Waste Catalogue code 20 03 01. Other third party waste or other non-contract wastes delivered outside the long-term contract will only be non-hazardous wastes as listed in the PPC permit to be secured for the operation. Appendix 3.2 in the original ES of March 2014 provides a detailed list of the proposed EWC codes for completeness.

3.6 The site will be operational seven days a week however the majority of Authority Waste is expected to be delivered from 7am to 6pm Monday to Friday and 8am to 2pm Saturdays, with extended Saturday opening from 8am to 6pm for up to 12 Saturdays over the year. On occasion it will be necessary to deliver waste to the site outside of these hours when requested by the Authority, and this will be by prior arrangement with NIEA.

3.7 It is anticipated that there will be 94 full-time employees working on the site. As the site will be in operation for 24 hours a day, not all the staff will be on site at any one time. They shall be split between the following areas:

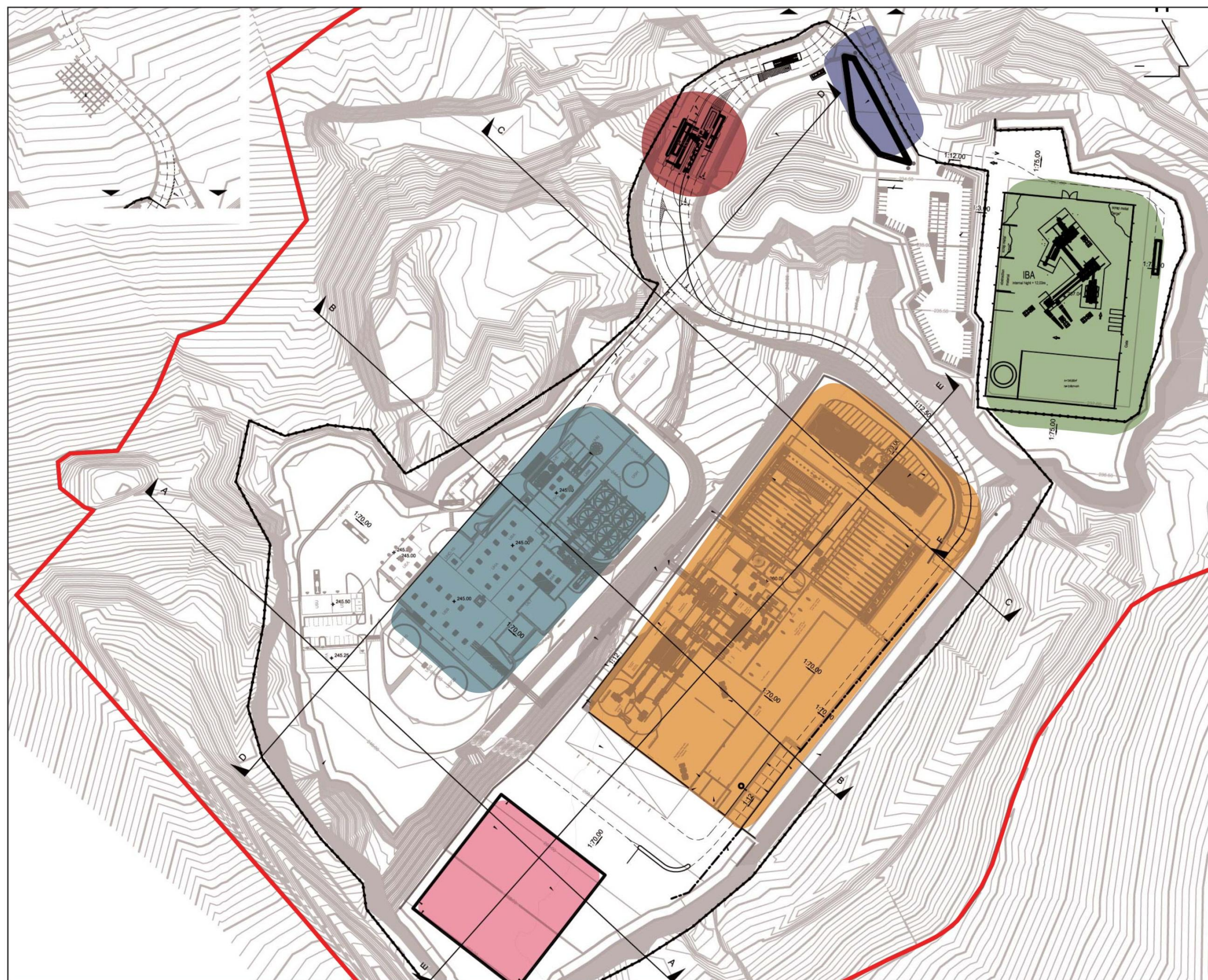
- MBT Facility – 36 staff;

- EfW Facility (including IBA Processing Facility) – 37 staff; and
 - Site Services (Visitor Centre, Administration, Weighbridge and Site Services) – 21 Staff.
- 3.8 The facilities will be capable of accepting all types of waste vehicles including bulked container heavy goods vehicles (HGVs), refuse collection vehicles (RCVs), street cleaning vehicles, bulky collection vehicles and light collection vehicles used in parks and amenities.
- 3.9 The site will also be capable of accepting all other vehicles which are used to transport materials to and from the facility such as bulk tankers, waste tankers and dump trucks.

- Hightown Quarry application site
- Weighbridge Complex
- Mechanical and Biological Treatment (MBT) facility
- Refuse Derived Fuel (RDF) Bale Storage building
- EfW Thermal Treatment facility
- Incinerator Bottom Ash (IBA) Treatment Facility
- Administration/Visitor Centre



Project: Residual Waste Treatment Project
 Client: Becon Consortium
 Title: Site Layout Plan
 Plan Number: Plan 3.1



- 3.10 All waste delivery vehicles will access the Hightown Site via the existing access road off the Boghill Road and will enter and exit the main site by passing through the weighbridge complex.

Weighbridge Complex

- 3.11 The weighbridge complex consists of three flush mounted weighbridges and a Weighbridge Building. Under normal operation, one weighbridge will be designated for inbound vehicles and one will be designated for outbound vehicles. The third weighbridge, which can operate as both an inbound and outbound weighbridge, will act as contingency should either of the weighbridges fail or a number of vehicles arrive at the weighbridge complex at any one time. There will be an additional weighbridge located at the IBA Treatment facility which will be operated from the Weighbridge Building.
- 3.12 The Weighbridge Building is approximately 18m x 4m. It consists of an office for the Weighbridge Operators (who manage and record all inbound and outbound vehicles) and a waiting area for the vehicle passengers who are not permitted to enter the site.
- 3.13 Upon entering the site, should a weighbridge operator or driver suspect that the waste being carried may cause fire at the MBT or EfW facilities, the waste vehicle will be directed to the smouldering load inspection area where its contents will be deposited onto the inspection area unloading point and examined.
- 3.14 All vehicle passengers visiting the site will be required to exit the vehicle at the inbound weighbridge and will be collected when the vehicle returns to the outbound weighbridge.



Fig 3.2 Weighbridge Complex at Indaver's Co. Meath EfW

- 3.15 The weighbridge complex will be open for vehicles during waste delivery hours as specified in earlier para 3.6. However, the Waste Authority may request for the weighbridge complex to open outside these hours by prior arrangement. The weighbridge will also act as first point of contact for all emergency services entering the site.
- 3.16 All vehicles entering or exiting the site will be directed over a weighbridge and will have their details logged by the Weighbridge Operators.
- 3.17 After being weighed, vehicles will be instructed to continue to their destination i.e. to the MBT or EfW.
- 3.18 The majority of the waste being delivered to the site will be discharged at the MBT Facility. Prior to leaving the site all vehicles will pass through the outbound weighbridge, where their weights will be recorded and they will receive a weighbridge ticket indicating all the recorded data. The Waste Delivery Vehicles will, if necessary, pass through the wheel-wash prior to leaving the site.

MBT Facility

- 3.19 The MBT facility has been designed to mechanically and biologically treat waste to separate out recyclable materials, rejects and prepared a Refuse Derived Fuel (RDF).
- 3.20 The MBT has a capacity to treat 300,000 tonnes of waste per annum.
- 3.21 For the year 2029/30, based on the assumed waste composition and project waste tonnages, the MBT facility is expected to accept and treat 241,319 tonnes of waste. Operational times will change throughout the year due to seasonal fluctuations of the waste tonnage.
- 3.22 There will be between 10-20 employees working in the MBT facility at any time during the day, including supervisors, machine operators, maintenance staff, manual hand pickers and general operatives.
- 3.23 There are two main elements to the MBT facility, the reception and pre-treatment area and the bio-drying tunnels. The two areas are connected by a recycle storage area for material awaiting collection for transport off-site.

Mechanical Treatment

- 3.24 The mechanical treatment area (shown overleaf at Fig 3.3) is designed to firstly separate the delivered waste into a number of different sized waste streams and to extract rejects and recyclable materials.



Fig 3.3 Overview of MBT Mechanical Treatment Area

- 3.25 Containing all the necessary mechanical process equipment, the reception and pre-treatment area is approximately 68m wide and 100m long with a maximum height of 18m primarily of steel construction with external walls formed from metal cladding panels.
- 3.26 Waste delivery vehicles will reverse through eight large access doors where they will enter a covered tipping hall whilst waste is being discharged. Management of vehicles in the MBT delivery yard area will be by means of a traffic light system to ensure only a single vehicle is manoeuvring in this area at any one time.



Fig 3.4 Example of MBT reception hall where waste is deposited from vehicles

- 3.27 The waste is deposited into a waste bunker located four metres below the tipping hall in what is referred to as the reception hall. The management of this area will be undertaken by the wheel loader operator. Within the reception (waste storage) area, the walls will be of reinforced concrete construction up to a height of 6m to allow for the storage of waste against these walls.



Fig 3.5 Example of waste bunker

- 3.28 Both the tipping hall and reception hall will be maintained under a slight negative air pressure and all delivery bays will be equipped with high speed doors and coupled with air curtain systems to minimise the venting of MBT emissions outside of the building.
- 3.29 The majority of waste to be processed through the MBT will be mixed Municipal waste. Rejects include materials in the waste which cannot be treated in the MBT, such as bulky waste and materials which are not permitted to be treated at the MBT.
- 3.30 The rejects will be placed into containers and will be transported to an appropriate licensed facility for disposal or treated in the EfW facility. Only rejects which are permitted to be treated in the EfW will be sent to it. Rejected items may include materials such as landfill rejects, tyres and Waste Electrical and Electronic Equipment (WEEE).
- 3.31 The equipment to be installed in the MBT will be capable of extracting a number of different types of material from the waste such as metals, paper, cardboard, plastics and textiles.
- 3.32 The MBT facility is largely an automatic process using conveyors to transport the waste. The mechanical treatment will consist of two treatment lines, which operate concurrently.
- 3.33 The feed hopper for each treatment line will be loaded using a Mobile Excavator equipped with a typical waste handling attachment.
- 3.34 The waste will be separated into different sized fractions using a Trommel, producing i) undersize, ii) midsize and iii) oversize waste streams.
- 3.35 The oversize material will be conveyed back to the reception hall where it will be shred and fed back into the hopper.
- 3.36 The remaining waste streams will pass through state of the art waste processing equipment to extract materials which can be sold as recyclable materials.
- 3.37 The equipment which will be used to separate and extract the materials includes metal separators, optical sorters and ballistic separators. There may also be number of manual handpicking stations to remove good quality recyclable materials and to undertake quality checking.
- 3.38 Extracted metals will be conveyed into skips which will be stored temporarily on site before being collected by metal recyclers. The paper, cardboard, plastic and textile materials that may be extracted will be conveyed to balers and afterwards temporarily stored in the recycle storage area prior to transportation to the reprocessor for recycling.



Fig 3.6 Example of baled plastic recyclate material extracted from waste

- 3.39 Following recyclate extraction the midsize fraction (now identified as RDF) will be fed directly to the EfW fuel bunker. This will be performed using an external conveyor linking both facilities which are covered and sealed to minimise odour discharge. The undersize material will be conveyed to the tunnel area where the bulk of the material will be biologically treated to decrease its moisture content.

Biological Treatment

- 3.40 This part of the MBT facility consists of 16 reinforced concrete tunnels arranged in two rows on either side of a central filling hall approximately 50m long and 18m wide. The roof comprises of steel trusses with a concrete suspended ceiling. Each tunnel is 33m long, 6m wide and 4.5m high (excluding the aeration floor).
- 3.41 The aeration floor, which is located under the tunnel chamber, consists of precast concrete slabs with conical holes.
- 3.42 The undersized material conveyed from the mechanical treatment area will be directed to a designated tunnel (changed daily) and will remain there for up to two weeks.
- 3.43 The material will be aerated and kept at a constant temperature using heat from the EfW to allow moisture to be extracted.

- 3.44 The air used as part of the bio-drying process will be recycled exhaust air from the reception and treatment halls. Following this bio-drying process, the exhaust air is chemically treated using an acid scrubber, housed in a steel portal structure approximately 15m long and 14m wide.
- 3.45 The exhaust air is then passed through a bio-filter structure (covering an area of approximately 62m x 14.5m, split into two bays either side of the scrubber), before releasing the cleaned exhaust air into the atmosphere.
- 3.46 Following the bio-drying process, the remaining material, now RDF, will be unloaded using a wheel loader, fed into a hopper and conveyed to the EfW fuel bunker.

Waste Bale Production

- 3.47 There is a need for the EfW facility to have a three-four week period of downtime during the year for essential maintenance work and servicing to be undertaken. This includes a single three week shutdown period during the summer months. During this period only Authority waste will be delivered to the site.
- 3.48 During the EfW downtime the operation of the MBT will change slightly to allow the production of RDF bales in the Reception Hall. The biological process will continue as normal during EfW shutdown and the RDF produced from this will be stored in the EfW fuel bunker.
- 3.49 An automatic baling and wrapping machine will be positioned in the Reception Hall to process midsized RDF, i.e. the material which does not undergo biological treatment. The estimated 6,000 tonnes of midsize RDF generated during this period equates to approximately 8,080 bales of RDF. The bales will be stored in the RDF Bale Storage building next to the Tipping Hall manoeuvring yard.
- 3.50 The RDF Bale Storage Building is an entirely closed structure approximately 77m by 70m, built primarily of steel construction with external walls formed from cladding.
- 3.51 The bales will be stored in stacks approximately 17m wide and 21m long with six rows per stack. Each stack will contain approximately 1,600 bales.



Fig 3.7 RDF Bale Storage in a facility adjacent to an EFW in Germany

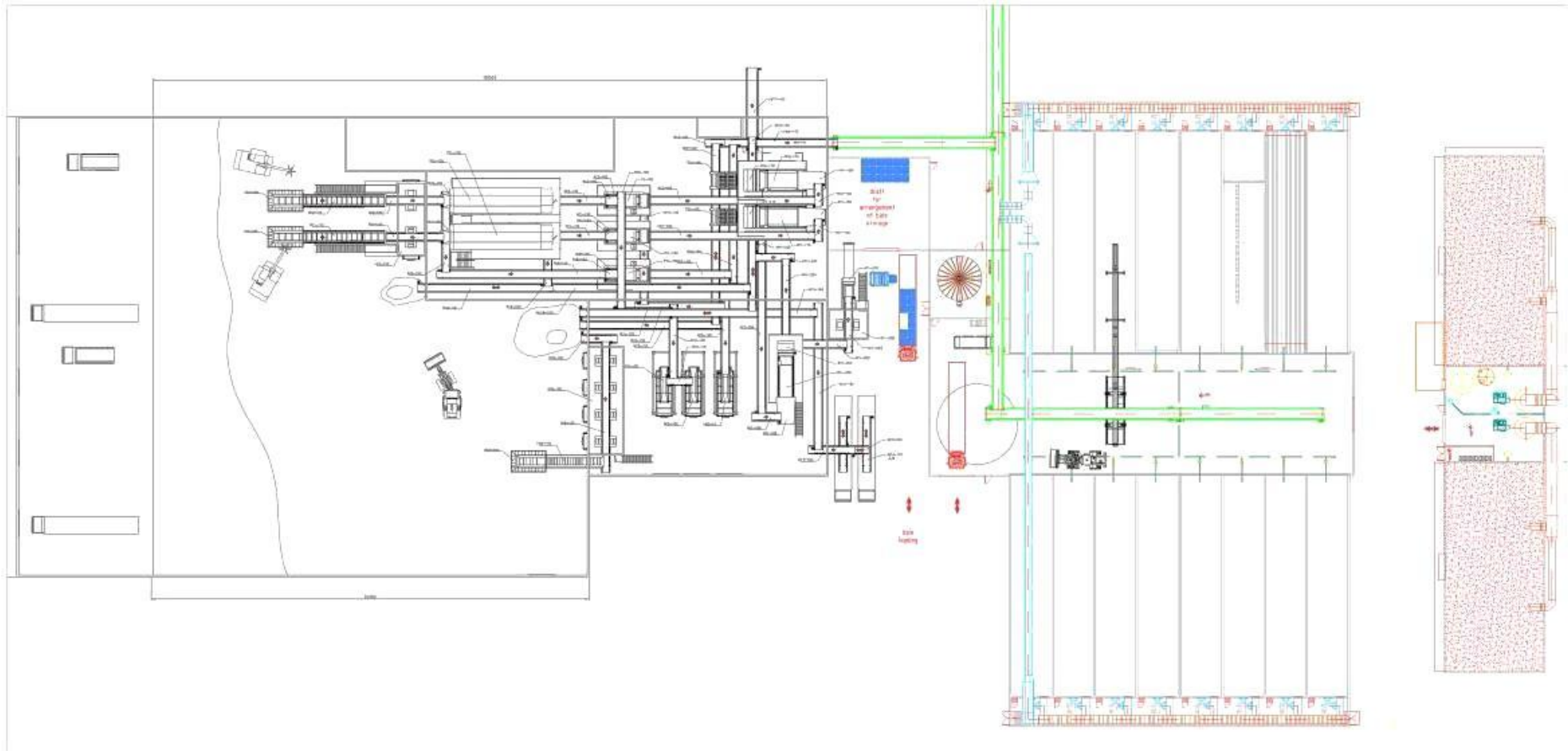
- 3.52 Storage space will be provided for six stacks to store approximately 9,000 bales in total. The stacks will be spaced over 5m apart to provide circulation and as fire mitigation. Fire hydrants will be provided to ensure all areas of the bale storage area are within 45m of a hydrant and can be served by at least two hose reels. All storage activities will be regulated through the IPPC permit.

- 3.53 The building will be fully enclosed and will be 14m at its highest point, with the overall building extending to some 5464 sq.m. Figure 3.7 above provides an indication of how waste bales are stored on other EFW sites.

- 3.54 The bales will be loaded onto a trailer using a forklift in the Reception Hall and transported to the Bale Storage Building where they will be stacked using a telescopic handler or similar equipment. All bales will be inspected prior to and after handling. In the event that a bale is damaged it will be transported back to the MBT Reception Hall for re-processing.

- 3.55 The Bale Storage Building will be filled during the EfW shutdown and then drawn down in the subsequent 3-4 months following the maintenance shutdown and baled waste recovered in the EfW in lieu of third party waste. In the unlikely event the the Bale Storage Building should become unavailable during the EfW downtime the mid-sized RDF will be sent offsite to another recovery facility or for disposal.

Fig 3.8 MBT Layout



Tipping Hall

Energy from Waste Facility

- 3.56 The Energy from Waste facility (EfW) is designed to thermally treat the Refuse Derived Fuel (RDF) produced in the MBT and third party waste, and to recover energy from the process through the generation of electricity and heat.



Fig 3.9 Indaver's Energy from Waste facility, Co. Meath

- 3.57 The facility will have a design thermal capacity of 68-70 MWTH and will export in excess of 100,000 MWh/year of electricity to the grid. For the year 2029/30, based on the assumed waste composition and projected waste tonnages, the EfW facility is expected to accept and treat approximately 220,000 tonnes.
- 3.58 The EfW will be in operation 24 hours a day and an average of approximately 8,800 hours a year, the only downtime will be for maintenance for 3 to 4 weeks in each year. There will be approximately 37 employees working in the EfW including supervisors, maintenance staff, crane operators and engineers.
- 3.59 The feedstock will be fed primarily from the MBT facility, although there will be some untreated third party waste discharged directly at the EfW.
- 3.60 The RDF produced in the MBT facility (midsize and undersized fraction) will be conveyed into the Fuel Bunker via a covered conveyor system.

- 3.61 Waste which is fed directly to the EfW (bypassing the MBT) will be discharged into the bunker in the Tipping Hall. The same monitoring and recording procedures will occur at the weighbridge complex for vehicles travelling to the EfW facility as for the MBT facility.



Fig 3.10 HGV reversing to waste bunker at Indaver's Co Meath EfW facility

- 3.62 The Tipping Hall will be maintained under negative pressure during operation, via the primary combustion air suction of the boiler, to minimise the venting of the bunker emissions outside the hall.
- 3.63 The waste discharged at the Tipping Hall will then be fed into the Fuel Bunker where it is mixed with the MBT RDF to produce a homogenised feedstock, which will be fed into the hopper using a crane.

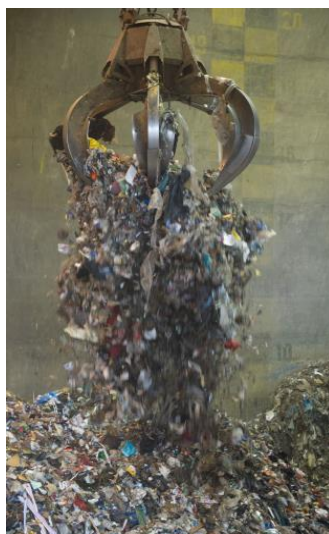


Fig 3.11 View of waste being mixed in the EfW bunker

- 3.64 From the hopper the waste is fed into a combustion chamber (incinerator) where it is burned at high temperatures (typically 850°C or higher). This process generates hot flue gases and releases heat energy. The heat from combustion is used to produce steam in a boiler.
- 3.65 This high-pressure steam then drives a turbine-generator, converting thermal energy into electricity.
- 3.66 Often EfW's also utilise combined heat and power (CHP) systems, supplying excess steam to district heating networks or industrial processes. The proposed facility at Mallusk will be designed to be capable of connecting to a district heating source should it become available in the future.
- 3.67 The Air Cooled Condenser will cool the expanded steam and return it as boiler water feed. The electricity generated in the EfW facility will supply power to the entire site and the excess power will be supplied to the national grid, . When the EfW is not generating electricity the site will obtain its power requirements exclusively from the grid.
- 3.68 The residue remaining on the grate following incineration, known as Incinerator Bottom Ash, will be cooled down and fed into the Bottom Ash Bunker.

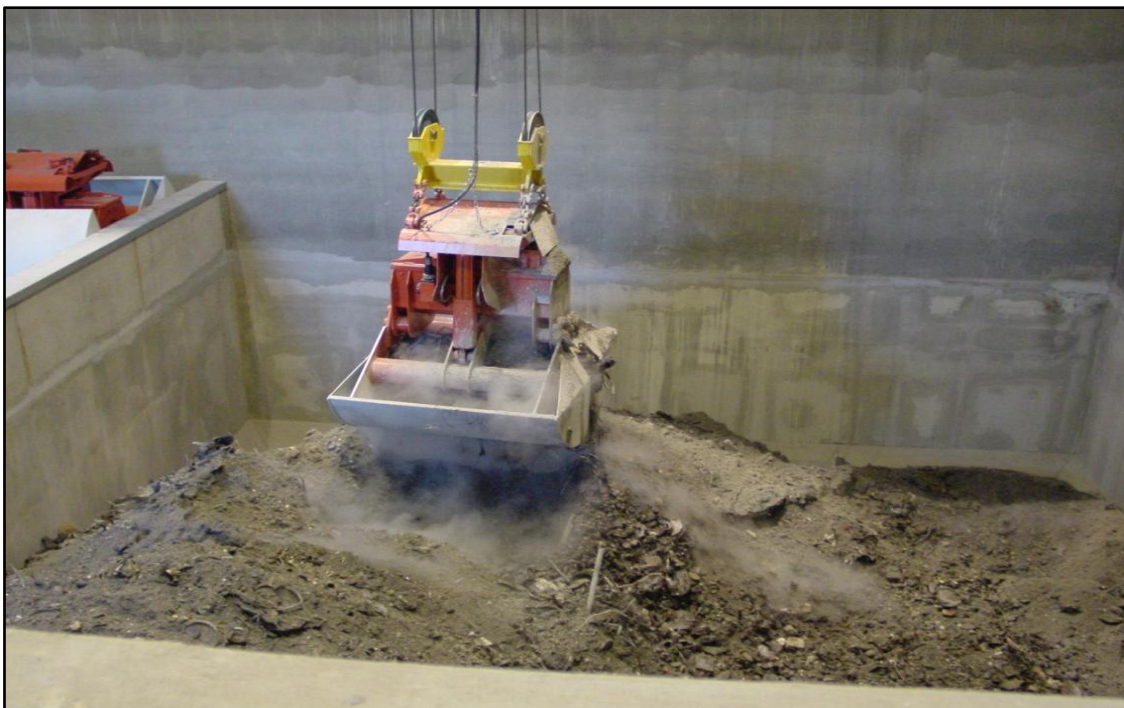


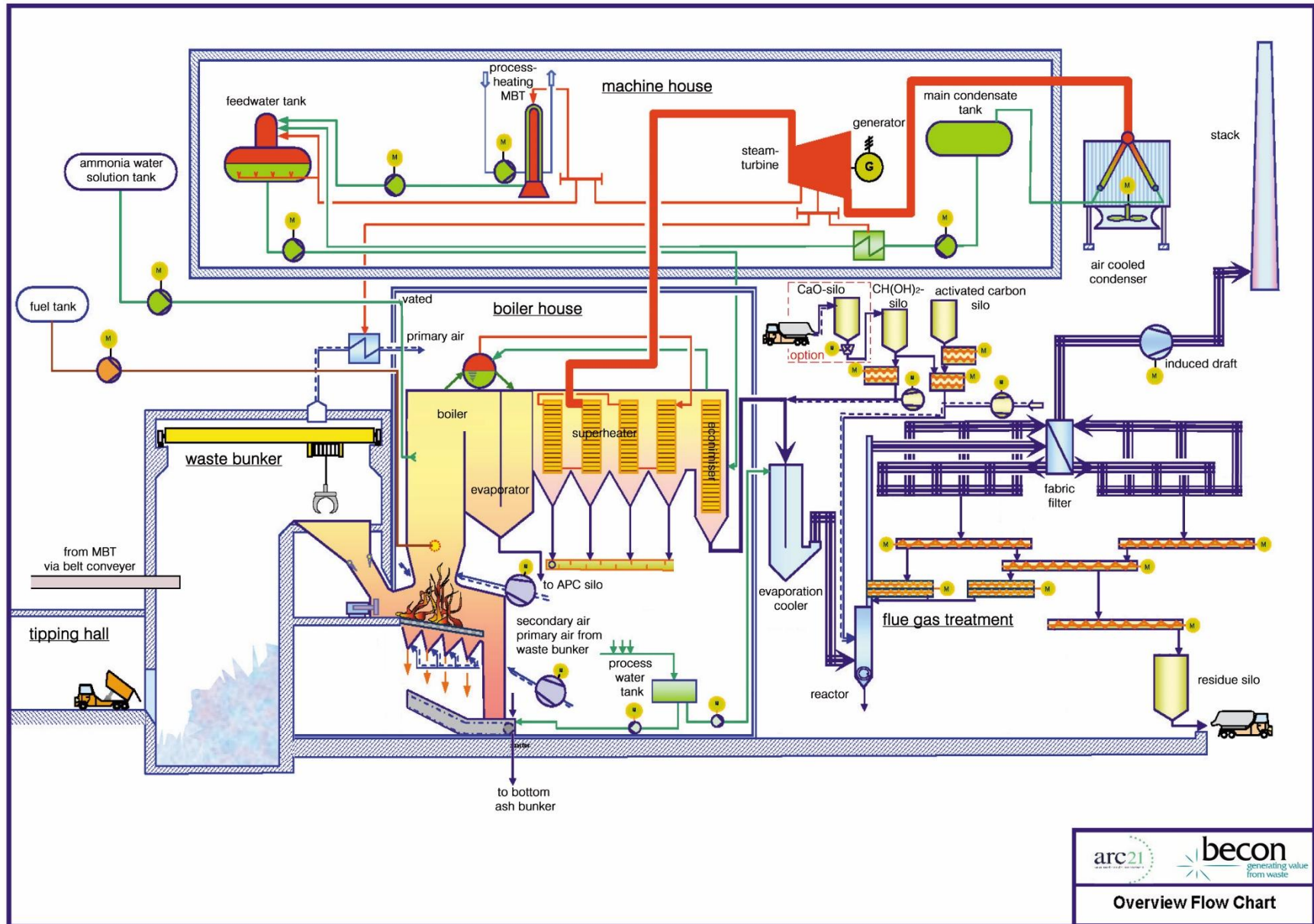
Fig 3.12 Bottom ash following quenching awaiting transportation to IBA plant

- 3.69 It will remain here until it has cooled before being transported to the IBA Processing Facility, where it will undergo initial maturation and processing to recover metals for re-smelting.

EfW Flue Gas Cleaning & Emission Control

- 3.70 The flue gases pass through a gas treatment system (filters, scrubbers, and catalytic converters) to remove pollutants such as: particulates, Heavy metals, Acid gases (HCl, SO₂), Dioxins and furans
- 3.71 The cleaned gas is then released through the chimney stack under strict environmental regulations applied by the NIEA through the IPPC licensing regime. . .
- 3.72 As a consequence of this chemical treatment an Air Pollution Control residue (APCr) will be generated (approximately 13,000 tonnes per annum), which will be classified as hazardous waste. This residue or 'fly ash' will be stored in an enclosed silo on-site before transportation off site. Irish Salt mine and Exploration (ISME) Company at Kilroot Carrickfergus operate a facility licensed to accept APCr for backfilling the excavated salt mines, replacing the need for virgin material. Indaver currently send APCr from their Co. Meath EfW facility to Kilroot and would envisage a similar arrangement from the Mallusk facility .

Fig 3.13 Typical EfW Process Overview



Incinerator Bottom Ash Processing Facility

- 3.73 The Incinerator Bottom Ash (IBA) Processing Facility is designed to treat the ash residue from the incineration process which is expected to be around 45,000-55,000 tonnes per annum and to separate out metals, unburned combustible materials and aggregate. The material which will remain following incineration will consist of:
- non-combustible material present in the original waste such as minerals, soil, glass, ceramics and other inerts, metals (ferrous and non-ferrous; Fe/NFe);
 - the ash content of combustible materials such as paper, wood, plastics (negligible ash content, if clean), etc.;
 - unburned combustible and organic material; and
 - up to 30% water content due to the quenching of the IBA in the bottom ash extraction system.
- 3.74 The facility will operate Monday to Friday from 7am to 7pm and will process all of the raw bottom ash from the EfW facility. The IBA will be transported from the EfW Ash Bunker using a vehicle which would typically have a capacity of 24 tonnes.
- 3.75 Each load of IBA leaving the EfW facility for the IBA Treatment facility will be weighed and details recorded at a single weighbridge located at the IBA Treatment facility.
- 3.76 Unburned combustible material extracted during the processing will be returned to the EfW waste bunker as required. The IBA facility will have 4 employees within the building to operate and maintain the equipment.



Fig 3.15 Example of an IBA Processing Facility without building enclosure

- 3.77 The IBA Treatment building will have an area of 110m by 70m and built primarily of steel construction with 4m high reinforced concrete push walls around its perimeter. The side of the building facing the Visitor Centre will be clad in metal panels to provide noise attenuation and the other three sides will be open above the push walls.
- 3.78 The treatment will focus mainly on the separation of the components of the IBA and to allow completion of the chemical reactions (hydration and carbonation) which begin during quenching of the IBA. The first step is maturation of the material for 4-6 weeks which takes place in the storage area in the IBA Treatment building.
- 3.79 Following initial maturation, the IBA material will undergo mechanical treatment to separate any metals and unburned combustible materials. The metals (3-10% of the total volume) will be sold to a metal reprocessor and the unburned combustible materials (0-3% of expected volume) will be fed back to the EfW for treatment. The mechanical separation will be completed using a separation systems such as a bar grate, conveyors, vibrating pan feeder, centrifugal vibrating screen, magnetic drum, overband magnets and a sorting cabin.
- 3.80 The aggregate from IBA is known as Incineration Bottom Ash Aggregate (IBAA) and is commonly used in the UK in various construction applications to replace virgin aggregate. Following processing this material is heterogenous and contains concrete, ceramics, glass, brick, clinker, some metals and fused material particles. It would be the intention to discuss the supply of IBAA with interested parties in the local construction sector to promote the reuse of this material, a practice which is in line with circular economy targets.

Visitor Centre, office and store buildings

- 3.81 The Visitor Centre has been designed to promote an educational appreciation of the environmental importance of reduce, reuse, recycle and recover in the context of an integrated waste management system.
- 3.82 The Visitor Centre will consist of a reception area, lecture hall and exhibition room which will accommodate up to 50 visitors at any time. Visitors will also have the option to travel by shuttle bus to the viewing galleries located in the MBT and EfW facilities. The centre is expected to receive up to 3,000 visitors per year during the first three years of operation.
- 3.83 The Visitor Centre will open from 10am to 5pm and by special arrangement outside these hours. Visitor Centre facilities will be available for use by the community and other groups by special arrangement. Two members of staff with support from the Administration team will manage the Visitor Centre.
- 3.84 The Visitor Centre building will also accommodate the administration staff for the Operations Company and the Waste Authority.
- 3.85 All employees and visitors entering the site will be required to park in the Main Site Car Park, adjacent to the Visitor Centre building. A shuttle bus will transfer staff to the EfW and MBT facilities.

- 3.86 An alternative pedestrian route, situated next to the site road way, will provide access to all parts of the site.
- 3.87 The Office/Store Buildings house the administration and maintenance staff. The welfare facilities for the EfW facility will also be located near the EfW facility buildings. There will be a small car park next to the maintenance office for commercial vehicles.

SuDS Detention Basin

- 3.88 A Sustainable Drainage Systems (SuDS) detention basin will be created as part of the site's proposed drainage measures. This feature will support mitigation of water environment impacts at the site.
- 3.89 It will provide an attractive landscaped setting at the entrance to the facilities and Visitor Centre. The design of the SuDS detention basin will allow water levels to be maintained at a minimum level at majority of times, but with the ability to allow water levels to rise during periods of high run-off. The area will be planted with native marginal and other aquatic planting.

Road Infrastructure – Widening and re-alignment of Boghill Road

- 3.90 In addition to the built development on the Hightown site there will be substantial road infrastructure improvements. This will comprise the upgrading of Boghill Road along its length from Hydepark Road to and beyond the existing site access road where this connects to Boghill Road, providing an enhancement in safety for vehicular movements to and from the site.
- 3.91 The junction of Boghill Road and Hydepark Road will be upgraded to provide improved visibility splays and radii to assist the turning of larger vehicles.



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Appendix 3.1

Outline Construction
Environment
Management Plan

	arc21 Residual Waste Treatment Facility	Issue: Final
	OUTLINE CONSTRUCTION AND MANAGEMENT PLAN	Date: April 2025

Outline Construction and Environmental Management Plan



	arc21 Residual Waste Treatment Facility	Issue: Final
	OUTLINE CONSTRUCTION AND MANAGEMENT PLAN	Date: April 2025

1. INTRODUCTION

The purpose of the Outline Construction and Environmental Management Plan (OCEMP) is to address the detailed procedures, sequencing and construction methodology anticipated by the Project Team engaged in the planning, liaison, and construction of the Project. The plan outlines proposals on traffic and environmental management and mitigation measures to be adopted during construction and provides supplementary information to the Environmental Statement on construction related issues.

It is also designed to be a live document which will eventually address how any planning conditions imposed on the project will be managed or discharged by the construction teams.

The OCEMP will be reviewed and updated on a minimum 6 monthly basis throughout the duration of the project until completion and all contractors shall comply with the document and subsequent revisions. The OCEMP may be reviewed earlier than every 6 months in response to a variation to capture any changes to Legislation and lessons learned during the course of the Works.

It is not to be confused with a Construction Phase (Health and Safety) Plan which will provide the Contractor with a mechanism to comply with its legal responsibilities when acting as Principal Contractor in respect to the Construction (Design & Management) Regulations 2016.

The OCEMP incorporates 3 main elements:

1. Background and description of the construction of the facility
2. Traffic management considerations
3. Environmental management considerations

	arc21 Residual Waste Treatment Facility	Issue: Final
	OUTLINE CONSTRUCTION AND MANAGEMENT PLAN	Date: April 2025

2. CONSTRUCTION OF THE FACILITY

2.1 Background

This Project is part of the integrated solution proposed in the arc21 Waste Management Plan and will contribute to the delivery of the Northern Ireland Waste Management Strategy and the statutory obligations established by the Waste & Contaminated Land (Northern Ireland) Order 1997 and the Northern Ireland Landfill allowance Scheme (NILAS)

The arc21 solution proposes that residual municipal waste will be delivered to a Mechanical Biological Treatment (MBT) facility where recyclable and re-usable material is recovered mechanically and the waste undergoes biological treatment. The remaining material can then be used as a 'fuel' for the Energy from Waste (EfW) facility to produce heat or electricity.

The technology will enable arc21 to manage waste from the region in an efficient manner, providing something useful from waste which was previously sent to landfill or shipped to various locations in Europe to be used in existing EfW plants.

2.2. Site location

The proposed site is located at Hightown Quarry, Ballyutoag, approximately 7.5km north-west of Belfast City Centre and 3km south-east of the existing Biffa Cottonmount Landfill at Mallusk. It is located within close proximity to Junction 4 of the M2, well known as the Sandyknowes junction.

The application site is located within the Antrim and Newtownabbey Borough Council area.

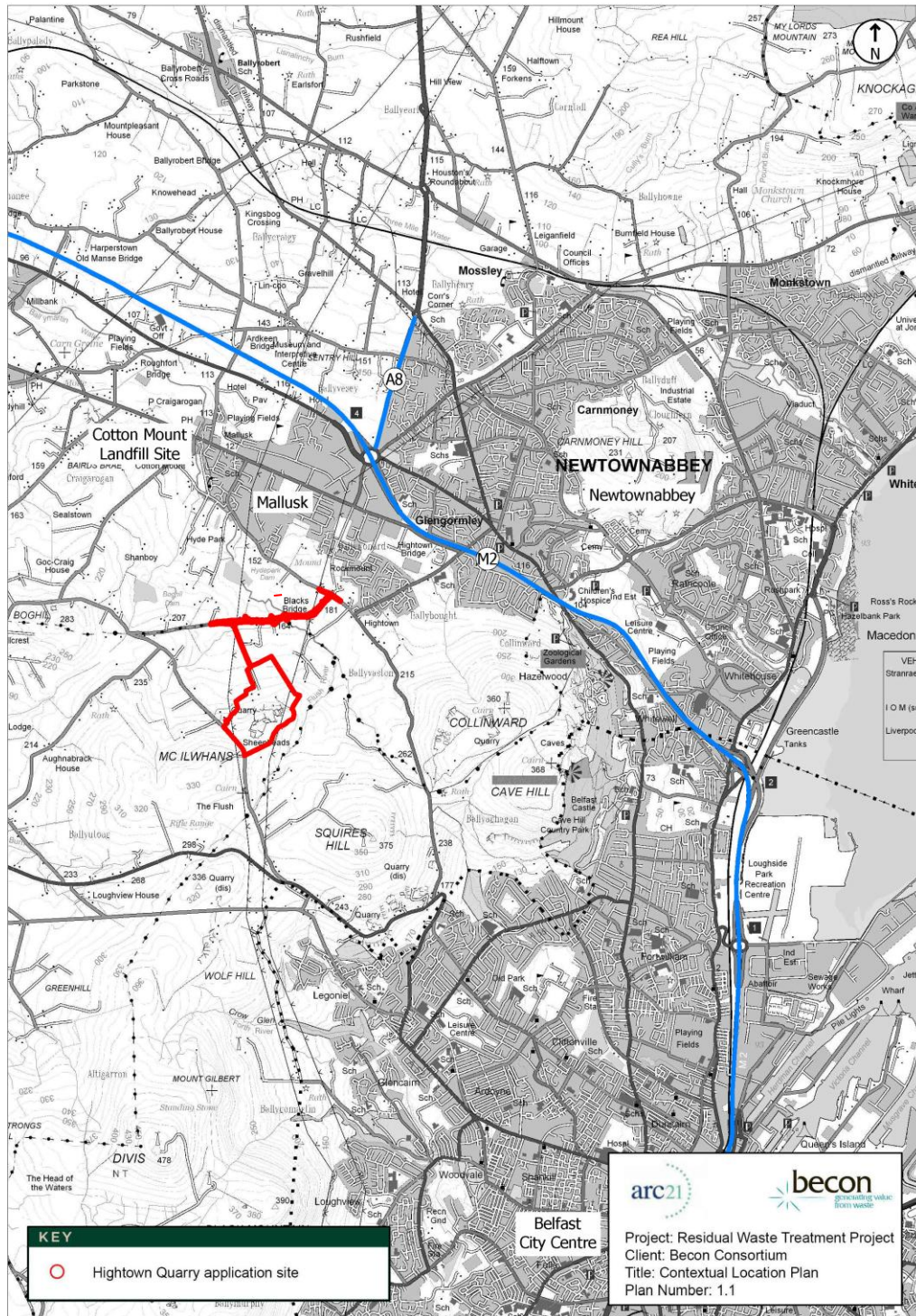


Figure 1 – Site Location

	arc21 Residual Waste Treatment Facility	Issue: Final
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2.3. Description of the site

Hightown has been an operational working quarry since 1965, with a small quarry evident on the 1967 geological survey plan.

The quarry has approximately 16 million tonnes of consented rock still in place that can be extracted. Approximately 5 million tonnes of rock have been extracted by Tarmac to date. Prior to Tarmac owning the quarry it was operated from 1965 by WJ Kane and it is estimated that 6.2 million tonnes of rock were extracted in this period.

Due to the previous site use as a quarry, the area is made up of a number of terraces ranging from 285 metres above Ordnance Datum (mAOD) at the highest terrace to 227mAOD at the bottom terrace.

The existing site itself is broadly segregated into an initial void area to the north and a second larger void to the south. The southern void is in-turn spilt along a north-east south-west line to create two terraces approximately 15m apart vertically with the higher terrace to the east. The southern void area is approximately 11m higher than the northern. The site is accessed from the north by a common access road and as such the three principal areas within the site essentially rise up in a series of steps.

2.4. The Facility

The main components of the proposed application includes the development of:

- Mechanical Biological Treatment Facility (MBT);
- Energy from Waste Facility (EfW);
- Incinerator Bottom Ash treatment facility (IBA);
- Visitors Centre (and Administration);
- Boghill Road Infrastructure Upgrades.

2.4.1 MBT

The MBT facility has been designed to mechanically and biologically treat waste to separate out recyclable materials, rejects and prepared a Refuse Derived Fuel (RDF).

2.4.2 EfW

The Energy from Waste facility (EfW) is designed to thermally treat the Refuse Derived Fuel (RDF) produced in the MBT and untreated waste, and to recover energy from the process through the generation of electricity.

	arc21 Residual Waste Treatment Facility	Issue: Final
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2.4.3 IBA

The Incinerator Bottom Ash Processing Facility is designed to treat the ash residue from the incineration process to separate out metals, unburned combustible materials and aggregate.

2.4.4 Visitors Centre

The Visitor Centre has been designed to promote an educational appreciation of the environmental importance of waste management and associated infrastructure.

2.4.5 Boghill Road

The Boghill Road is a rural road connecting HydePark Road in the east to Lylehill Road in the west. The road varies in width over its length ranging from just under 4m at localised pinch points to over 6.3m on the approach to the HydePark Road junction.

Like many other rural roads, Boghill Road does not appear to have been designed to any particular standard, it is more likely that it has developed over time and has been surfaced out to its current width. Generally the verges consist of earth banks with hedgerows on top and are of varying width. Large sections of the portion of the road under consideration are relatively straight however, so the limited verge width adversely affects forward visibility at discrete locations only.

Upgrade proposals include widening the Boghill road to 6-7m and introducing a pedestrian footpath from the junction with the HydePark road to the entrance to the site (a length of approximately 1200m). The works will improve both the horizontal and vertical alignment of this section of the Boghill road whilst keeping as close to the current alignment as possible and reducing land take.

Two bridge structures will also need to be upgraded / replaced to accommodate the new increased road width. The detailed proposals and construction methodology will be developed in consultation with Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland Environment Agency (NIEA) Water Management Unit (WMU) and Department for Infrastructure (DfI).

2.5 Project Details

2.5.1 Details of Client, Contractors and Consultants

To follow.

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2.5.2 Organisation Chart

To follow.

2.6. Programme

The Construction duration is expected to take approximately 41 months. Detailed construction programme to follow.

2.7 Working Hours

The construction hours will be from 7am to 7pm Monday to Friday, 7am to 1pm on Saturdays. No works will occur on Bank Holidays or Sundays unless prior approval sought from Antrim and Newtownabbey Borough Council.. There will be certain circumstances where the construction work will be required to take place outside of these hours. An example of this is during the period of construction for the EfW bunker structure and stair cores, when working hours will need to be extended to 24hours in order to carry out the slipforming construction method (which is dependent on 24hr concrete supply). This will be in intermittent concrete pours for durations of up to 7 continuous days over a 4 month period. The exact phasing and timescales for this work will be confirmed following detailed planning with the slipform specialist. In these cases the necessary approvals will be sought from the local council through the normal procedures and if required an Extended Hours Working Plan will be developed in Consultation with Antrim and Newtownabbey Borough Council.

2.8 Pre-Start Survey

A Pre-Start Survey of the works will be carried out prior to construction works commencing. This will consist of a photographic aided report on the existing environment including; existing structures, boundaries, foot paths, roads, access points, fences lines, walls, buildings (inside & out), hedge lines, kerb lines, lighting columns, street furniture and road signs. The findings of the survey will be documented and stored within the project offices.

2.9 Construction site compound and accommodation, welfare and storage

Main Project offices will be established in the area to the east of the access road, just past the existing weighbridge complex, with small satellite offices at both the MBT and EfW sites to be used by engineers for storing drawings, setting out equipment etc. Remote welfare facilities will be provided for operatives on the main sites.

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The main office area will be used by the client and contractors with necessary accommodation also made available for the Authority and its representatives. Whilst each party may have a standalone office building, they will be positioned adjacent to each other for ease of communication, co-ordination and for holding project meetings.

Car parking will also be a shared facility, however, areas may be designated for individual parties, depending on their needs and staff numbers. Construction phase parking will utilise the area designated for the permanent visitors centre car park. Temporary accommodation and storage compounds will make use of the available space outside this parking area to allow permanent works to be completed without disruption to the temporary facilities.

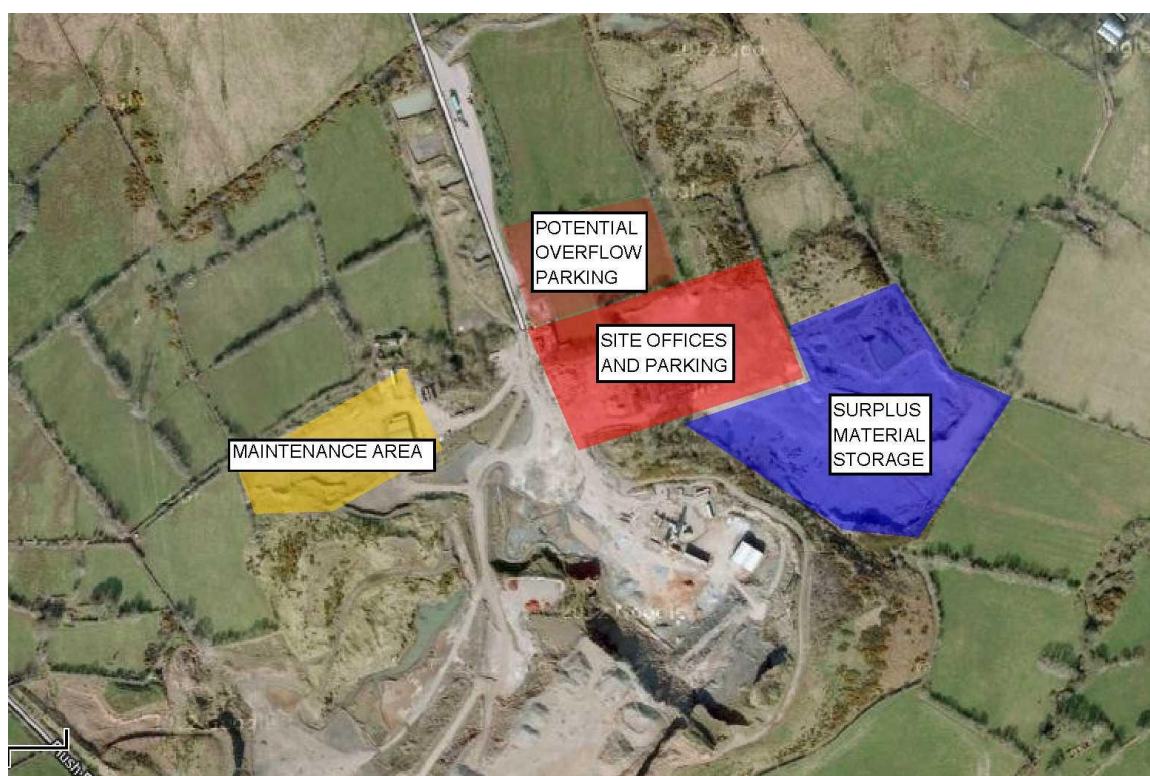


Figure 2 – Construction Compound and Offices Location

2.9.1 Accommodation

Site offices will be constructed from modular anti-vandal containers and may be stacked two tiers high to reduce the overall footprint. It is envisaged that individual office accommodation blocks will be constructed for the contractors. The Becon Consortium and Arc21 will also have their site offices within these.

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There will be conference rooms for project meetings and additional meeting spaces within the respective contractors' offices for low level meetings.

The offices shall be provided with a metered mains power supply. Construction stage sewage provision will be via mobile toilet units and temporary sinks and showers that will be regularly emptied.

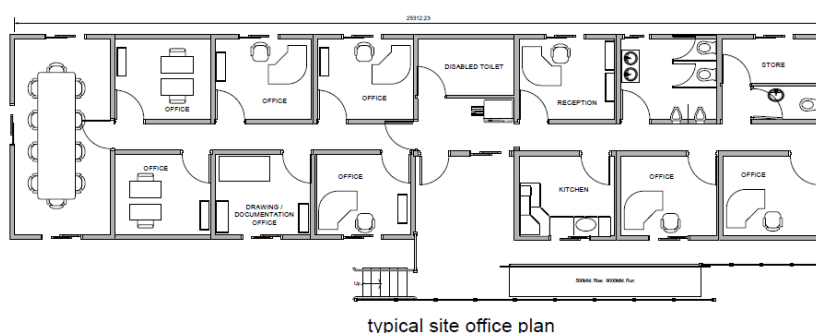


Figure 3 - Typical office layout

2.9.2 Welfare Facilities

The main offices will have integrated welfare facilities including male and female toilets, disabled WC, and kitchen facilities for staff. Showering facilities will be available. There may also be the potential for a communal catered canteen, which would be provided and operated by a third party. Operative welfare facilities including drying rooms and locker rooms will be provided.

Mobile welfare units or toilet blocks will also be positioned in designated areas on the main site for convenience. The welfare facilities on site will vary according to the workforce on site but will be provided in line with CDM(2016) regulations.

2.9.3 Storage Compound

Combined site office and storage areas are shown in Figure 2. This area will contain the main hub offices and provide storage for small or fragile materials away from the main site. The compound will be fenced and gated and have perimeter security lighting. Waste management and fuel storage areas will be located within the compound.

Laydown areas have been identified on the main site for the Principal Contractor.

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2.10. Construction of the Facilities

The construction and commissioning of the facility will take place over a 41 month period

2.10.1 Treatment to the existing Quarry face.

It is expected that the perimeter quarry face will be prepared for construction of the proposed facility by the quarry operator prior to possession of the site.

The quarry rockface has been surveyed and recommendations have been received for stabilisation works to remove overhanging or loose materials and reposition overburden to improve the overall stability of the slopes. For example, the stabilisation works may entail limited areas of rock nailing and trimming and there is a potential for reprofiling by blasting. A rock trench structure or a spoil bund may be constructed at the base of the quarry rockface to provide additional protection from falling rocks during the construction and operational phases of the Project.

All necessary works will be subject to detailed design and installation prior to commencement of the project construction phase.

2.10.2 Site Set-up

Initially offices and storage containers will be transported to the site to provide accommodation and welfare in advance of the works commencing.

Plant will be transported to site to prepare the area for the construction compound and to excavate trenches for the installation of services. Modular office units will arrive on site on articulated lorries and be positioned using lorry mounted crane or a mobile crane.

Storage compounds, lighting, security fencing etc will follow.

Offices and plant to carry out the enabling works will be moved on to site prior to major works commencing on the Boghill Road.

2.10.3 Existing Structures and Buildings

There are a number of small existing structures on the site, some of which will be taken away or demolished, whilst others will be left for use during the construction and permanent works. Structures to be removed/retained on site include:

- Substation / switchroom – this will be retained during the construction phase to provide power to the site offices and compound area.
 - Water borehole / pumphouse – this will be retained to provide a water supply during the early construction phase.
-

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- Weighbridge complex / wheelwash – this will be utilised during the construction phase for site access control and vehicle washing where required. This will be decommissioned and removed on completion of construction works.
- Store Rooms / Workshop – to be retained and utilised during the construction phase for contractor maintenance works.
- Storage sheds – the large storage sheds adjacent to the former asphalt plant will be removed to accommodate the IBA treatment plant.
- Aggregate bunkers – these structures will also be removed to allow construction of the IBA treatment plant.
- Above ground fuel storage tanks and bunds – to be removed by Tarmac prior to construction commencement.
- Derelict farm buildings – the stone farm buildings to the west of the weighbridge area, and north of the existing workshop will not be impacted by the development and will be retained. These also serve as potential bat roosts.

All other minor structures and temporary accommodation will be removed by Tarmac prior to site possession. No underground storage tanks are known to exist on the site.

2.10.4 Enabling Works

Enabling works will involve preparing the site for the construction of the MBT and EfW facility by the formation of two distinct platforms which make use of the existing terracing within the site. During this enabling works phase, some 200,000m³ of rock will be excavated and placed within the site. Rock drilling, blasting and processing will take place as part of this activity.

Perhaps the most significant element of the enabling works will be the removal of the protruding section of the south-east rock face. This is required to create the necessary platform width for the MBT facility and will be removed by blasting. The volume of rock generated will be hauled and placed to fill the void to the south-west of the MBT platform

1. The majority of the MBT facility will sit on the upper quarry platform at a level of +260mAOD, which is approximately 1m below the current platform level. Excavated material generated from lowering the platform will be placed to the south-east of the platform to form the upper delivery yard and unloading hall at +264m.

There will be a nett surplus of material from the MBT platform enabling works which will be hauled and placed in the visitors centre and car park area, raising this by approximately 1m above the existing level.

The EfW facility will sit at the lower quarry platform at a level of +245mAOD. The current platform will be extended in a south-east direction to create the necessary space for the EfW footprint. This will involve the excavation of an existing 'intermediate' platform

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and the material generated will be used to raise the EfW platform slightly to the finished level of +245mAOD and help to balance the cut and fill volumes.

The IBA treatment plant area will require further earthworks and potential blasting to prepare the platform for construction. This area currently rises up to the south-east by approximately 10m above the existing platform level, where it becomes a near vertical quarry face. Reducing this to a level platform will produce additional surplus material to be transported and stored on site

Modelling of the cut and fill volumes has shown a surplus of rock fill material will be left over following the enabling works. Exact quantities are sensitive to the bulking factor between in-situ rock and processed, placed and compacted engineered fill, however the volume is expected to be in the order of 30,000m³.

As works progress, this volume will become more defined. Temporary storage areas will be required for the material until the earthworks have been completed, after which some material may be used for bunding, screening, landscaping or exported from site for use as fill material elsewhere. The area to the south-west of the MBT platform may be used for temporary storage as no development is to take place in this area.

Material from the quarry will also be processed and utilised to construct the Boghill Road upgrade, further reducing the expected surplus volume.

2.10.5 Boghill Road Upgrade Works

As part of the development proposals, the Boghill Road will be upgraded to a 6-7m carriageway width with increased capacity and width to accommodate the anticipated traffic to the Hightown Quarry site. The road will be realigned in the horizontal and vertical aspects to improve drainage, forward visibility and gradients. The junction with Hydepark Road will be enhanced to provide enhanced visibility splays and turning space for vehicles. This work will be phased to be undertaken during the enabling period of the works (see section 3 – Traffic Management for more details).

2.10.5.1 Bridges

In order to accommodate the increased road width and alignment modifications, the two existing bridging structures will have to be replaced ('Black's Bridge' and the bridge overarching a tributary to the Flush River).

The existing Black's Bridge will be carefully deconstructed and replaced with a precast flexi-arch structure.

A working platform will be erected below the arch during removal to ensure that debris does not enter the waterway. The platform will be equipped with toe-boards

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and a liner to prevent small debris falling between boards. Debris will be removed regularly and taken directly to the main site for re-processing.

With the existing bridge removed, spread foundations for the new structure will be formed in reinforced concrete. This is likely to require the construction of in-situ reinforced concrete bank seats to support the arch structure. These will be located outside the channel and set back from the riparian zone in order to mitigate any impact on the waterway. In order to prevent any potential cement wash from the wet concrete entering the waterway, a cut off trench will be dug between the foundation and the waterway to contain any run-off.

With the bank seats in place and cured, the precast arch elements will be delivered to site and lifted into position using a mobile crane. The arch units are self-supporting and will not require any temporary works within the waterway. The units will be positioned in a single day, following which they can be backfilled and the road constructed over.



Figure 4 - Flexi-arch construction over a Waterway

The existing tributary to the Flush River follows a very meandering path where it crosses beneath the existing road. The intention would be to take this opportunity to improve the waterway alignment in this localised area by facilitating a more perpendicular path below the road.

A flexi-arch similar to that proposed for Black's Bridge will also be used.

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The construction will be similar to Black's Bridge , however a new channel will have to be excavated along the proposed realignment. Scour protection measures such as gabion mattresses will be placed in the bed of the new channel. The channel will stop short of tying into the existing waterway throughout construction of the new bridge. When construction is complete, the existing waterway will be diverted into the new channel and the existing channel filled and reinstated. There is also opportunity to translocate some of the bankside vegetation to the new realigned channel.

Separate detailed method statements and risk assessments will be produced for these bridges in advance of construction, and in consultation with DAERA Pollution Prevention Team within the Water Management Unit (WMU) at NIEA. Any comments from the consultation will be addressed in the final method statement prior to works commencing. All precautionary measures will be in place to reduce the risk of pollution including:

- Dry periods will be selected for groundworks and the new channel opening.
- Water monitoring during the works
- Scour protection to the newly excavated channel.
- Silt mats and oil booms downstream of the works
- Silt fencing along the banks of the live waterway
- Selection of well-maintained plant and daily plant inspections to check for leaks or damage
- Removal of any excavated material from the area to prevent washing into the waterway.

2.10.9 Roads and Drainage

2.10.9.1 Construction Phase Considerations

External pavements will be formed from a combination of bituminous and reinforced concrete surfacing. In the main the site's road network will receive a bituminous make up while harder wearing areas and yards will be surfaced using jointed reinforced concrete hardstandings.

General collection of rainwater across the site roads and hardstandings is via traditional trapped gullies and linear channel drains. Surface water drainage will flow to the proposed attenuation basin and via petrol/oil separator tanks. Only roof and external surface water run-off will enter the storm drainage system.

Any leachate from the waste within the buildings will be diverted to process water tanks and recirculated back into the treatment process. In the MBT facility, surplus process water will be sprayed onto the organic waste within the biodrying tunnels.

Within the EfW facility, leachate from the waste bunker will be collected in a sump and pumped back over the waste. This moisture will evaporate during combustion.

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Building floor drainage within EfW will be piped to the bottom ash water basin, and will be taken up during the cooling and hydration of the bottom ash as it comes off the grate.

Foul sewage collected from the MBT, EfW and visitors centre will be treated close to source (within the main site) by a site package treatment plant with treated effluent being piped separately from storm drainage along new pipework to be laid along the length of the site access road to a discharge point agreed with NIEA near Boghill Road.

The NIEA water quality sampling point will be located immediately downstream of the new package treatment plant. A further pollution risk mitigation measure has been included in the design that includes the provision of monitoring equipment to assess the quality of discharge from the package treatment plant. In the unlikely event of discharge failing to meet the required limits, the flow will be diverted to a separate storage tank which will include four days storage, and will require emptying after it has intercepted any non-compliant treated effluent. This storage tank and system will provide time for maintenance of the package treatment plant to resolve a potential issue causing water quality issues that may not satisfy the specified limits as set by NIEA.

During the construction phase and before this foul sewage system including package treatment plant is installed and operational, foul sewage from the temporary welfare facilities will be collected and stored locally and emptied on a regular basis via a tanker, and disposed offsite.

A single attenuation basin incorporating flow control has been proposed and will be required to limit the discharge to the nearby watercourse to the flow rate permitted by DfI Rivers in accordance with sustainable drainage (SuDS) principles. The flows from the attenuation basin will discharge into the same tributary of the Flush River that the previous site surface water flows connected to. Monitoring of the storm drainage system will be undertaken by the operator on a quarterly basis in line with the Discharge Consent from DAERA. The maintenance of the SuDS basin (including penstock) will be incorporated into the operational maintenance plan. This penstock valve will enable closure of the outfall in the potential event of an accidental spillage of contaminant occurring on the site. This element of the drainage system will form part of the pollution risk mitigation measures to be delivered as part of the project.

It is considered that the proposed attenuation basin can be constructed to form part of the construction phase as well as the operational phase drainage infrastructure. This will be dependent on the proposed construction phasing plans and additional drainage measures will certainly be required as described in Section 2.10.9.2.

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2.10.9.2 Construction Phase Drainage

A construction phase drainage plan will be produced to manage run-off during the works. This will be based on the following key principles:

- Diverting clean water from works areas by cut-off ditches to separate clean and dirty water
- Treating silt laden run-off close to the source by local settlement ponds, constructed in accordance with CIRIA guidelines.
- Constructing ditches alongside site roads to keep road surface free of standing water and reduce silt generation.
- Installation of check dams in steep sections of roadside ditches to slow down flows and aid settlement.
- Continuous monitoring of performance and ability to react quickly to changing conditions

It is anticipated that the permanent SuDS attenuation basin will be constructed early in the programme so that this drainage facility can be used as a settlement lagoon during construction. This will provide a buffer in case of an incident and will help in the visual identification of any releases of oils or fuels. Prior to the construction of the new SuDS basin, the existing attenuation ponds and 3 stage petrol interceptor will be utilised for site drainage.

It is proposed to carry out regular water quality monitoring during the construction phase in line with parameters identified with the Construction Discharge Consent from DAERA, SuDS infrastructure will be maintained on a regular basis throughout the construction period to ensure that it performs correctly. Such monitoring will also be required in order to safeguard Smooth Newt which are present in a number of these settlement lagoons.

The discharge from these lagoons will be taken to the existing balancing ponds (located on the eastern side of the site access) and reed beds which currently treat all the run-off from the site. These will provide a further stage of treatment. Drainage from these ponds will pass through a 3-stage petrol interceptor which is located at the site boundary in close proximity to the point of discharge.

3. TRAFFIC MANAGEMENT – BOGHILL ROAD AND SITE TRAFFIC

3.1 Boghill Road

The entrance to the proposed site is located approximately 1.2km along the Boghill Road from the junction with the Hydepark Road. The road has undergone minor improvements in the past associated with the use of the site as a quarry. At its peak in

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2000, weighbridge figures show that the quarry was generating 201 one-way vehicle movements per day.

The majority of these vehicles will have used the eastern section of the Boghill Road to reach their destination as there are weight restrictions on both the Boghill and Flush Roads to the west.

The current construction programme assumes that the Boghill Road upgrade works will take place during the enabling works phase on the main site.

This is important to achieve the service commencement date for the facility, and has the added benefit of ensuring the road is of a suitable standard to receive construction traffic and deliveries throughout the project

The enabling works will be a relatively contained operation, requiring minimal access to and from the site during working hours. Once all the necessary earth moving and stone processing plant has been mobilised to site, there will be limited construction traffic on the Boghill Road as the initial phase involves processing and moving aggregates within the site boundary.

Typical construction associated traffic would include operatives travelling to and from work, fuel deliveries, maintenance fitters, and explosives for blasting

3.1.1 Constraints

There are a number of key constraints to be considered in planning the construction activities and sequencing for the upgrade of Boghill Road. These include the following:

- a. Local resident access – there are a total of six residential properties which are served by five access roads off the main Boghill Road between Hyde Park Road and the site entrance. These residents will need to be accommodated throughout the works. There are also further residences along the west section of Boghill Road who, whilst not located within the works will be impacted by road closures and diversions.
 - b. Existing structures – there are two existing bridge structures along the road which will need to be demolished and replaced to suit the new alignment and wider road cross section. Replacement of these structures will result in localised road closures and diversions to be put in place.
 - c. Local road network – where the Boghill Road meets the Flush Road to the west of the site, there are 7.5T weight restrictions on both the Boghill Road (north of the junction) and the Flush Road (south of the junction). Also, due to the rural location of the site and the existing road network, diversion routes during closures will be of the order of 4.5 miles.
 - d. Utilities infrastructure which requires coordination including existing utilities present in road, supplies to site and properties, new treated effluent outfall pipeline from main site, drainage etc.
-

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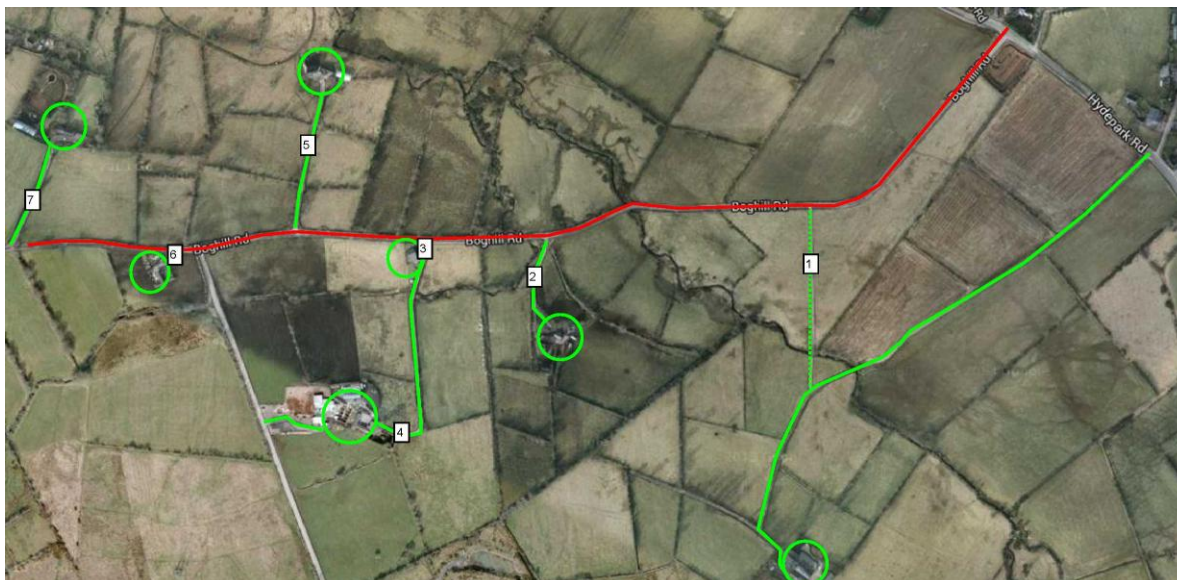


Figure 5 – Local Access Constraints

3.1.2 Improvement works

It is proposed to carry out the Boghill Road upgrade in three phases (see Figure 6)

PHASE 1 (CH 0 – 700)

This will involve upgrading the road from the junction with the Hydepark Road to just west of Black Bridge and will involve a road closure to replace Blacks Bridge. Local access will be diverted via Boghill Road west.

PHASE 2 (CH 700 – 850)

In phase 2, the Boghill Road closure will be extended from CH 700 to CH 850 to allow for the replacement of the culvert at CH 725 and the associated road upgrade works in this section. Local access for properties to the west will be via a diversion whilst the property to the east of the culvert (no.26) will be able to use Boghill Road east to Hydepark Road.

PHASE 3 (CH 850 – 1400)

Phase 3 will involve the off-line construction of the road realignment between CH1100 and CH1300. The widening between CH850 and CH1100 will be carried out under a traffic management arrangement which will allow local access to and from the east and west. The tie-in to the existing road line between CH1300 and CH1400 will result in some short-term disruption and will be carried out in close liaison with the local residents. For example these works could be carried out between 10am and 4pm, allowing access to and from properties at commuting times.

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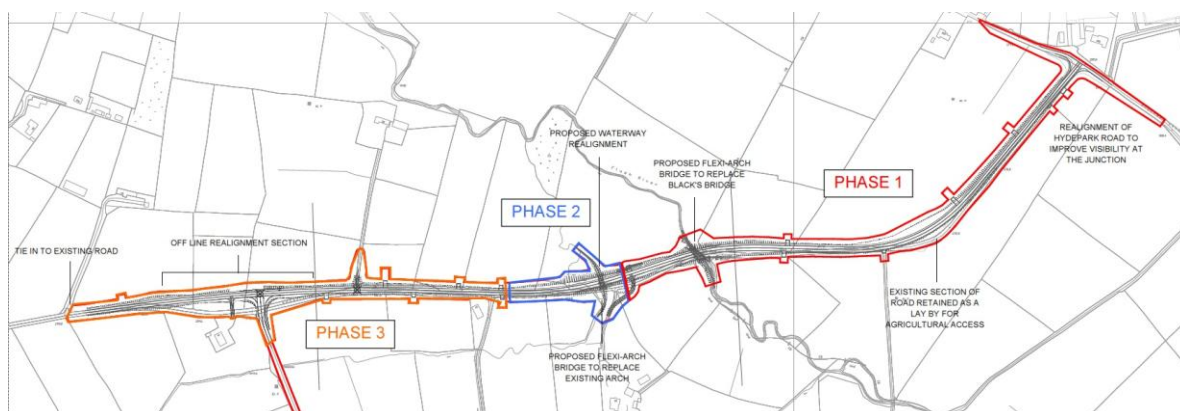


Figure 6 – Boghill Road Overview - Construction Phases

3.1.3 Construction Sequencing Overview

1. Erect new temporary fence lines for construction phase
2. Construct off-line road section / road box and drainage as far as possible
3. Set up diversionary routes and close road from ch 0 – ch 700 (does not isolate any residents)
4. Continue with upgrade / widening works either with local access and traffic lights, or alternatively close road completely in this section.
5. If road closed, replace blacks bridge when road construction is well advanced along ch 0 – 700 and the majority of fill from the quarry site has been hauled and place.
6. Carry out upgrade to junction with Hydepark road
7. Replace blacks bridge to tie in with programme for surfacing ch 0 – 700.
8. Move closure to ch 800 and replace 2nd bridge whilst allowing local access for residence nr 26 along the recently constructed section. (others still use diversion)
9. With bridge constructed, allow local access to and from Hydepark Road whilst constructing ch 800 – 1400 both off-line and under traffic light arrangement.

Note – *diversion to Boghill Road via Sealstown rd is approx 4 miles

*Diversion via Ballyutoag rd is approx 6 miles

*Weight restrictions apply to Boghill rd north and Flush rd south of junction with Boghill road

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PHASE	CHAINAGE	DESCRIPTION OF WORKS	ACCESS ARRANGEMENTS	APPROX DURATION (WKS)
1	0-700	a Install temporary construction site boundary fence	Existing	4
		b strip topsoil and unacceptable material from off-line sections		
		c place fill to form off-line widened section of road		
		d install off-line carrier drains and manholes		
		e close road from ch 0 – ch 700	Diversion via Boghill Rd west	8
		f stockpile fill material from quarry site at ch 300 lay-by		
		g demolish existing Black Bridge at ch 600		
		h construct new flexi-arch bridge. Excavate, mass conc fill, form abutments, place units, spandrels and backfill		
		i carry out any necessary upgrades to existing watermain within road		
		j tie in new section of road with existing and complete drainage, interceptor, kerbing, gullies, footpath etc		
		k complete tie-in with Hydepark Rd under TM		
		l install VRS off new bridge abutments		
2	700-850	a extend road closure to ch 850	Property at ch700 uses new BoghillRd east. Other properties use diversion via Boghill Rd west	4
		b construct off-line box culvert to divert existing watercourse		
		c demolish existing culvert and infill channel, diverting through new culvert		
		d extend watermain upgrade through this section		
		e complete road upgrade inc drainage, kerbing, footpath etc		
		f install VRS across culvert		
3	850-1400	open road closure from ch 850 east for local access only	Road available for local access only	6
		a strip topsoil and unacceptable material from off-line section to the north		
		b place fill to form off-line widened section of road		
		c install off-line carrier drains and manholes		
		d set up traffic management for single file local access		
		e complete north side of road including extension of watermain upgrade		
		f switch TM and complete south side of road		
		g carry out tie-in's of off-line section at CH1100 and CH1300		
		h wearing course and road markings ch 0 – 1400	Road available for local access only	1
		i road fully open	Road open	

Table 1 – Boghill Road Construction Sequencing

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3.1.4 Proposed access and delivery routes

Construction traffic (and ultimately waste delivery vehicles) will use the following route:

1. From various points of departure to A roads and motorways leading to the M2.
2. Exit the M2 at junction 4 (Sandyknowes) and take Scullions Road to the B95 Mallusk Road.
3. Take Mallusk Road west towards Hydepark Road, or Mallusk Road east to Hightown Road
4. From Hightown Road take a right at the junction with Hydepark Road, then left into Boghill Road
5. From Hydepark Road, turn right at the Boghill Road

The construction traffic route is shown in figure 7 below.

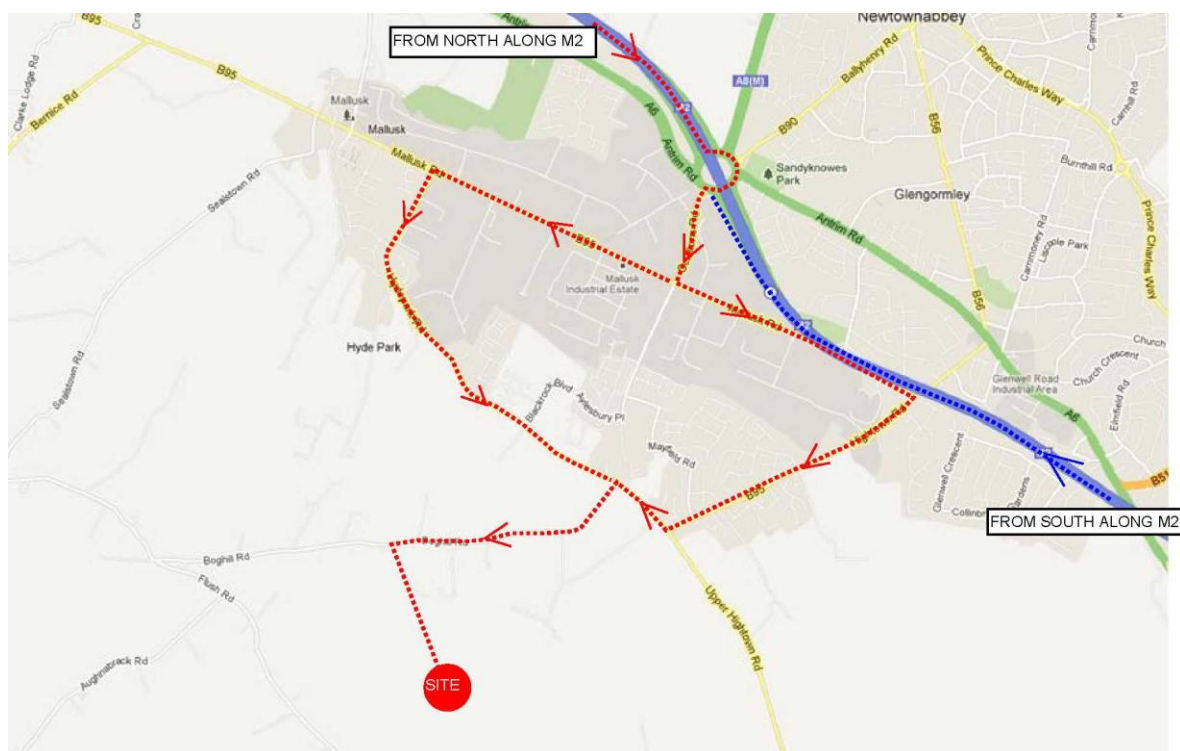


Figure 7 – Proposed routes to the site

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Hightown Road will be the designated route for deliveries from the M2 with Mallusk Road/Hydepark Road to be used as an alternative in case of restrictions/closures/roadworks etc.

Heavy goods vehicles coming from the west and not arriving from the M2 motorway will still have to access the site from the Hydepark Road end of Boghill Road. This is due to the 7.5T weight restriction in place on the Flush Road (south of the Boghill Road junction) and the Boghill Road (north of the junction with the Flush Road)

Vehicles less than 7.5T and cars may still access the site from the west side of the Boghill Road.

3.1.5 Site Entrances

The site will be accessed from the existing quarry access road. There are no other access points to the site.

During the construction stage, security will be stationed in the existing weighbridge office to control personnel and deliveries to site. From the weighbridge office, the gate personnel will determine if those coming onto the site have been inducted. If not, they will be directed to the site offices to arrange induction.

Deliveries will also be directed to the appropriate location and an appropriate member of staff from the contractor will be notified to meet the delivery and arrange offloading.

Regular staff and operatives who have previously been inducted will have their details recorded by the guard. This may involve an ID or numbering system to speed up potential early morning bottlenecks.

3.2 Construction Traffic

During the construction phase the project will generate a range of traffic, which can be broken down into the main phases of construction as outlined below:

3.2.1 Site set-up

Earthworks plant will be delivered to site on low-loaders to prepare the compound area, install services and commence enabling works.

Portacabins will be required for the site compounds, as well as portable toilets/welfare facilities, and lock up containers – these will be delivered on flat bed trucks and low loaders.

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3.2.2 Boghill Road

Excavations will generate unsuitable fill material which will be transported by tipper lorries back to the site for use in landscaping or transported off site to a licensed waste disposal facility.

Drainage materials such as pipes, precast manhole rings, kerbs etc will all come to site on flatbed lorries.

The culvert replacement structures will come as precast items 'flat-packed' on a flatbed lorry. A mobile crane will be required during construction of the concrete foundations and during placing of the bridge units.

Road building aggregates will be generated on the main site and transported along Boghill Road. During surfacing works, bituminous materials will be delivered from off-site using tippers and articulated lorries.

3.2.3 Enabling Works

The enabling works will require large numbers of heavy earthmoving plant including excavators, dump trucks, rollers etc as well as drilling rigs and crushing and screening equipment. These items of plant will be delivered on low loaders to the main site. Once the required plant is on site, the enabling works will be a relatively contained operation with no aggregates being imported or leaving site. There will still be regular deliveries of fuel and visits by plant fitters etc during this period.

3.2.4 Foundation construction

The commencement of the main construction works will require additional plant and craneage, whilst some of the earthworks plant will be taken off site. Regular deliveries of reinforcement and ready mixed concrete will take place during these works.

3.2.5 Concrete structures

The main concrete structures are the MBT tunnels and the EfW bunker building. It is proposed to slipform the EfW bunker and stair cores which will require 24hr deliveries of ready mixed concrete during these construction periods.

3.2.6 Steel framed structures

Erection of the steel framed structures will require large mobile cranes on site of up to 500T capacity. Structural steel will come to site on flat articulated lorries. Most of this will be on regular length trailers. Large quantities of cladding panels will follow, delivered on flat lorries or curtainsiders.

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3.2.7 Process equipment

Most of the equipment will arrive to site on regular length articulated lorries however the large items of plant which will be transported as single units will require specialist transportation. See Section 3.3 for details on abnormal loads.

3.2.8 Site infrastructure and drainage

Various materials including pvc drainage pipework, precast concrete manhole rings, duct, chambers, kerbs and gullies will be delivered to site over this period. These materials will be delivered from various suppliers by a variety of different vehicles. Most will be offloaded in a storage area on site for use as and when required.

Road surfacing works will require specialist plant including spreaders and rollers to surface the site circulation roads. Hot bituminous materials will be delivered on covered tipper lorries.

3.2.9 All Phases of Construction

An additional component of traffic to the site will be the daily arrival of workers in cars, vans and small trucks. Occasional deliveries of small packages will also take place with vans and other light goods vehicles. All construction related traffic will be provided parking within the site, including workers personal transport vehicles.

Portacabins will be required for the site compounds, as well as portable toilets/ welfare facilities, and lock up containers – these will be delivered on flat bedtrucks and low loaders. A mini tanker will visit site on a weekly basis to clean out the portable toilets/ welfare facilities.

3.3 Abnormal loads (details and management)

As part of the construction process there will be a number of elements to be delivered to site which will constitute abnormal loads.

The definition of an abnormal load is load is one which cannot, without undue expense or risk of damage, be divided into 2 or more loads for the purpose of carriage and, on account of its length, width, height or weight, cannot be carried on a normal vehicle.

3.3.1 Limits and Dimensions

- If a load is between 2.9 metres and 3.66 metres in width and the overall length of the load does not exceed 27.4 metres this vehicle / load may move unescorted.
 - If a load is between 3.66 metres and 4.3 metres in width and the overall length does not exceed 27.4 metres this vehicle / load may move, provided that the
-

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haulier supplies an escort vehicle. (This requirement is made in the interest of road safety.)

- If a load exceeds 4.3 metres in width or 27.4 metres in length this vehicle / load may be provided with a police escort, subject to operational constraints and other factors.
- If a load has a gross vehicle weight of 80 tonnes or more the 2 day notice rule applies irrespective of dimensions.
- The notifiable lengths start at 18.65 metres under Construction and Use and 18.3 metres under Special Types Legislation.
- Where the width of any vehicle or load exceeds 3.50 metres or the notifiable lengths, as above, an attendant, in addition to the driver if required.

3.3.2 Legislation

Motor Vehicles (Construction and use) Regulations (Northern Ireland) 1999 provide the basic law by which normal motor vehicles and trailers are built and operate on the road.

Road Traffic and Vehicles Motor Vehicles (Authorisation of Special Types) Order (Northern Ireland) 1997. The movement of large or heavy loads that exceed dimensions set down in the C&U Regulations is permitted provided they comply with this order. These are generally referred to as Abnormal Loads.

Anyone wishing to move an abnormal load must notify Department for Infrastructure (DfI) Roads by submitting an Abnormal Loads (AL1) Application Form for:

- all loads in excess of 38 tonnes on four axles
- all loads in excess of 40 tonnes on five axles
- all loads in excess of 44 tonnes on six axles
- all loads in excess of five metres in width

Two clear working days notice is required for all of the above.

Five clear working days notice is required for:

- all loads in excess of 80 tonnes
- all loads in excess of 6.1 metres in width
- all loads in excess of 27.4 metres in length

A special permit is required for:

- all loads in excess of 150 tonnes
 - all loads in excess of 6.1 metres in width
 - all loads in excess of 27.4 metres in length
-

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3.3.3 Table of Abnormal Loads

Facility	Element	Details	Transport weight (approx.)	Dimensions of transport (approximately)
MBT	Reception Hall	Steel primary roof truss		
EfW	Bunker roof	Precast concrete beams	Ca. 55 to	Length 32m x 2,50m x 0,50m
EfW	Waste Bunker	Crane truss and other steel girder	Up to 10 to	max. 20m x 1, 5m x 1,5m (lxbxh)
EfW	Turbineset	Turbine with components on frame	ca.70 to	7m x 4,5m x 4m
EfW	Turbineset	Upper part of turbine	ca.16 to	4,5m x 1,9m x 2,5m
EfW	Turbineset	Oilarrangement	ca. 56 to	
EfW	Turbineset	Generator	ca. 62,5 to	4,7m x 2,5m x 3,4m (lxbxh)
EfW	Turbineset	Gearbox	ca. 22to	3m x 3m x 2,3m (lxbxh)
EfW	Tanks	Condensatetank 221m³	ca. 28 to	18,5m x 4m x 4,5m (lxbxh)
EfW	Tanks	Condensatetank 45m³	ca. 10 to	8,5m x 3,m x 3,3m (lxbxh)
EfW	Tanks	Fueltank 100 m³	ca.20 to	15,5m x 3m x 3,4m (lxbxh)
EfW	Waste crane	Parts of wastecrane	ca. 24 to	31,6m x 1,6m x 2,3m (lxbxh)
EfW	Electrical equipment	Generatortransformer	ca. 50 to	7m x 4m x 4,5m (lxbxh)
EfW	Electrical equipment	Station supply transformers	ca. 8,5 to	2,5 m x 1,5m x 2,5m (lxbxh)
EfW	Electrical equipment	Emergency power (Diesel)	ca. 30 to	13m x 3m x 3m (40`-Container)
EfW	Boiler	Feed hopper	ca. 80 to	12m x 8m x 4,5m
EfW	Boiler	Boiler drum	ca. 110 to	12,5m x Ø 2,5m
EfW	Boiler	Grate frame delivery as elements	ca.15 to	2,5m x 4m x 1,5m

Table 2 – Anticipated Abnormal Loads

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These abnormal loads are typically transported individually by specialist haulage contractors with custom built vehicles and trailer units. Escort vehicles come before and after the transporter and where necessary, police may be used to provide additional safety escorts for road users.

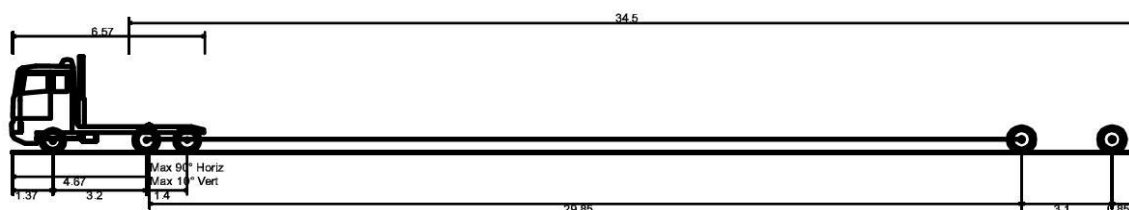
Local residents who may be affected during the delivery of any abnormal loads will be contacted at least 1 week prior to the commencement of any deliveries. The notifications will include the following information:

- Name and number of the Construction Site Manager
- Commencement date for deliveries
- Duration of delivery period
- Estimated times of deliveries
- If applicable a request to keep the highway clear of parked cars during the delivery period

3.3.4 Auto-Tracking of key road junctions

Consideration has been given to the potential for abnormal load deliveries to the site and the suitability of the existing road network to be able to accommodate such vehicles.

The largest load in terms of length and the load likely to be the most difficult to deliver to site will be the precast concrete beams which form the roof structure to the EfW bunker. These will be manufactured in controlled conditions off-site and transported to site in one piece. The vehicle parameters for modelling the swept path of these loads are shown below:



Extendible platform vehicle (fully extended)

Overall Length	38.470m
Overall Width	2.600m
Overall Body Height	3.396m
Min Body Ground Clearance	0.320m
Max Track Width	2.600m
Lock to Lock Time	6.00 sec
Wall to Wall Turning Radius	16.500m

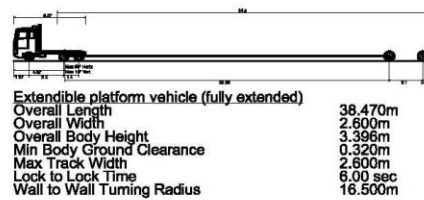
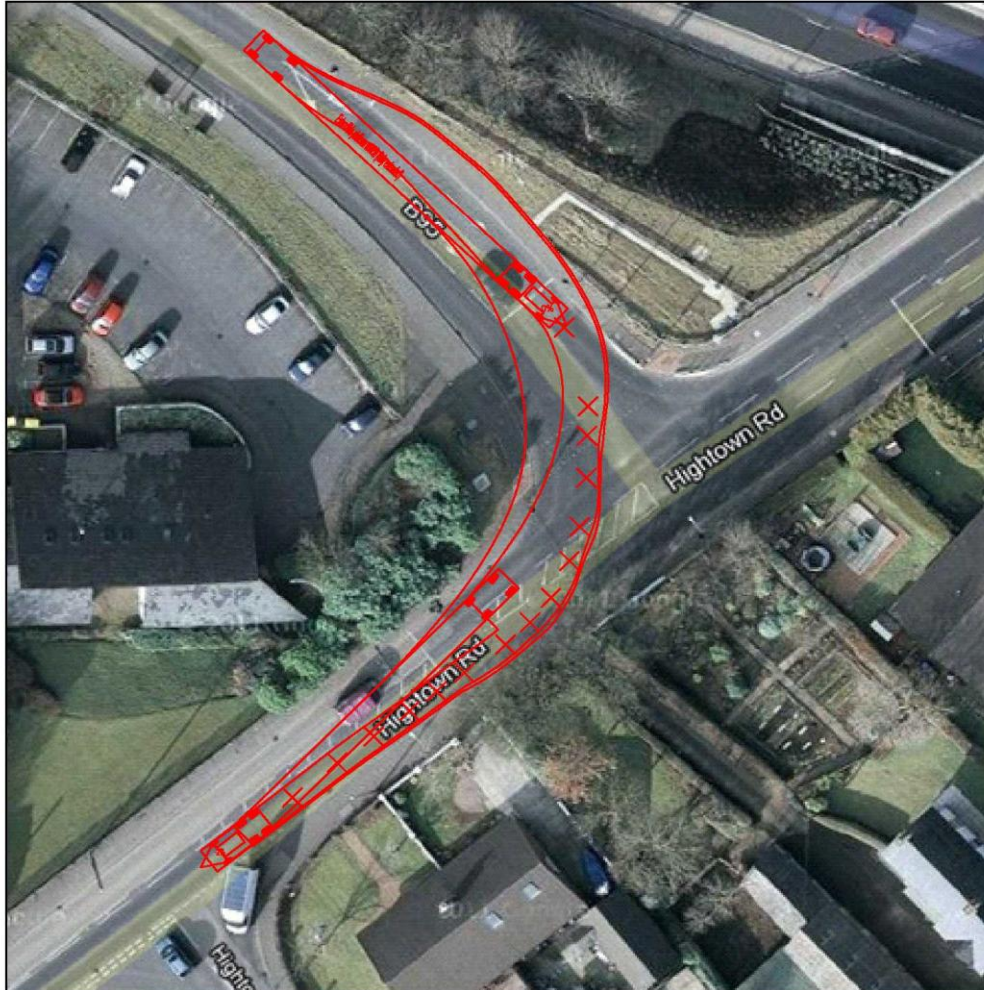
Figure 8 – Parameters of Abnormal load delivery vehicle

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Three road junctions have been modelled using the above vehicle dimensions:

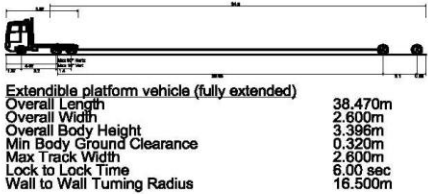
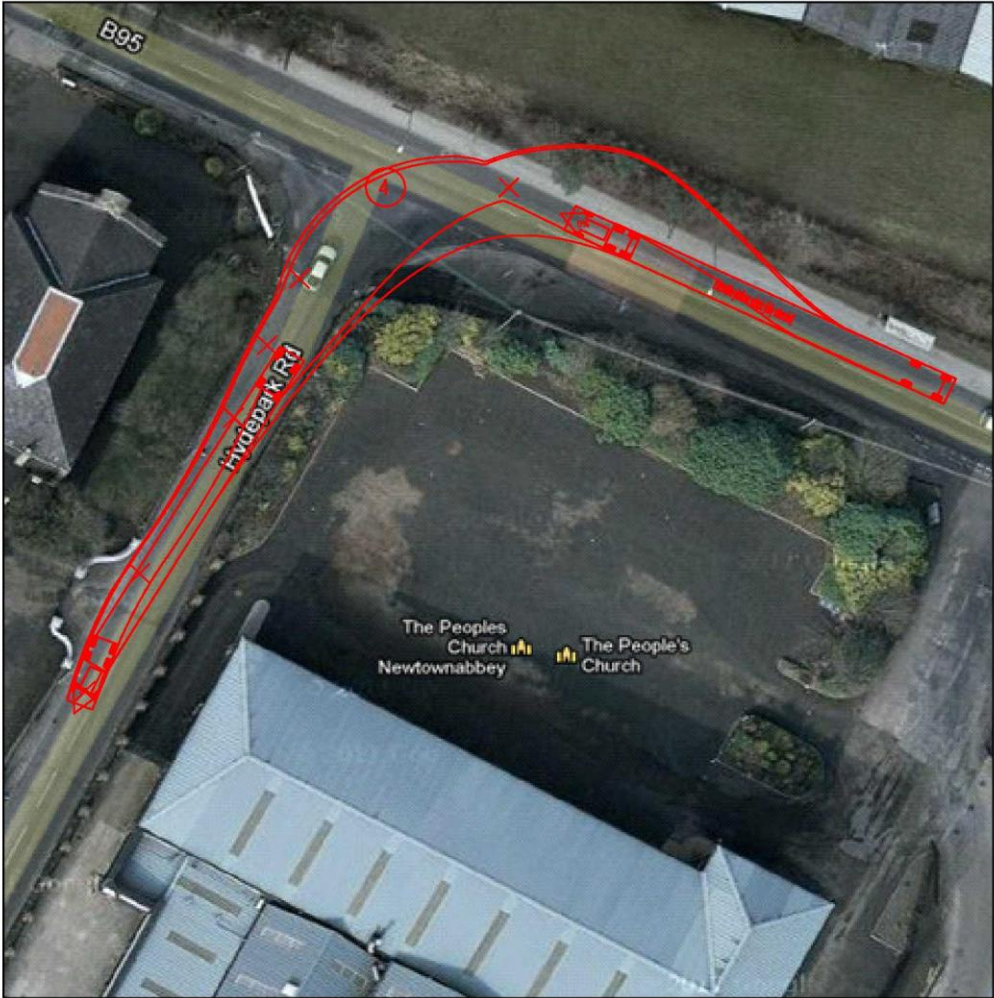
- Mallusk Road into Upper Hightown Road
- Mallusk Road into Hydepark Road
- Upper Hightown Road into Hydepark Road

The road network in advance of these junctions is considered capable of accommodating a vehicle of these dimensions.



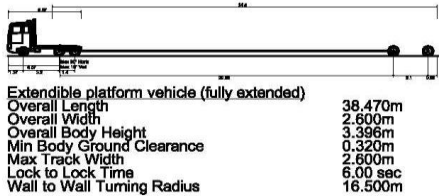
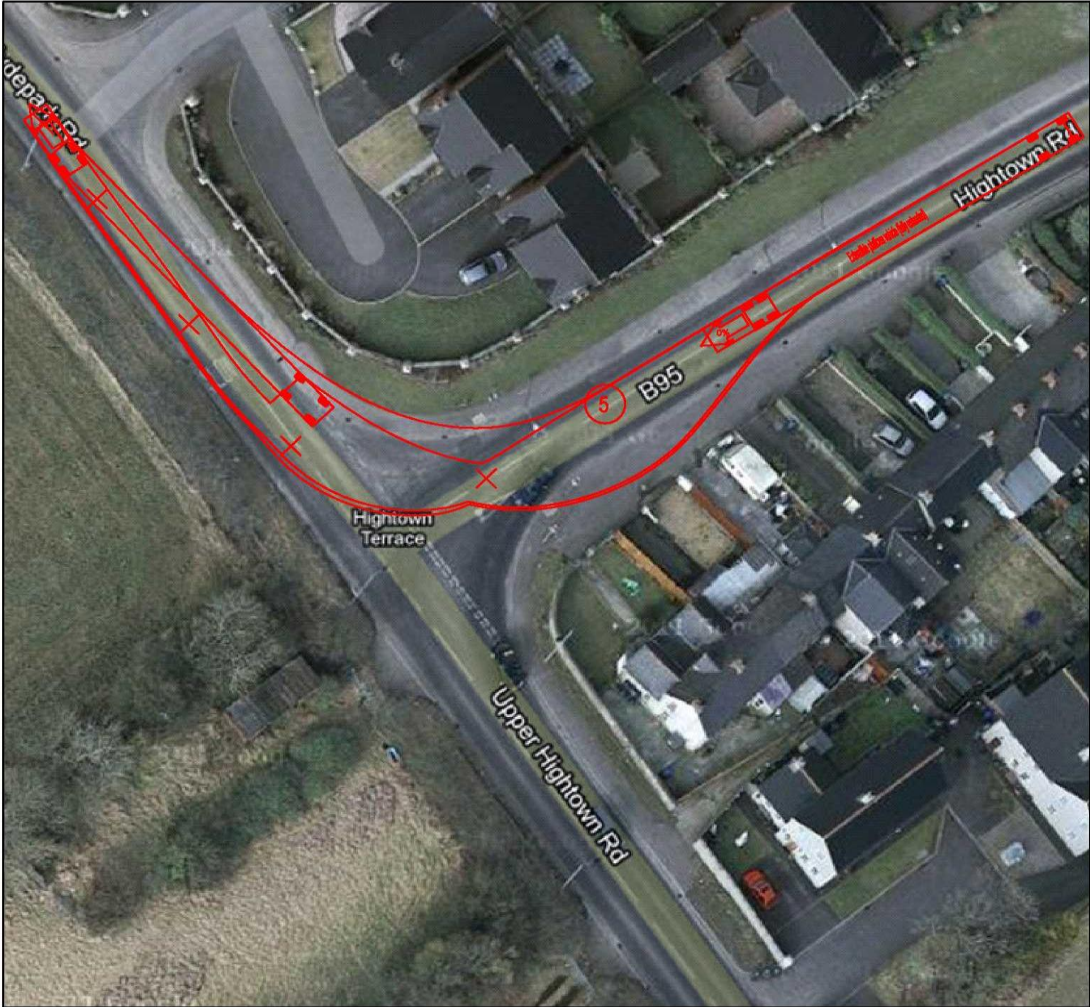
Hightown and Mallusk Road Junction
Scale 1:500

Figure 9



Mallusk and Hydepark Road Junction
Scale 1:500

Figure 10



Hightown and Hydepark Road Junction
Scale 1:500

Figure 11

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3.3.5 Preliminary Findings

Mallusk Road to Hightown Road

The swept path shows the vehicle utilising the left-hand side footpath on the approach to the junction and catching the opposite footpath on the inside of the bend. Further investigation will be required to determine the potential for services to be located within these footpaths. These footpaths are unlikely to support the loads from this vehicle without causing damage. There is a pelican crossing across the Mallusk Road in this location. To the east, a vehicle restraint barrier is set to the back off the footpath and continues around the corner to the Hightown bridge parapet. There is also some pedestrian guardrails and high containment trieff style kerbs at this corner. The swept path appears to avoid the street furniture on the approach but clashes on the inside of the turn with the signal pole. This pole may need to be removed to allow the load to pass.



Figure 12 – Mallusk Rd to Hightown Rd

Mallusk Road into Hydepark Road

The Mallusk Road becomes very narrow in advance of this turn off into Hydepark Road. This route involves land take and the removal of hedges to complete the turning movement and so should be avoided. This route will not be required if Hightown Road is used to access the Hydepark Road.

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Figure 13 – Mallusk Road to Hydepark Road

Hightown Road into Hydepark Road

Again, the swept path assumed that the footpath on the approach to the junction will be used. This is a wide footpath in this location with drop kerbs and is used by residents to access their driveways. Further investigation should be carried out to determine the location of services in this area and the footpath construction make up. There are two road signs at the end of this footpath, one of which clashes with the swept path shown. This is a lit 40mph speed limit sign which may need to be disconnected and removed to allow these long loads to pass. On the inside of the bend, the swept path also runs over the footpath. This should also be checked for services. There is some evidence that vehicles have previously went over this footpath due to visible kerb damage and settlement.



Figure 14 – Hightown Road junction with Hydepark Road

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3.4 Site Traffic and Pedestrian Management

3.4.1 Access arrangements

All traffic shall enter the site by the main access gate at the site entrance. The security guard will record the vehicle details and direct deliveries to report to the reception office where an appropriate member of site staff will show the driver where to off load the materials. A segregation barrier will provide a pedestrian route that will lead all pedestrians to the site offices.

Operatives will be asked to identify themselves and show proof of site induction at the security office. Those who have not been inducted will be directed to the site offices to undergo a site induction.

A turnstile system between the site compound and the construction site will be used by operatives and will provide a means of recording those present on site at any one time. This is of particular importance should the site need to be evacuated due to fire or emergency.

3.4.2 Site Roads

As part of the enabling works, access roads will be formed within the site to transport aggregates between various locations. These roads will generally follow the permanent access routes to the MBT platform, the EfW platform, Visitor Centre, RDF Bale Storage Building and IBA Treatment Facility. During construction, roads will be formed from stone produced on site and capped with finer crushed material such as type 1. Ongoing maintenance will be required throughout the works to repair potholes and keep the site roads in a suitable condition for deliveries. Temporary roadside drainage measures will be installed where required to keep roads as dry as possible and prevent the generation of silt.

3.4.3 Maintenance of off-site roads

There will be potential for delivery vehicles and other site traffic to carry mud and silt onto the public roads when exiting the site. In order to prevent this, it is proposed to utilise the existing wheel wash at the site weighbridge during the construction phase. This will be used as required to wash down vehicles prior to leaving the site.

The wash water will enter a sealed settlement tank below and be re-circulated for use in the washing process. Periodic removal of sludge and replacement of the washing water will be required, with waste being removed off site.

If necessary a road sweeper may also be deployed on the access road up to the site to keep this clean and prevent vehicle carrying mud onto the Boghill Road.

The road sweeper will be required during the Boghill Road upgrade works.

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3.4.4 Signage

Adequate signage will be required on the lead up and entrance to site as to enable safe traffic movements on the public highway. These will be in accordance with contract requirements.

All roads and tracks inside the site will have adequate signs along the edge of road warning drivers of potential dangers, speed limit signs (as per limits described in para 3.4.8), warning of hazardous areas, passing points, directional signage etc.

3.4.5 Road Edge Markers

Reflectors posts or boulders painted in fluorescent paint will be in place where necessary along the road edge to warn drivers of the road edge during poor weather conditions, for example snow.

3.4.6 Vehicle parking

All construction vehicles and plant are to be parked in a safe and tidy manner at the work location when not in use. Adequate parking will be provided for the workforce and reserved parking for the client, no private vehicles will be allowed further than the car park.

3.4.7 Pedestrian access

Access to site will be through security, which will be located at the site compound, only persons with a valid induction on to the site will be allowed on to the site. Where practicable, pedestrian routes will be formed to separate pedestrians and site traffic. Suitable crossing points to be selected for road crossings giving the pedestrian a clear line of vision for crossing. Pedestrian access will be formed throughout the site compound area. Pedestrian barriers and signage will be checked daily.

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Figure 15 – Example pedestrian / vehicle segregation on haul road

3.4.8 Site speed limit

The majority of the site will be covered by a 15mph maximum speed limit. In areas where pedestrians are present, for example in and around the site compound, a maximum speed limit of 5mph will be in place and enforced.

3.4.9 Transport Risks

Detailed risk assessments will be carried out for specific vehicle and load movement from one location to another. All site vehicles shall be fitted with rotating flashing beacons and audible reversing signals. Flashing beacons must be switched on as the vehicle enters the site. Site based vehicles will have them on at all times when on site.

All construction vehicles are to travel on the designated roads and tracks, with the only exception being excavators. When cranes and large loads are travelling through the site they must be escorted by means of a vehicle with flashing beacon in front.

One-way systems will be in place where practicable, such as at stone processing areas to avoid conflict of movements and reduce the risk of impacts.

Adequate passing points to be introduced in the roads and tracks with clear vision between passing points to eliminate unnecessary reversing on vehicles on site. These

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passing places must be used unless there is clearly sufficient room for 2 vehicles to pass each other, i.e. on wide sections of the roads.

Vehicles will flash their lights to indicate that they will give way to oncoming vehicles. It is acknowledged that normal 4x4 vehicles in most cases should give way to heavy oncoming plant.

3.4.10 Overhead Power lines/services

Where overhead power lines are present on site or along the Boghill Road, goal posts and warning tapes will be erected to give a visible warning of the power line. These will be checked regularly and maintained if necessary.

High voltage overhead lines are present to the west of the site above the quarry face. Appropriate safety exclusion zones will be considered when siting tower cranes and as part of any lifting plans for lifting operations in this area.

3.4.11 Construction Vehicles

The design of some vehicles presents hazards, such as restricted visibility and lack of driver protection from the effects of over-turning, noise and vibration. Choosing the right vehicle for the job is an essential part of effective vehicle management. The vehicle selected needs to be capable of performing its designated tasks safely. The following are important factors to consider:

- All round visibility for the driver is a minimum on all vehicles all around. CCTV and/or convex mirrors to be used.
- Effective braking systems on all vehicles. A brake testing device will be used to test relevant vehicles – the pass rate for brake efficiency is 19%.
- Stability under all foreseeable operating conditions.
- Safe access to and from the cab and other working locations.
- Headlights, horn, windscreen wipers and warning devices.
- Protection for the driver from work hazards, falling objects and the effects of the vehicle overturning. (vehicles to be fitted with falling objects protective structures and roll-overprotective structures)
- Protection for the driver from weather, noise, vibration, noxious fumes and dusts.

3.4.12 Vehicle Inspection and Maintenance

Construction vehicles work in harsh environments and require effective maintenance regimes to avoid developing defects. A programme of daily visual checks, regular inspections and servicing schedules shall be established according to the manufacturer's instructions and the risks associated with the use of each vehicle.

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In particularly sensitive areas, such as during the Boghill Road bridge replacement works, frequency of inspections may be increased to twice daily.

Vehicles should have maintenance log to help them manage and record vehicle maintenance operations. Vehicles operators will fill out inspection forms and return them to their employer on a weekly basis, these forms will be discussed at the weekly safety review meeting – tracking of vehicle defects will take place at this meeting. Employers should establish procedures designed to encourage drivers to report defects or problems and ensure that problems with vehicles are put right. Planned inspection and maintenance needs to follow manufacturer's instructions and include where appropriate.

- Braking systems.
- Seat belts.
- Tyres, Including conditions and pressures.
- Steering.
- Convex mirrors, CCTV and other visibility aids.
- Lights and indicators.
- Safety devices such as interlocks.
- Warning signals.
- Windscreen washers and wipers.
- Fire fighting equipment and spill kits.
- Condition of cab protection devices
- Functional checks on the vehicle, Including controls and starting systems.
- Correct location of guards and panels of the vehicles.
- Other checks as necessary.

3.4.13 List of vehicles involved in project

- Various size tracked Excavators with attachments
 - Rubber tyred excavators
 - Various size Dumper trucks
 - Bulldozers
 - Tractors, trailers & fuel bowser
 - Fuel tanker
 - 6/8 wheeler concrete lorries
 - 40ft trailer and lorry unit
 - Low loaders
 - Roller
 - Rigid lorry
 - Road sweeper
 - Various mobile cranes
 - 4x4 jeeps and work vans
 - Asphalt spreader
 - Tracked crushing and screening plant
 - Tracked drilling rig
-

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- Other vehicles as required

3.4.14 Site Traffic and Pedestrian Rules

These are Site specific traffic rules to accompany general site rules:

General site operatives

- All operatives must undergo site induction.
- All operatives to wear appropriate PPE at all times.
- All operatives to park in site compound car park.
- All operatives to use pedestrian access routes.
- Site vehicles to be used to gain access to work areas.
- Large construction plant to be given precedence at all times.
- Seat belts to be worn at all times.
- Site speed limit of 15mph must be adhered to at all times.
- A minimum of 15m behind vehicle in front

Plant operators

- All operatives must undergo site induction.
- All operatives to hold valid competency cards (CPCS etc) for plant they operate and be deemed competent.
- All operatives to park in site compound car park.
- All operatives to wear appropriate PPE at all times, especially when leaving their vehicle.
- Any mechanical plant or equipment found to be defective is not to be used.
- Plant and vehicles to be switched off when not in use
- Do not leave keys in unattended vehicles
- Site vehicles to be used to gain access to work areas.
- Large construction plant to be given precedence at all times.
- Seat belts to be worn at all times.
- Dismount dump trucks when being loaded.
- Site speed limit of 15mph must be adhered to at all times.
- The minimum distance between moving construction plant is 30 metres.

Visitors/Land Owners

All visitors will be directed to the site office in the site compound.
They will be made aware of any hazards on site and will be escorted on site.
All visitors will be issued with temporary PPE.

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3.5 Stakeholder Communication and Consultation

Open and clear communication with stakeholders is of the utmost importance to ensure that potentially affected parties are kept informed throughout the construction process. The Project Liaison Officer will be responsible for managing and co-ordinating stakeholder issues and communications during construction, involving local residents, elected representatives, schools, businesses, public transport providers and the emergency services. Communication will be established in advance of and during construction to initially provide an overview of the project and to introduce a point of contact should any issues arise.

The emergency services will be invited to the site in advance of works commencing. This will allow them to be briefed on the nature of the project, access arrangements, timescales, workforce numbers and key contacts, in order that they will be better informed to deal with potential incidents both on the work site and the surrounding area.

As part of the planning process, information days were arranged in local venues to introduce the project to those who may be affected both during construction and operation of the facility. This engagement with local residents and affected parties will continue in order to provide information on the proposed works, updates on construction programme, and to help manage concerns about future activities.

Road Closures

Temporary closure of the Boghill Road is required in order to carry out the upgrade works and bridge replacements on the eastern section. These works will cause some disruption to residents of the Boghill road and will require road diversions to be set up.

Meetings will be arranged with residents and the emergency services prior to the road closure application to help identify particular needs or concerns and to try and address these in the traffic management arrangements. The sequencing and phasing of the works will be advised at this stage so that all stakeholders are aware of the construction process and can forward plan for any personal disruption.

A formal application will then be submitted to DfI Roads for approval. This application will be submitted a minimum of 3 weeks in advance of the proposed closure. Signs will also be erected to give advance notice of any closures, proposed diversion route and the planned duration.

In addition to communications through the Liaison Officer, DfI Roads will formally list the notice of closure in the local press.

Regular updates will be provided e.g by letter drops, e-mail or community meetings to advise how works are progressing and if there are any issues which may affect the programme for completion and the return to normal traffic movements.

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Service interruptions

Should any planned service interruptions be required (water, electricity, telecommunications), these will be notified at least 7 days in advance to the affected properties.

4. ENVIRONMENTAL MANAGEMENT SYSTEM

The Site Environmental Management Plan (SEMP) is embedded within the framework of the Environmental Management System (EMS). Overarching this EMS and providing the foundation on which the EMS is based is the Environmental Policy. This Policy will commit the project team to work in an environmentally responsible manner, demonstrating high standards of environmental care and performance.

4.1 Description of the Environmental Management System (EMS)

An Environmental Management System will be implemented by the Principal Contractor for the construction of the Mechanical Biological Treatment (MBT) and Energy from Waste (EfW) facility

The EMS will be based upon the principles of:

- Identification;
- Assessment;
- Mitigation;
- Monitoring;
- Recording;
- Reviewing.

An Environmental Impact Control Plan (EICP) will be prepared. All members of the Project team will be responsible for the implementation of the Plan but the Contractor Project Manager will lead the team and control changes. He will appoint an Environmental Designee to manage the implementation process.

4.1 Identification

Prior to commencement of site works the Project Team for the Principal Contractor and their appointed sub-contractors will convene to identify the potential environmental issues which may arise throughout the duration of the Project. These will include off-site issues and cover the design, construction and commissioning phases of the Project, up to handover to operations staff.

Each issue will be entered on a register of environmental risks.

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4.2 Assessment

The Project team will undertake an assessment of each of the identified environmental risks. This assessment will produce a clear definition of the risk, the potential impacts it may have and the consequences arising from the occurrence of the risk.

The findings will be entered on the register of environmental risks.

4.3 Mitigation

Mitigation measures will be devised based upon the individual assessed risks. These could range from changes in design to remove the risk to on-site construction precautions to manage the risk and prevent the impact being realised.

The agreed mitigation measures will be entered on the register of environmental risks. Any specific mitigation measures defined by planning conditions will also be addressed.

4.4 Monitoring, Recording & Reviewing

The register of environmental risks will act as the management tool for the control of environmental issues arising for the Project. It will be reviewed on a regular basis to identify the efficacy of the mitigation measures employed based upon the monitoring data collected and records kept.

In accordance with the aim of continuous improvement the result of the reviews will be communicated to the team so that appropriate amendments can be made. Further dissemination of best practice methods will be co-ordinated through the Company Environmental Manager to harvest ideas and improve standards on the Project.

4.5 Methodology for Ensuring Compliance with International Standards

The system to be employed is accredited to the prevailing environmental management system. To ensure compliance the system is audited twice a year by National Quality Assurance (NQA), an independent external organisation.

Sub-contractors will be selected on the basis of certification or if this is not possible their capability to comply with the EPC Contractor Environmental Management System.

The Project Environmental Management Plan will be checked and approved by the Environmental Designee prior to original issue and all subsequent issues and amendments will be similarly reviewed. Internal audits of the implementation of the

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Plan will be carried out by the Environmental Designee or his delegated representative.

Where required, Project specific external audits by the applicable international standards authorities will be arranged during the course of the project to support the parent company accreditations of the joint venture members.

4.6 Auditing the Environmental Management System

The Environmental Management System is managed in turn by the Quality Management System for the Project and as such will be audited in the same process as the Quality Management System. It is likely that environmental and quality system audits will be undertaken concurrently.

The Project Quality Manager will prepare an audit schedule in advance of contract commencement. The audit schedule will identify the frequency of both internal and external audits of the Environmental Management system.

Typically the Environmental Management system will be internally audited on an annual basis with particular critical procedures audited on a more frequent basis depending on the nature of the Project and the changing circumstances as works progress. External audits will be conducted on a twice yearly basis.

A review of the key compliance elements of BS EN ISO 14001:2004 will be conducted every month to ensure all matters are being addressed. These matters include:

- Display of current policy document;
- Internal and external audits;
- Non-conformances, Corrective Actions and preventive Actions;
- Status of Register of Environmental Aspects;
- Legal issues;
- Control of records;
- Resources, Roles, Responsibilities and Authority;
- Competence, Training and Awareness;
- Monitoring and Measurement;
- Emergency Preparedness and Response;
- Operational Control (SEMP and SWMP);
- Communication;
- Control of Documents.

The audit schedule will also incorporate the review of the principal Project Management documents associated with the execution of the works such as:

- Construction Phase Health & Safety Plan;
 - Design Management Plan;
 - Quality Management Plan;
-

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- Site Waste Management Plan;
- Emergency procedures.

Internal audits will be carried by the independent Head Office Environmental Manager or his delegated representative and generally take the form of site visits to verify compliance. A checklist of environmental measures will be completed for the site to identify where improvements can be made.

Random selections will be made of documentation to ensure the relevant records are in place, e.g. waste transfer notes. Interviews will be held with key site staff to ascertain their level of understanding and implementation of the applicable environmental procedures.

The results of the audit will be scored and a report prepared to identify areas for improvement and any non-conformances. A timetable for corrective action will be agreed with the auditor and a follow-up meeting will be held to close-out actions. Results of the audits will be circulated to senior management within the company to allow analysis of trends across the company's sites. This will in turn allow good practices to be adopted and particular repetitive errors to be eliminated. This will contribute to the cycle of continuous improvement which is the aim of the Environmental Management system.

The external auditing company for the EPC Contractors are National Quality Assurance (NQA). NQA will be available to carry out independent third party audits when required. The format of external audits will be as per internal audits.

4.7 Auditing and Reporting on Sub-contractors

All EPC Contractors will be registered to BS EN ISO 14001 – the Standard for Environmental Management, and will operate to the requirements set out in the Standard.

Each EPC Contractor seeks to comply with all legislation pertinent to environmental management and require all Sub-Contractors to conduct their work in such a manner that unnecessary risks and disturbance to the environment are avoided, by employing Best Practice Options to minimise risks.

Compliance with the requirements of the Environmental Management System is a condition of employment on all Contracts and is important in the prevention of legal action being taken against the EPC Contractor and its Sub-Contractors.

The appointment of Sub-Contractors shall be on their ability to meet the requirements of the contract, given due consideration to safety and environmental performance, quality, programme and economics.

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All potential sub-contractors are assessed by their response to a Sub-Contractor Questionnaire which covers Safety, Health, Environmental and Quality issues. With regard to quality each sub-contractor is requested to confirm their organisation is registered to BS EN ISO 14001:2015 or is actively working towards this standard.

In general, sub-contractors will be chosen who operate an Environmental Management system to BS EN ISO 14001:2015. Sub-Contractors who have not achieved this standard will be required to operate under the EPC Contractor's Environmental Management System.

Where the sub-contractor operates an Environmental Management system, each EPC Contractor will act as a third party checker within the sub-contractor's system.

Where the sub-contractor is operating under the EPC Contractors system, the works will be checked against criteria produced by the EPC Contractor in consultation with the sub-contractor which will ensure BS EN ISO 14001:2015 compliance.

Prior to commencement of works sub-contractors will be issued with the SEMP. The main sections of the SEMP will be discussed during a pre-start meeting which will include an agenda item for Environmental Aspects. A copy of the sub-contractor's environmental plan relating to their scope of work, will be written prior to mobilisation that reflects and details how the commitments in the SEMP will be delivered. Sub-contractors will also provide their current certification for review by the Principal Contractor.

Prior to off-site manufacture of permanent works items, the EPC Contractor will visit the proposed works facility to verify that compliance with the required Project standards can be achieved in respect of safety, environment and quality.

During off-site manufacturing periods, EPC Contractor site staff will perform spot checks of the works to ensure compliance with the sub-contractor's procedures and systems.

Following commencement of installation or site works, site meetings will be held with sub-contractors on a weekly basis or when the Site Agent deems it necessary.

The Environmental Designee will undertake continuous monitoring during the construction phase to ensure that works comply with statutory and all contract requirements, to show that works are being undertaken in compliance with the project plan, procedures, work instructions and method statements, and to demonstrate remedial action has been taken as necessary. Environmental check point schedules will be completed to ensure environmental quality control measures are adhered to. These record will be held in the site quality control files.

The number and significance of Non-conformance Reports relating to each sub-contractor shall be discussed at the Project Meetings. Corrective actions will be

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identified and registers will be kept to track resolution of matters. These will be considered in respect of the project Key Performance Indicators (KPIs) for reporting of performance of the Project overall. A section relating to environmental matters will be included in the Monthly Progress Report to highlight matters arising

4.8 Minimising the Environmental Impacts

The Project team and all its employees will have a legal obligation to conduct their work in such a manner that unnecessary risks and disturbance to the environment are avoided. As part of the Environmental Management System, personnel are made aware of issues which may impact on the environment, and are encouraged to act responsibly.

Compliance with the requirements of the Environmental Management System will be a condition of employment on all Contracts and Sub-contracts. Personnel disregarding the environmental protection measures adopted in the Work Instructions and Site Environmental Management Plan will be subject to disciplinary action.

Consultations and dialogue will continue throughout the planning and construction phases of the project and ensure the environment is protected.

Environmental issues will be communicated to staff and operatives at site induction and Environmental Toolbox talks will be delivered by the Environmental Designee, with records of attendance maintained.

Issues raised on site will be discussed at the weekly construction meetings and appropriate action taken by the responsible person identified.

Consultations will continue throughout the project with the relevant authority when required.

5. Draft Site Environmental Management Plan

This draft SEMP outlines the key site environmental issues to be considered, and will be developed into a full Site Environmental Management Plan prior to works commencing on site.

The plan will develop as detailed design and construction methodology evolves.

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5.1 Roles and Responsibilities

The site team will be given clear direction on their particular role and responsibility in respect of Environmental Management and implementation of the Environmental Management System. These are summarised as follows:

5.1.1 EPC Project Managers

The Project Manager shall:

- Provide information on contract requirements, including Scope of Works, to the Environmental Designee following contract award and prior to start of works on site, and also when any changes occur.
- Nominate Environmental Designee and Waste Representative(s).
- Ensure the required consents are in place before work starts.
- Ensure environmental and waste requirements are included on requisitions and in sub-contracts and orders.
- Ensure oil, including diesel, is stored in properly bunded tanks / bowzers / drip trays in accordance with the regulations.
- Ensure Waste Transfer Notes / Hazardous Waste Consignment Notes are checked against invoices before payment.
- Report incidents and non-conformances to the Environmental Designee.
- Ensure the Environmental Designee is informed of any environmental complaints.
- Liaise with statutory authorities and Client as required and ensure records of communication (including verbal communication) are kept. Ensure statutory authorities are always accompanied on site visits.
- Include environmental performance, review of Contract Objectives and Targets (including environmental), review of incidents and non-conformances at the Contract Review Meetings.
- Ensure controls are implemented by employees and sub-contractors to avoid environmental damage and breach of legislation.
- Ensure employees and sub-contractors receive Induction Training (including environmental rules).
- Ensure employees and sub-contractors receive training in spill control.
- Ensure employees and sub-contractors receive Environmental Toolbox Talks as well as Health & Safety Toolbox Talks.
- Verify actions resulting from Corrective Action Requests and Observations raised during audits are completed by the deadlines.

5.3.2 EPC Environmental Designees

The Environmental Designees shall:

- Report major incidents to the Project Manager immediately, the Company Environmental Manager, the Company Insurance Department, NIEA and other statutory authorities where required.
-

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- Carry out thorough investigations and provide reports to the Contract Manager and Environmental Manager after an environmental incident.
- Log, monitor and resolve incidents and non-conformances.
- Obtain prior agreement from the Contract Manager and Environmental Manager for any deviations from Environmental Procedures.
- Disseminate information issued by the Contract Manager and Company Environmental Manager, including changes to legislation, to relevant employees.
- Identify employees that require environmental training, provide or organise the training and maintain training records.
- Provide advice; deal with queries and correspondence on environmental issues.
- Liaise with the Company Environmental Manager and identify significant environmental impacts for the Project.
- Maintain the Project-Specific Environmental Management Plan.
- Undertake inspections to ensure controls are in place and working effectively.
- Monitor the progress in closing out Corrective Action Requests and Observations raised during audits.
- Provide report to the Contract Manager for delivery at progress meetings.
- Complete Environmental "Action Lists", when required, and forward to the Contract Manager each month.
- Ensure all records are retained and readily available.

5.3.3 Sub-contractors

Sub-contractors shall only transport waste to licensed facilities. In this case they must:

- Be in possession of a Waste Carrier Licence.
- Complete Waste Transfer Notes / Hazardous Waste Consignment Notes and submit to the Environmental Designee.
- Only take waste to a licensed Waste Management Site or Waste Exempt Site, as instructed by the site management team.
- Complete Tipping Dockets/Tickets and give to the Environmental Designee.

5.3.4 All Staff

All Staff shall:

- In the event of an incident, stop work, implement control procedures and report the incident to the Site Agent and Environmental Designee.
 - Inform the Site Agent when waste needs collecting.
 - Pass any queries or correspondence on environmental issues to the Environmental Designee / Site Agent.
 - Work in accordance with Environmental Procedures / Work Instructions, Contract Environmental Plan and Method Statements.
-

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- Method Statement authors will include environmental controls and obtain advice from the Environmental Manager when unsure of requirements.
- The Procurement Department shall include environmental and waste requirements on orders and attach the relevant information.

SITE ENVIRONMENTAL MANAGEMENT PLAN (SEMP)

The SEMP will remain a live document throughout construction which can be revised to address particular issues which may arise during construction.

The Contractor will review the SEMP on a minimum 6 monthly basis throughout the duration of construction until project completion and all contractors shall comply with the document and subsequent revisions. The SEMP may be reviewed earlier than every 6 months in response to a variation to review mitigation measures and to capture any changes to environmental Legislation and lessons learned during the course of the Works.

It is the intention that consultations and dialogue will continue throughout the planning and construction phases of the project and ensure the environment is protected.

Environmental issues will be communicated to staff and operatives at site induction. Environmental Toolbox talks will be delivered by the Environmental Designee, and records of attendance maintained.

Periodic environmental training will be organised as the need arises. For example, all operatives and staff will be provided with emergency response training to avoid adverse environmental impact.

Issues raised on site will be discussed at the weekly construction meetings and appropriate action taken by the responsible person identified.

Consultations will continue throughout the project with the relevant authority when required. Where consultations are required, these will be highlighted in the following sections.

5.6 LANDSCAPE ISSUES

The temporary construction offices and compound will be positioned in a visually unobtrusive setting, flanking an existing quarry face. Storage and waste management areas will be located next to the offices.

On completion of the Contract all designated temporary roads, temporary hardstandings and temporary laydown areas shall be uplifted and removed from the

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site. These areas are currently within the unvegetated quarry site, however appropriate landscaping measures may be taken to allow these areas to re-vegetate naturally.

Surplus stone from the enabling works will be stored in designated storage areas in accordance with the planning application or re-used as feature elements within the proposed development, in accordance with the landscape proposals.

Planting Proposals

The landscape proposals of the proposed development propose a positive strategy which seeks to:

- Anchor and absorb the proposed built forms into the landscape and provide softening of the quarry landscape through the introduction of landscape features and planting in species groups and patterns appropriate to the variety of adjacent landscape characteristics and thereby achieve an improved 'knit' of the quarry landscape with its surroundings.
- Reinforce the transitional character of the application site between the higher moorland landscapes to the south and the lower-lying farmland landscapes to the east, north and west;
- Provide limited areas of planting of carefully controlled species mixes (approved by the scheme ecologists) to create the transitional effect desired in an efficient manner, without the need for blanket screen planting of these vegetation types across the application site;
- Retain and manage the remaining majority of the application site consisting of naturally regenerating grass and sparse scrub areas;
- Soften near-distance views from adjacent publicly accessible viewpoints within the proposed development looking towards the proposed large building masses through the use of planted timber screen fencing and hydro-seeding of scrub planting on steep banks;
- Offset the widening of Boghill Road by enhancing its rural character with tree screening and hedgerow planting, particularly on its southern side to screen and soften views towards the quarry area of the application site;
- Achieve the majority of mix planting with transplant seedlings or hydro-seeding that will have the optimum potential to mature in the prevailing soil conditions;
- Plant larger trees, achieved with localised soil improvement to tree pits, to create an attractive setting for the visitor centre and surrounding publicly accessible area, including fastigate specimens to complement the vertical patterns evident in the design of the visitor centre;

5.7 ECOLOGY AND BIODIVERSITY

Ecological surveys have been carried out on site as part of the environmental impact assessment.

A preconstruction ecology survey will be carried out prior to construction to check for protected and invasive species, and focus will be given on the findings of the

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Environmental Impact Assessment. If Invasive species are found on site an Invasive Species Management Plan will be produced to describe the prevention of the spread of these.

Prior to construction commencement, Smooth Newts will be subject to a capture and relocation exercise to be undertaken under a NIEA licence. The capture/relocation exercise would commence when the newts are active from April onwards and be completed before October. All ponds within the site that support Smooth Newt will be retained and those currently used for settlement purposes (as part of the existing drainage regime for the active quarry) will be taken off line and managed/enhanced for the benefit of this species. Areas where Smooth Newt have been relocated to will be safeguard from construction areas through use of herpetofauna and Heras fencing.

All working staff will be made aware of designated areas where Smooth Newt have been relocated to under a NIEA Smooth Newt protected species licence. Any works considered to impact on Smooth Newt and their habitat to facilitate enabling works to the quarry walls and preparation the construction areas would also form part of the licence application to be submitted to NIEA.

The exposed quarry faces within the site will undergo treatment to remove loose material and stabilise the slopes.

Should enabling/construction work be planned during the nesting bird season (March to August inclusive) a check of the quarry face immediately prior to construction of any construction work for nesting activity by peregrines and other species and a check of the quarry floor for the presence of territorial ringed plover will be essential to ensure the impacts on nesting birds are avoided.

Such works will be undertaken under the supervision of a suitably qualified ecologist. In the unlikely event that usage is identified, NIEA will be contacted with any remaining works undertaken on a respective protected species licence.

There is evidence of otter activity close to the existing Flush Bridge. A survey will be carried out prior to the bridge replacement works at each watercourse to check for the presence of any holts. In the unlikely event that Otter are considered to be affected by the works, NIEA will be contacted with any necessary works undertaken under licence. The proposed bridge construction method will ensure that access ledges are retained under the new structures required for the Flush River and its tributary.

In terms of badger activity on site a single sett was first identified during the habitat survey in 2021. The sett is located within the scrub in the north of the application site and comprises a single entrance. As such, it is considered to be an outlier sett. At the time of the 2021 survey the entrance was clear however no other evidence of the presence of Badgers (such as latrines, snagged hairs or evidence of foraging) was

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observed. During the June 2021 bat activity survey a Badger was observed towards the eastern side of the site. An updated walkover in 2023 recorded this sett entrance as inactive, and the walkover in 2024 recorded the area being heavily overgrown with scrub which along with the absence of mammal tracks indicates that the sett has been abandoned.

Whilst the most recent surveys have recorded the sett entrance to be inactive, given the observed presence of badger within the site and the wider area a series of precautionary mitigation measures should be implemented in order to ensure the welfare of any individuals present.

Protective fencing will be installed in order to highlight the sensitive location of the sett during the construction phase and to buffer it from potential disturbance. Furthermore, all contractors working on site will be briefed regarding the presence of Badgers and of the types of activities that would not be permissible in proximity of the sett.

Any trenches or deep pits that are to be left open overnight will be provided with a means of escape should a Badger enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.

Any trenches/pits will be inspected each morning to ensure no Badgers have become trapped overnight. Should a Badger get stuck in a trench it will likely attempt to dig itself into the side of the trench, by forming a temporary sett. Should a trapped Badger be encountered, the project ecologists should be contacted immediately for further advice.

The storage of topsoil or other 'soft' building materials within the application site will be given careful consideration. Badgers will readily adopt such mounds as setts, which would then be afforded the same protection as established setts. To avoid the adoption of any mounds, they would be subject to appropriate inspections or consideration given to fencing them with Badger proof fencing.

During the development, the storage of any chemicals required for the building construction will be strictly controlled to ensure there can be no contact from any Badger activity and contained in such a way that they cannot be accessed or knocked over by any roaming Badgers.

The bolster planting of new native shrub buffer around the sett, along with hedgerow and wildflower grassland planting as part of the development proposals would maintain and enhance foraging and connectivity opportunities for Badgers. Berry / fruit bearing species included within the planting scheme will provide seasonal foraging resources.

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During construction work, disturbing boundary hedgerows should be avoided. Such disturbances include direct damage and root compaction from machinery, depositing site compounds, tipping of spoil or other construction activities. Retained hedgerows and their rooting zones must be protected from impacts; such as storage of heavy material and storing of mounds of spoil, gravel and other substrates near the rooting zone of the surrounding hedgerows and treelines. Operation of heavy machinery will be restricted at least 5 m from retained hedgerows and trees.

As part of site clearance works, hedgerows and trees must be inspected for breeding birds or mammal habitation prior to clearance or removal. It is best practice to avoid clearing hedgerows from the beginning of March to the end of August. This will be of particular significance in the Boghill Road upgrade works which will require hedge removal to allow for the road widening and realignment.

Following the road widening works, hedgerows will be replanted using native species.

Storage of machinery and construction materials will be restricted to pre constructed holding area or hard standing/ stockpiling area. Under no circumstances will machinery or construction materials be stored on semi-natural habitats adjacent to the site development area.

In order to restrict collision damage to mammals using the site, vehicle traffic will be slow moving (15mph). As a result, risk of collision impacts on mammals during the construction phase will be minimal.

Lighting Mitigation

- All lighting will be task orientated and be kept to the minimum amount required for security/ health and safety. There shall be no direct lighting of the hedgerows on site.
- Lights will be switched off when not in use, where practicable and safe to do so.
- Light spill will be minimised using adjustable column heights and/ or cowls/ hoods.

5.8 ARCHAEOLOGY AND CULTURAL HERITAGE

There is one known site within the application 'red line' (site 056:102) which is the site of 'Booley Huts' excavated in 1996. It should be noted that while this precise location is within the application site boundary, the site of these huts will not be disturbed. As such, no specific mitigation is proposed for the site of these 'Booley Huts'.

Blacks bridge (Industrial Heritage feature 07300:000:00) on the Boghill Road that will require removal due to the widening of the road. This bridge has been surveyed by a specialist Industrial Archaeologist. The survey report has been submitted to

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Department for Communities (DfC) Historic Environment Division (HED) and agreement has been reached on its removal.

Due to the potential for unknown items of cultural heritage to exist in the general area of the proposed works (in particular areas such as that along the Boghill Road), it is proposed that a licensed archaeologist should be appointed to carry out a watching brief of topsoil stripping (not including the removal of overburden from quarry area). Prior to construction, the archaeologist will agree with HED, their programme of works and in addition to any requirements from HED, the following measures will be undertaken as part of the works:

- Licensed archaeologist to be present during top soil stripping along the Boghill Road in order to monitor disturbance.
- Any test trenches required by the archaeologist are to be excavated using a smooth edged bucket on a back acting mechanical excavator.
- Each excavating machine to be observed by an archaeologist.
- The DfC HED case officer to be kept informed at all stages of the works and DfC HED are to be consulted to agree the appropriate course of action in the event of the discovery and identification of any archaeological remains. Excavation may be required and agreement for this or other preservation methodology, should be made between client and DfC HED.
- If required, the archaeologist should undertake post excavation works and complete a full report on the artefact finds and all other aspects of their role in the project. This report is to be submitted to DfC HED for approval and subsequent inclusion in relevant databases.

It should be noted that under the terms of The Historic Monuments and Archaeological Objects (NI) Order 1995, it is a requirement to report the discovery of any archaeological object to the statutory body. All staff working on this scheme are to be made aware of their responsibility under this legislation, should they uncover any potential artefacts.

5.9 WATER ISSUES

5.9.1 Water Pollution

During the works there will be a potential for pollution of watercourses from suspended solids while pumping out trenches, foundations or by direct run-off from the quarry slopes and site roads during extreme wet weather. There are a number of surface water drains leading to Flush River tributaries on the site, potentially creating an interception point for pollution and contamination.

All work will be carried out in line with GPP5 "Works and Maintenance in or near water" in order to ensure best practice with regard to the protection of water quality.

The handling, use and storage of hazardous materials will be undertaken in line with Guidance for Pollution Prevention (e.g., GPP2 Above Ground Oil Storage Tanks).

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Attention will be given to the areas where the watercourses transect the roads to ensure that roadside drainage runs are treated before entering the watercourse. Impacts will be avoided by adopting good construction practices, for example.

- Use of preconstruction drainage to divert run-off away from the stripped working area e.g. cut-off ditches.
- Land drains on the low side of excavations in high-risk areas where ground surface water is a problem will be plugged to stop water containing suspended solids from being transported to a watercourse.
- Use of filters such as natural vegetation, geotextiles, stone check dams etc.
- Use of settlement ponds / lagoons / proposed SuDS basin to treat run-off from hardstanding areas and when dewatering excavations, including management and maintenance of ponds.
- Use of above-ground settlement tanks
- Use of check dams in steeper drains to slow down flows and aid settlement of silt.
- Filtration by pumping to grassland before discharge to watercourses
- Minimising stockpiles of material, and locating essential stockpiles as far away from watercourses as possible. A minimum distance of 20m from waterbodies will be applied in relation to stockpiles of material. A minimum 10m vegetation buffer should also be retained along waterways.
- Good soil handling and storage methods including protection of stockpiles with geotextiles or re-establishing vegetation. Silt fencing will also be used at the toe of stockpiles when appropriate.

There will also be a potential for pollution of watercourses from fuel, oil, and chemical spillage. Fuel, oil, and chemicals must be stored in bunded containers that can be securely locked, and sited at least 30m from the nearest watercourse.

Within the containers, there will be a drip tray with a raised mesh floor which will be capable of holding at least 110% of the volume of the largest container, or 25% of the total volume of containers stored. The Environmental Designee will carry out weekly checks and ensure that the allowable storage capacity is not exceeded. The capacity of the bund will be displayed using signage.

Semi-permanent fuel storage tanks will be roofed and any liquid collected from the bunds will be treated as a hazardous waste and disposed of accordingly.

Spill kits will be stored at these locations and all staff and operatives trained in their use. Mobile bowzers will be double skinned and fully bunded to contain 110% of the contents. A fuel storage area will be constructed at the main site compound where mobile bowzers can be parked up when not in use, or overnight. This will consist of a concrete hardstanding which falls to a drain point. This will drain through an oil-water separator before being discharged.

Written re-fuelling procedures will be communicated to site operatives. In most cases there will be nominated operatives to carry out all refuelling of plant. Refuelling using

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mobile bowzers must be carried out away from waterways or site drainage ditches, in a designated hardstanding area. Bowzers will have hoses with trigger handles which cannot be locked in place. Drip trays and spill mats will be placed under the fuelling point. The bowser should be parked as close to the item of plant to be refuelled as possible. Refuelling will be supervised at all times and the nozzle of refuelling equipment will never be propped open

Plant operators will be required to check their machines on a daily basis and record their findings. All fuel and oil leaks must be reported and repaired immediately. Serious defects will require the operator to park up the item of plant immediately until the problem has been rectified. All items of plant will carry an appropriately sized spill kit, of at least 20L. Prior to carrying out work in close proximity to a watercourse, plant must be inspected and cleaned as appropriate.

Pumps and other fuel driven equipment must not be sited closer than 10m from a watercourse.

Generators and other fuel driven equipment must not be sited close to open drains/gulleys. These small items of plant should also be placed on a 'plant nappy' or drip tray to ensure any potential leaks are contained.

Larger static generators and associated fuel tanks e.g. for providing electricity to offices, will be stored in a purpose built, adequately sized watertight bund with a rain shed roof. It is envisaged that power will be provided by mains for the majority of the programme.

Even though the prevention of potential polluting activities is of prime importance, it is recognised that emergency procedures need to be put in place. Spillage response will form part of Method Statements. The handling, use and storage of hazardous materials will be undertaken in line with Guidance for Pollution Prevention (including GPP2 Above Ground Oil Storage Tanks). The requirements of the Control of Pollution (Oil Storage) Regulations (NI) 2010 will be adhered to at all times.

In addition to the measures mentioned above the following will also be followed –

- Place oil boom/sediment mats upon rivers/streams where construction activities are present.
- Control and manage dewatering of excavations using a permit system or similar.
- Use of solid 'floc-blocks' to aid deposition of fine suspended solids within settlement ponds/tanks (*Consent to Discharge will be sought from DAERA WMU (Department of Agriculture, Environment and Rural Affairs Water Management Unit I).*

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5.9.2 Control Measures for Oil Storage

Oil is one of the most common pollutants in the UK and spilt oil can pollute waterbodies and groundwater supplies which can be used for drinking water. All oil storage on site will comply with the Control of Pollution (Oil Storage) Regs (NI) 2010, specifically;

“Requirements for oil storage – general [Control of Pollution \(Oil Storage\) Regulations \(Northern Ireland\) 2010 \(legislation.gov.uk\)](#)

4.—(1) Oil shall be stored in a container which is of sufficient strength and structural integrity to ensure that it is unlikely to burst or leak in its ordinary use.

(2) The container shall be situated within a secondary containment system which satisfies the following requirements: —

(a)subject to paragraph (6) it shall have a capacity of not less than 110% of the container's storage capacity or, if there is more than one container within the system, of not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater;

(b)it shall be positioned, or other steps shall be taken, so as to minimise any risk of damage by impact so far as is reasonably practicable;

(c)its base and walls shall be impermeable to liquid and oil;

(d)its base and walls shall not be penetrated by any valve, pipe or other opening which is used for draining the system; and

(e)if any fill pipe, or draw off pipe, penetrates its base or any of its walls, the junction of the pipe with the base or walls shall be adequately sealed to prevent oil escaping from the system.

(3) Where a fill pipe is not within the secondary containment system, a drip tray shall be used to catch any oil spilled when the container is being filled.

(4) Any valve, filter, sight gauge, vent pipe or other equipment ancillary to the container (other than a fill pipe or draw off pipe or a pump) shall be situated within the secondary containment system.

(5) Where any drum is used for the storage of oil in conjunction with a drip tray as the secondary containment system, it is sufficient if the tray has a capacity of not less than 25% of: —

(a)the drum's storage capacity; or

(b)if there is more than one drum used at the same time with the tray, the aggregate storage capacity of the drums.”

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TYPES OF OIL EXPECTED TO BE FOUND ON SITE

- Petrol
- Diesel
- Heating oils
- Biofuels
- Lubricating and hydraulic oils
- Synthetic and mineral oils
- Biodegradable
- Shuttering and cutting
- Waste oils

OIL STORAGE LOCATIONS

In all cases oil will be avoided being stored in high risk locations such as:

- Where there is risk of damage by impact or collision e.g. from site traffic
- Within 50M of a spring, well or borehole
- Within 10M of a watercourse, ditch or drainage channel
- Where spilt oil could enter open drains or soak into unmade ground where it could pollute groundwater

OIL STORAGE TANKS AND CONTAINMENT SYSTEMS

- When storing more than 200litres of oil, a secondary containment system will be provided. The capacity of the secondary containment system will be either 110% of the largest drum or 25% of the total volume stored (whichever is greater).
 - All ancillary equipment will be kept contained within the bund.
 - All valves, filters, sight gauges, vent pipes, taps and fill pipes will be arranged so that oil is caught in the SCS
 - The flexible draw-off pipe will be fitted with a nozzle at the delivery end that closes automatically when not in use
 - All taps, valves and flexible hoses and any pumps, through which oil can be discharged will be located in the SCS
 - All taps and valves will be kept locked shut when not in use
 - It will be ensured that the primary oil container is in good condition and not likely to burst or leak
 - The pump set will be fitted with a check valve in the feedline to prevent tank drain down in the event of damage to the pump or feed line
 - The SCS, ancillary equipment and pipework will be protected from damage, collision or impact
 - The SCS will be impermeable to oil and water and will not have any drain down openings or valves
 - The SCS will provide maximum containment at all times – All accumulated water / oil will be removed frequently
 - The container will be clearly labelled with product type and maximum capacity.
-

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INSPECTION AND MAINTENANCE

- All oil storage areas, containers and secondary containers will be frequently inspected and checked for signs of damage, corrosion, bulging, leaks or unauthorised use and interference. Any required maintenance, defects or faults will be repaired immediately
- If a sight gauge is used to measure tank contents it will be properly supported and fitted with a valve that closes automatically when readings are not being taken.

5.9.3 Control Measures for Refuelling

A designated refuelling area will be established for the project. This area will consist of an impermeable surface, situated well away from watercourses. Signage will be erected to indicate the location of the refuelling area and an oil spillage kit will also be at hand at this area. All fuel deliveries to site will be supervised by a designated individual.

When refuelling has to be carried out away from the designated area, it will be carried out by using a drip tray or other secondary containment solution to prevent oil from spilling onto the ground. Where mobile refuelling is necessary, all bowzers will carry an emergency spill kit. All oil containers (including mobile bowzers) will be returned to the designated storage area after use.

5.9.4 Watercourses

All works in or adjacent to watercourses will comply with DAERA and DfI Rivers requirements. In addition, DAERA and DfI Rivers will be consulted and discharge consents obtained for any proposals to discharge water from water mains and discharge of site runoff.

Watercourse crossing design would be based on best practice available from DAERA NIEA and CIRIA guidance. There are two water crossings on the Boghill Road to consider as part of the works. These existing culverts will need to be replaced, extended and strengthened to accommodate the new road alignment. Design detail includes one in-line flexi-arch structure and one off-line flexi-arch structure.

The in-line flexi-arch construction requires no disturbance to the banks or bed of the river whilst the other will be installed off-line and the watercourse diverted through this new culvert. The detailed methodology will be developed in collaboration with WMU Pollution Prevention before works commencing.

5.9.5 Concrete Washout

The concrete supplier will be encouraged where possible not to wash out on the site. The preferred method will be for drivers to brush down any surplus concrete left on the

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chute, prior to leaving the site to return to the batching plant, where they can wash down. This will be agreed with the concrete supplier in advance. Should this not be possible for whatever reason, e.g. delays, distances from the plant etc, trucks delivering concrete will wash out in a designated wash out pit on site.

Designated concrete washout pits will be constructed in suitable areas, well away from watercourses, and in consultation with DAERA WMU Pollution Prevention Team. The location of these washout areas will be communicated to concrete delivery drivers at site induction. Concrete lorries delivering to the bridge replacement locations on Boghill Road will wash out at the batching plant, or at the main construction site within the quarry.

Drivers will be encouraged to be conservative with their water use, should they need to make use of the washout pit. This will limit the volumes of wash-water to be dealt with.

Washout pits will consist of excavated pits with an impermeable membrane, or alternatively a more permanent watertight concrete tank may be constructed. Discharge of wash-water will not be permitted unless consent is granted by DAERA, following appropriate treatment.



Figure 16 Example Concrete Washout Pit

5.9.6 DAERA WMU Liaison

DAERA WMU Pollution Prevention Team will be consulted well in advance of any proposal for works near, in or liable to impact any waterway. Of particular note are the bridge replacement works and waterway realignment on the Boghill Road. Construction methodology and mitigation measures will be discussed and agreed

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with DAERA WMU prior to construction works commencing. Method statements will be communicated to the workforce as toolbox talks and all involved will sign up to the approved system of work.

5.10 ENERGY

Energy will be used during construction for:

- Fuel for the vehicles, plant and machinery used on the site;
- The transport of materials/waste to and from the site; and
- Electricity used for lighting and heating

All plant will be serviced regularly to minimise emissions and inspected before being allowed on site. Plant should be switched off when not in use.

As most work will be carried out primarily in daylight hours, electricity use for lighting and heating of the construction site offices and working areas is expected to be minimal. Staff will be encouraged to adopt a 'switch off' policy with regard to lighting and heating when working in offices. Posters will be displayed highlighting energy wastage. Energy consumption will be monitored in the occupied offices on site.

The Project Manager/Deputy Project Manager should consider the use of infrared detectors with security lighting, or low energy spotlights.

5.11 MATERIAL USE

The project will be relatively self-sufficient in terms of aggregates to be used in construction. Earthworks within the site have been optimised to leave a small surplus of rock fill which can then be processed and utilised for the Boghill Road upgrade.

In general, the use of materials on site will be on the basis of a 'reduce, re-use, recycle' approach.

Materials will be stored to avoid wastage and deterioration of quality.

Good soil handling techniques will be adopted throughout the project. Stripping, storage, handling, and spreading of soil will be in accordance with current best practice. As the majority of development is within the exposed quarry footprint, stripping of soils will be minimal and limited to the widening of Boghill Road, and for the construction of temporary compounds and parking areas. Phased stripping/clearance will be undertaken in order to minimise the amount of exposed soil at any one time.

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All timber products must be derived from a sustainable managed source with a written declaration from the supplier.

All timber shall be Forest Stewardship Council (FSC) / Programme for the Endorsement of Forest Certification (PEFC) certified

5.12 TRAFFIC AND TRANSPORT

There will be a regular frequency of HGV movements required for delivery of materials and process components during construction

There will be a single construction access route into the site from the Boghill Road, utilising the existing quarry access road.

To ensure minimal impact on local traffic, a Traffic Management Plan (TMP) will be agreed with the client as referenced in Section 3 of this document and relevant statutory agencies. Compliance with the TMP will be a requirement for all employees and sub-contractors.

During the construction phase, boulders or stone bunds will be placed along the road edges to act as edge protection. Boulders should be painted in a bright colour to distinguish them from the road construction material.

5.13 COMMUNITY RELATIONS

A dedicated liaison officer will maintain ongoing liaison with the client and other neighbours after construction commences. All communications will contain contact details to direct any questions or complaints to the *Dedicated Liaison Officer for the project*.

Any complaints will be addressed efficiently and all efforts made to maintain good working relations between all parties. Complaints will be documented on 'Complaint Logs', investigated promptly and reviewed at regular progress meetings.

The Principal Contractor will respond to all enquiries within 5 days of receipt and to issue a holding email if further investigation is required to provide a detailed response, including a unique reference number.

Details of any complaints and remedial measures taken will be forwarded to the Authority.

Operatives employed on site will be informed at site induction of the importance of maintaining good relations.

The site will sign up to the Considerate Constructors Scheme.

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5.14 NOISE AND VIBRATION

The construction hours will be from 7am to 7pm Monday to Friday, 7am to 1pm on Saturdays. No works will occur on Bank Holidays or Sundays unless prior approval sought from Antrim and Newtownabbey Borough Council. There will be certain circumstances where the construction work will be required to take place outside of these hours e.g. particular works (which is dependent on 24hr concrete supply). In these cases the necessary approvals will be sought from the local council through the normal procedures and if required an Extended Hours Working Plan will be developed in Consultation with Antrim and Newtownabbey Borough Council.

While some noise emissions will cause temporary impact, good communication between the site management team, the local Environmental Health Officer and local residents will ensure that such impacts are kept to a minimum by correct timing, silencing or other mitigation measures.

All operatives will receive training and advice on noise minimisation and general good site practice through site-specific training and briefings.

Noise levels will be adhered to in accordance with the findings of Chapter 13 of the original Environmental Statement and subsequent addendums. The Principal Contractor will implement appropriate mitigation to identified receptors of the development.

Best practice will be implemented in order to minimise noise and vibration and comply with the contents and recommendations of the "Code of Practice for Noise Control on Construction and Open sites" (BS5228-1: 2009+A1:2014).

Noise Monitoring Plan

A Noise Monitoring Plan will be drawn up prior to construction commencing. This will detail the predicted noise levels as a result of construction activities and will specify the typical noise levels of construction plant intended for use. This will be set against appropriate construction noise impact criteria. Anticipated noise monitoring positions will also be set out.

Mitigation measures will be undertaken if the results of noise monitoring indicate that excessive noise impacts are arising from the activities associated with the works.

Liaison with the local community will be carried out during the construction phase.

Prior to works being undertaken, consultation with occupiers of potentially sensitive receptors that may be adversely affected by construction noise and vibration will be undertaken. The Principal Contractor will provide information of construction works

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and notice of when potentially high noise and/or vibration generating activities are taking place.

The Principal Contractor will develop further, however as a minimum the following mitigation measure will be implemented for the construction phase;

Distancing from Sensitive Receptors

- Noisy work activities will be planned in order to maximise the distance from any sensitive receptors
- Work compounds will be laid out so that access and loading areas are located appropriately
- Shouting and raised voices will be kept to a minimum. The use of tannoy and radios will be prohibited within close proximity of any area identified as sensitive residential receptors.

Plant and Equipment

- Modern installation techniques will be adopted that utilise high frequency pile drivers which significantly limit noise and vibration. Pile dampers will also be utilised.
- Only equipment conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions will be used
- Plant and equipment will be maintained and operated following manufacturer's instructions to run efficiently generating minimal noise
- Mobile compressors and generators will be fitted with appropriate silencers and/ or proprietary acoustics enclosures
- Site staff will enforce a policy whereby all plant is shut down when not in use
- Using electrically powered equipment run from the mains supply where available is preferred to using generators to power plant and equipment
- Crane spindles, pulley wheels, telescopic sections and moving parts of mobile working platforms will be adequately lubricated in order to prevent undue screeching.

Traffic Noise during Construction

- Delivery vehicles will, where reasonably practicable, be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable
- Time slots will be adopted for deliveries to ensure that convoys of vehicles do not arrive simultaneously and to avoid unnecessary idling on-site
- Strict controls will be implemented to prevent temporary parking on kerbside in the vicinity of noise sensitive receptors near the site
- Sufficient clear signage will be utilised to ensure that demolition and construction vehicles use only designated routes
- Care will be taken when unloading vehicles to minimise noise.

Noise screening

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Where appropriate and if deemed necessary, screenings will be utilised in order to reduce noise levels between the source and the receiver. Materials used for screening may include earth bunds, existing buildings, site security hoarding or purpose-built noise screens.

Vibration

A vibration risk assessment will then be undertaken to ensure that underground utilities, buildings and other protected structures surrounding the works are protected from damage.

5.15 EMISSIONS

Emissions during construction will consist of light, dust, and fumes.

The site will be generally unlit at night. Temporary lighting units powered by portable generators will be used where necessary to ensure safe working and/or site security. They will be positioned in such a way as to minimise glare. Lighting will take into consideration the effect on Bats and will follow guidance from Bat Conservation Ireland Guidance.

Most machinery used on site will be powered by diesel engines. In order to control the emission of excessive exhaust fumes and smoke, contractors will ensure that all vehicles and items of plant and equipment are correctly adjusted and maintained.

Inevitably a certain amount of dust will be produced during dry weather conditions. However, every effort will be made to keep this to a minimum. Vehicle speeds will be restricted on site to minimise dust generation (recommended 15mph). Where appropriate, water will be sprayed onto the surface to dampen the surface and thereby reduce dust generation. Water may be abstracted from site settlement lagoons which form part of the site drainage system for this use, but not from watercourses.

Precautions will be taken to minimise the deposit of mud and dust on the roads, but this cannot be avoided completely. Any such deposits will be removed regularly using road brushes, wheel wash and vacuum road sweepers.

Burning of materials will **not be permitted** on site.

5.17 NATURAL RESOURCES

Natural resources will be sourced locally where practicable to reduce the impact of transportation. However, due to the specialist requirements of parts of the scheme, this may not always be possible. Mitigation measures will be in place to minimise

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wastage, including the extraction or reuse of aggregates (where they are available and meet the relevant specifications).

The objective will be to conserve natural resources where possible.

Topsoil

Topsoil and vegetated turves may need to be excavated around the site boundary prior or during construction. Care must be taken to ensure that the methods of excavation and reinstatement do not damage the soil and seed bank which should be returned to the same area on reinstatement.

Timber

Timber will be used for temporary fencing, handrailing, shuttering works and for permanent fit out of buildings. Timber must be derived from a sustainably managed source with a written declaration from the supplier.

All timber shall be Forest Stewardship Council (FSC)/ Programme for the Endorsement of Forest Certification (PEFC) certified.

Stone and Hard Core

The use of stone and hard core will be used to prepare the construction platforms for each part of the facility, and also to surface temporary construction compounds, parking areas and haul roads. The vast majority of all aggregates will be sourced and processed on site.

Aggregates from the main site will also be used for the Boghill Road construction works.

The mineral erionite has been identified as potentially being present on the site. Erionite is part of the zeolite group of minerals. Studies conducted (mainly in Trukey and the USA) into Erionite and human exposure state that Erionite fibres only pose a potential hazard if they are disturbed and become airborne.

AWN Consulting have carried out a Risk Assessment in relation to the potential presence of Erionite at the application site. The Risk Assessment (Higtown Quarry, 03/04/2019, Ref:19_65667SR01) is included at Appendix 4.3 of the March 2019 ES addendum.

A site survey was conducted in January 2019 and representative samples were collected from areas where zeoloites were most likely to occur geologically. Laboratory analysis was carried out on 8 representative samples utilising optical microscopy and scanning electron microscope (SEM). It was concluded by the laboratory that erionite was not present in any of the samples.

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Despite the absence of the mineral in question during this investigation, a precautionary approach is being taken to further safeguard the health and wellbeing of staff and neighbouring communities alike to manage any risks from rock breaking during the construction programme and through ongoing monitoring and the provision of hardstanding and planting during operation of the facility.

The appointed Principal Contractor will prepare specific Risk Assessments in relation to working in areas where rock disturbance is required and will include the following conservative measures:

- Potential blasting areas to be inspected for geomarkers i.e. to establish areas where zeolites might be present and probed using suitable coring or fracturing equipment. Cores will be inspected for the presence of zeolites by a geologist with laboratory analysis conducted as required;
- To further confirm any risk of exposure to construction workers (and need for appropriate PPE), representative air sampling and laboratory analysis for fibre release testing will be conducted during initial “trial” blasting works;
- Dust suppression techniques as outlined in the OCEMP to be utilised. Techniques include:
 - Use wet methods to reduce dust generation where erionite is present (e.g., when drilling rock, apply water through the drill stem to reduce airborne dust, or use a drill with a dust collection system); and
 - Prohibiting dry sweeping or the use of compressed air for cleaning;
- If fibres found to be present within air above recommended occupational exposure levels then the applicable areas will be subject to same exposure measurements and mitigation techniques that apply to sites containing asbestos. Mitigation would include:
 - Avoid/minimise any areas identified as containing erionite mineralisation where possible;
 - Areas of infill that are identified as containing erionite to be capped with a “blinding” layer of aggregate / geomembrane (or equivalent) to protect area from abrasion and any potential fibre release;
 - Consider different construction techniques if areas contain erionite e.g. drilling instead of blasting rock;
 - Protecting employees with personal protective equipment, including respiratory protection. Note: An occupational safety and health professional would be consulted for specific guidance about the most appropriate personal protective equipment that should be used for the work being conducted and decontamination procedures required. Dampening and monitoring will be undertaken to avoid any potential for dust containing fibres extending beyond the works area;
 - On-going monitoring of dust for fibres to manage the risk within the construction area and ensure no off-site risk.

Energy Use

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Water Use

Water will be used in small quantities for cleaning, toilet facilities and vehicle washing, and dust suppression.

5.18 Waste Management

The proper management and handling of waste on site is essential to ensure that pollution and increased levels of contamination are minimised.

Under the Waste and Contaminated Land (Northern Ireland) Order 1997 and the Waste Management Licensing Regulations (Northern Ireland) 2003, all activities involving the treatment, keeping or disposal of waste must be authorised by NIEA and must be carried out in accordance with that authorisation.

Waste produced on-site will be subject to the Duty of Care under the Environmental Protection Act (1990)^[1] as well as the waste hierarchy. It is the joint responsibility between the Principal Contractor and the Applicant to ensure that waste produced on-site is disposed of in accordance with relevant legislation. The transportation of waste to and from the Site will also comply with the Duty of Care requirements.

The development will seek to maximise the reuse of materials generated on-site, where possible, in order to minimise waste disposal. Additional intrusive site investigations may be required prior to construction commencing to identify any areas of contamination present on-site. Further soil sampling during construction activities will be undertaken for classification and disposal of waste soils.

Waste materials will be disposed of by the contractor/s to appropriate recycling facilities or appropriately licensed landfills. The appropriate landfill for the disposal of any contaminated soil off-site will depend on the waste classification determined from the chemical analysis or Waste Acceptance Criteria testing, as necessary. The Site Manager / Environmental Manager will audit waste carriers and disposal facilities and maintain documentary evidence that these requirements are being met, including a register of waste carriers, disposal sites (including transfer stations) and relevant licensing details for each waste stream. Waste contractors who remove waste should be registered with NIEA.

Materials used during the construction works such as oil, chemicals, cement, cleaning materials and paint have the potential to cause serious pollution. The NetRegs Guidance for Pollution Prevention (GPP) notes and other relevant guidance will be followed during the handling, storage and use of such materials.

^[1] Her Majesty's Stationary Office (1990). *The Environmental Protection Act 1990*.

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Procedures will be set in place to respond to any emergency incidents which may occur on the Site.

Once the Principal Contractor takes control of non-hazardous waste management on-site, waste shall be managed as per the Contractors Construction Site Waste Management Plan.

All relevant subcontractors will be required to investigate opportunities to minimise and reduce waste generation in line with the “Northern Ireland Waste Prevention Programme: The Road to Zero Waste (this Waste Prevention Programme is due to be reviewed in 2025.)” through:

- Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- All work areas shall be maintained in a state of good housekeeping and with litter removed from all work areas. Regular maintenance of work and laydown areas shall be undertaken to remove waste, wind-blown debris and dust or loose materials from footpaths and carriageways;
- Implementation of a ‘just-in-time’ material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
- Good housekeeping implemented on site as standard with no dumping/ littering policy on site;
- The principal contractor will undertake site inspections to ensure site is kept clean and tidy and to instruct subcontractors when clean-up of site is required;
- Use of standard size components in design detailing to eliminate risk at source where possible to do so;
- Attention to material quantity requirements to avoid over-ordering and generation of waste materials;
- Re-use of materials where feasible e.g. re-use of excavated soil for landscaping;
- Segregation of waste at source where practical;
- Re-use and recycling of materials off-site, where feasible, and where re-use on-site is not practical (e.g. through use of an off-site waste segregation facility and re-sale for direct re-use or re-processing);
- Careful handling and transportation to avoid damage to raw materials;
- Efficient ordering of materials to reduce waste;
- Skips will be colour coded and signposted to reduce risk of cross contamination and covered to prevent dust and debris blowing around the Site, these will be cleared on a regular basis; and
- Burning of wastes or unwanted materials will not be permitted on-site.

The table below summarises the potential types of wastes that will be generated during construction of the facility, and indicates the most appropriate method of

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disposal. Waste minimisation will be encouraged following the 'Hierarchy of Waste' – Reduce, Reuse, Repair, Recycle and Recover.

Licensed waste carriers will be used to transport waste off site. All vehicles will be covered and enclosed. Waste transfer notes will be obtained for all waste leaving site in accordance with the Duty of Care requirements

5.19 Types of waste from a typical construction project

ACTIVITY	WASTE GENERATED	DISPOSAL RECOMMENDATION
Site preparation	Stone, topsoil and Vegetation	Topsoil will be separated and stored on site for restoration and landscaping. Stone and aggregates will be reused on site
Site operations	Office rubbish, paper, packaging, canteen refuse, etc	Recycle as much as possible using segregated skips, some canteen refuse to landfill.
"	Waste from site	Collect in covered skips and send to a licensed waste disposal site
"	Scrap metal and re-bar	Send to recycling facility
"	Sewage	Removed by a licensed contractor
"	Wood off cuts	If unable to chip on site, send for recycling to licensed waste transfer station
"	Concrete	Re-use surplus for blinding layers, etc, or break up for re-use as hardcore.
Site maintenance of plant	Workshop waste, e.g. paints, oil, etc	Collect for recycling, e.g. used oil, or send to licensed waste transfer station, probably classified as hazardous waste.
Backfilling and grading	Surplus spoil	Reuse on site
Reinstatement	Temporary stone areas	Leave as is, or combine in stockpiles for future re-use / sale.
"	Temporary fencing	Re-use elsewhere

Table 3 Types of Waste from Typical Construction Project

The table below indicates the types of **hazardous waste** that could potentially be generated during a project.

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CATEGORY	DESCRIPTION / EXAMPLES
Oils and solvents	Oily rags, thinners, solvents, degreasers, hydraulic fluids, lube oils, used oil spill clean-up/absorbent materials and associated contaminated soil, and empty oil containers
Paint	Primers, paints and empty cans
Epoxy coatings	Used for coating pipe joints or repairing damaged factory applied coatings
Contaminated ground	Oil Spills
Biocides	Disinfectant
Batteries	Lead acid
Fluorescent tubes	From site offices
Drilling muds	Only if contaminated as bentonite muds are generally used
Pigging debris	Water/contaminated debris.

Table 4 Types of Hazardous Waste

5.20 Hazardous Substance management

Subcontractors will be required to submit COSHH assessments for review by an appointed member of the appointed site contractor. COSHH assessments will be reviewed using information from the material safety data sheet (MSDS), also submitted by subcontractors.

COSHH assessments will be audited by the Project Health & Safety Officer.

COSHH Assessment must contain the following information: -

1. identifying the substance
 2. describing how it is used
 3. detailing the number and type of employees who are exposed to the risk
 4. classifying the hazard (s) likely to be encountered
 5. outlining the routes of entry to the body
 6. describing the steps to be taken to minimise the risk
 7. identifying appropriate local exhaust ventilation, if deemed necessary
 8. health surveillance requirements
 9. information, instruction and training requirements
 10. first aid measures
 11. storage requirements
 12. disposal recommendations
 13. risk level assessment
-

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It will be the responsibility of the subcontractor to review and revise their COSHH assessments in the event of ill health or accident, changes in legislation, changes in work procedure, use of new plant and equipment, or other substantive reason.

A register of hazardous substances will be maintained on site for review by the Company Health & Safety Department. Deliveries of hazardous substances will be to suit the requirements of the programme avoiding lengthy storage periods and taking cognisance of shelf life.

Hazardous substances are common pollutants of waterbodies and groundwater supplies which can be used for drinking water. The following control measures will be put in place on site in order to avoid the potential for contaminants from hazardous substances migrating to surface and groundwater.

All containers for hazardous substances (solid and liquid) will be leak-proof. Storage of such substances will be within impermeable, bunded, secure areas, with impervious walls and floor to remove the risk of migration to groundwater or a nearby watercourse. Such storage areas will be located away from sensitive areas of the site and will be covered to prevent ingress of water. Hazardous substance stores will be clearly marked with appropriate warning signs.

Hazardous substances will be segregated, and stored to prevent unplanned escape to the environment. Cement will be stored in a lockable store, whilst liquids will be stored within a bunded facility. All diesel tanks, whether static or mobile, will be fully bunded to retain at least 110% of the volume. Storage facilities will be sited as far as possible from operational processes and existing drains. Inspections will be carried out on bunds and stores on a regular basis with weekly monitoring being documented on the Company 'Weekly Health & Safety and Environmental Checklist'.

Storage areas for hazardous substances will be kept tidy and we will plan deliveries to keep the amount of hazardous materials on site to a minimum.

Any water that has come into contact with hazardous materials, or is believed to be contaminated, will be stored, tested, classified and appropriately disposed of in accordance with relevant legislation.

The quantity and type of all environmentally hazardous materials will be recorded and updated weekly on the Materials Storage Inventory Form.

Spill kits suitable for the absorption of the stored substance will be maintained at storage areas, and operatives trained in their use. Work Instruction WI – 001 'Storage, Housekeeping and Use of Fuels, Oils, Paints, and Chemicals' will be implemented as part of our environmental management system.

Hazardous waste or special waste will be segregated and disposed of in accordance with *The Hazardous Waste Regulations (NI) 2005*.

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The regulations prohibit the mixing of hazardous waste without a permit. Hazardous waste is considered mixed if it has been mixed with:

- (a) a different category of hazardous waste
- (b) a non-hazardous waste; or
- (c) any other substance or material

The Principal Contractor and subcontractors must ensure that waste described as hazardous must not be mixed with different categories of hazardous waste, non-hazardous waste, or any other substance or material. Each category of hazardous waste must be separated for disposal.

Waste is considered hazardous if it contains dangerous substances in concentrations set out in the Regulations.

5.21 EMERGENCY / INCIDENT RESPONSE

The appointed Principal Contractor will produce an Environmental Emergency Response Plan (EERP) as part of the Environmental Management of the project. This plan will be developed prior to works commencing on site. The EERP will:

- Detail potential environmental incidents and the appropriate response required
- Provide details of the 24-hour Environmental Emergency Response Crew to be available throughout construction
- Provide a list of statutory bodies to be contacted in the case of an Environmental Emergency, including the NIEA Pollution Incident hotline number (0800 80 70 60) for the reporting of incidents.
- The NIEA Pollution Response Team also has a dedicated email address for pollution issues that are not urgent and do not need immediate attention - email: emergency-pollution@daera-ni.gov.uk
- Detail the appropriate reporting procedure required for near misses, incident and accidents, and a template report form for same
- Require all personnel to undertake a site induction which will include an Environmental "Tool Box" workshop that includes EERP

Spillage Response

The most likely incidents to occur on a site will include silt, oil, concrete, grout, cement, and chemical contamination of nearby waterway(s), and contamination of land with oils, chemicals and construction products.

- Identify the cause of the incident and act to try and prevent it worsening. Stop or reduce the flow of diesel, engine oil, hydraulic oil, or chemicals.
 - Contain the incident using sand, absorbent pads, or by digging a containment bund.
-

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- Report the incident immediately to site management, explaining the nature, cause, and location. The site management team will then involve other statutory bodies and specialist clean up contractors as necessary.
- Contaminated ground is to be excavated and disposed of as hazardous waste.

“Do Not” Instructions

- Do not dig grips / ditches to drain polluted matter to a nearby waterway or drain.
- Do not ignore an incident as this will lead to serious disciplinary consequences and possible legal action against the Company, and / or your employer.
- The Project Environmental Policy is available for anyone to read. It is displayed in the Site Office. If unsure of environmental requirements, ask the Site Agent.

Incidence Response Reporting

- All operatives will be made aware that any environmental incident, spillage or complaint must be reported to the Principal Contractor as soon it happens
- Environmental Events as a result of the Works will be recorded by adding an “Environmental Incident”, “Environmental Complaint” or “Other”
- Every effort will be made to establish the cause of the issue leading to a complaint/ spills/ incident. Assuming the issue arose from the failure of a control system, the issue will be put right at the earliest opportunity
- The response action will be recorded by the Site Manager
- A log of all complaints/ spills/ incidents and follow-up actions will be maintained
- The Environmental Manager will undertake an investigation of all major incidents and will notify relevant agencies as required. Any reference numbers will be recorded and notified to the Employers Representative.

5.24 Environmental Impact Control Plan

The Environmental Impact Control Plan is produced prior to commencement of the Project. This will consider all aspects of the Project including but not limited to:

- Land Use;
 - Landscape Issues;
 - Ecology and Biodiversity;
 - Archaeology and Cultural Heritage;
 - Proximity Water Courses and Groundwater issues;
 - Pollution
 - Energy Consumption;
 - Material Use;
 - Natural Resources;
 - Traffic and Transport issues;
 - Noise and Vibration;
-

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- Emissions;
- Odour
- Vermin and Pests and Flies
- Waste Management;
- Litter
- Hazardous Substance Management;
- Community Relations;
- Socio Economic.

A list of environmental aspects and their associated impacts and mitigation measures has been produced. This constitutes the outline Environmental Impact Control plan for the Facility.

5.25 Summary of Environmental Aspects

	Description	Tick as applicable (✓)
(1)	Noise generation from construction plant and equipment	✓
(2)	Fuel consumption by construction plant and equipment	✓
(3)	Electricity consumption in offices	✓
(4)	Waste generation in offices and on site	✓
(5)	Hazardous waste generation on site	✓
(6)	Water consumption	✓
(7)	Raw material consumption	✓
(8)	Fuel and oil release from construction plant and equipment	✓
(9)	Discharge of chlorinated water after cleansing / testing	✓
(10)	Discharge of suspended solids	✓
(11)	Possible release of asbestos fibres to the atmosphere (from working with old asbestos pipes or within demolition works)	
(12)	Release of chemicals to the environment	✓
(13)	Traffic management	✓

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(14)	<i>Release of wash water from concrete delivery trucks</i>	✓
(15)	<i>Release of emissions by construction plant and equipment</i>	✓
(16)	<i>Spills and leaks from construction plant and equipment</i>	✓
(17)	<i>Smoke emission</i>	✓
(18)	<i>Acid release</i>	✓
(19)	<i>Working near wildlife</i>	✓
(20)	<i>Working near protected wildlife</i>	✓
(21)	<i>Working near rare plants</i>	
(22)	<i>Working near invasive plant species</i>	✓
(23)	<i>Working close to trees</i>	✓
(24)	<i>Working close to tree(s) with preservation order(s)</i>	
(25)	<i>Working through hedgerows</i>	✓
(26)	<i>Working close to listed building(s)</i>	
(27)	<i>Working close to archaeological features</i>	✓
(28)	<i>Working outside 'working area'</i>	✓
(29)	<i>Light emissions from temporary lighting equipment</i>	✓
(30)	<i>Discovery of fallen animals (carcasses)</i>	✓
(31)	<i>Deposition of mud on roads</i>	✓
(32)	<i>Working near foul sewers / septic tanks</i>	✓
(33)	<i>Vehicle washing</i>	✓

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(34)	Soil handling and storage	✓
(35)	Dust emissions	✓

5.26 Summary of Environmental Impacts

	Description	Tick as applicable (✓)
(1)	Nuisance from noise generation caused by construction plant and equipment	✓
(2)	Nuisance from vibration from construction plant and equipment	✓
(3)	Waterway pollution through discharge of water containing chloros	✓
(4)	Waterway pollution through discharge of water containing suspended solids	✓
(5)	Water resource depleted through charging new pipelines for testing	✓
(6)	Contamination of land and groundwater through oil and fuel leaks	✓
(7)	Contamination of land and groundwater through chemical spills	✓
(8)	Contamination of land and groundwater through acid spills from batteries	✓
(9)	Increased CO ₂ from energy use	✓
(10)	Nuisance caused by litter	✓
(11)	Contamination of land and water by litter	✓
(12)	Waterway pollution from cement wash during truck wash out	✓
(13)	Waterway pollution from escape of oil, fuel, grease	✓
(14)	Waterway pollution from escape of battery acid	✓
(15)	Air pollution through emissions from construction plant and equipment	✓
(16)	Air pollution from smoke caused by lighting fires	

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(17)	<i>Disturbance to wildlife</i>	✓
(18)	<i>Disturbance to protected wildlife</i>	✓
(19)	<i>Damage to rare and protected plants</i>	
(20)	<i>Spread of invasive species of plants</i>	✓
(21)	<i>Damage to trees</i>	✓
(22)	<i>Damage to trees with preservation orders</i>	
(23)	<i>Damage to hedgerows</i>	✓
(24)	<i>Damage to land outside 'working area'</i>	✓
(25)	<i>Nuisance from light pollution</i>	✓
(26)	<i>Danger to motorists when mud on roads</i>	✓
(27)	<i>Spread of disease on discovery of fallen animals (carcasses)</i>	✓
(28)	<i>Water pollution from damaged foul sewers and septic tanks</i>	✓
(29)	<i>Pollution of waterways from vehicle washing</i>	✓
(30)	<i>Damage to soil structure from poor soil handling and storage techniques. Also, water pollution from suspended solids being transported to waterways, and transfer of disease.</i>	✓

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5.27 Planned Mitigation Measures

ACTIVITY / PRODUCT / SERVICE / ISSUE	ASPECT	ENVIRONMENTAL IMPACT	OPERATIONAL CONTROL MEASURES	RESPONSIBILITY
General operational activities	Light emission through inappropriately sited temporary lighting for work activities	Light pollution	- Ensure that lights are sited to avoid glare - Set up lights and check if causing glare - Lighting will take into consideration the effect on Bats and will follow guidance from Bat Conservation Ireland Guidance.	Site Engineer Environmental Designee
	Dust emission through stone processing and trafficking site roads	Nuisance to humans and animals	- Dust will usually only be a problem in dry weather. - Crushing equipment and conveyors to be fitted with dust suppression sprays - Speed limit on site will be low to reduce dust rising - Water bowsters will be used if dust becomes a problem; - Tool Box Talks to be carried out with all staff before work commences to identify issues to personnel.	Site Engineer Environmental Designee
Delivery and storage of materials	Damage to materials through inappropriate off loading and storage methods	Damaged materials cause unnecessary waste creation and use of natural resources	- Handle and store materials to avoid damage - Order materials to suit the requirements of the programme - Avoid over ordering - Avoid repetitive handling - Reuse materials where possible to keep them out of the waste stream	Site Engineer
Operational and office activities	Waste generation	Water pollution and site untidiness	- Use covered / netted skip for collection and storage of waste - Refer to Site Waste Management Plan - Comply with 'Duty of Care' legislation – ensure all hauliers of waste are in possession of a Waste Carriers Licence, and provide Waste Transfer Notes for waste off site. Ensure waste is disposed at a	Site Engineer Environmental Designee

			licensed tip or site with a Waste Exemption Licence. Request copy of Waste Exemption Licence, and keep on file. - Remember: Copies of Waste Transfer Notes must be held for 2 years, and Hazardous Waste Consignment Notes held on file for 3 years to comply with legislation - Ensure Waste Management Data Sheets are completed monthly and submitted to the Environmental Manager.	
Operational and office activities	Waste generation	- Litter <i>Vermin, pests, flies</i>	- Construction and office waste will be disposed in segregated skips in a designated area - Adhere to the measures identified in the Bird Hazard Management Plan, March 2014 ES Appendix 17.2 - Kitchen and food waste will be disposed in sealed bags in a covered skip - Regular housekeeping around the skip storage area will take place - Food will be consumed in designated areas	Site Manager Site Agent Site Engineer Environmental Designee
Storage and use of oils, diesel, and chemicals	Release of oils, diesel, and chemicals from storage area	Unplanned release of oils, diesel, and chemicals can cause land contamination and water pollution	- Adhere to the requirements of Control of Pollution (Oil Storage) Regulations (NI) 2010. - Establish centralised, suitably bunded, dedicated storage areas with adequate spill kit provision, i.e., oil absorbent material - Keep small quantities of fuel and oil in leak-proof containers, in the site store within bund tray - Maintain housekeeping inside the store. Ensure a clear walkway, free from tripping hazards and spills of oil, etc. - Mobile diesel bowsers must be fully bunded. Ensure that hose is returned to housing after use, and locked. - Bunds to be checked regularly and emptied as required. Bund liquids to be disposed of as hazardous waste. - Interceptor tank to be alarmed and checked on a weekly basis to ensure oils storage levels are not exceeded. To be emptied to go off site as hazardous waste.	Site Manager Site Agent Site Engineer Environmental Designee

			- Bulk fuel may be stored in static tanks. These must be banded to retain 110% of the volume of the storage tank. Ensure the delivery hose is kept within the band. - Store chemicals in ventilated area. Consult with Product Data Sheets and COSHH assessments, and follow advice and requirements. - Chemicals to be stored within a secure banded facility - Maintain register of hazardous substances - Keep at least 30m from a waterway and at least 50m from a well or spring	
Excavation and drainage activities	- The potential for uncontrolled release of diesel during filling - Potential for leaks from hydraulic hoses - Accidental damage to existing live pipe-work leading to flooding - Discharge of suspended solids via land drains	- Diesel can kill vegetation and cause severe water pollution and land contamination - Water pollution and land contamination from leaking or burst hydraulic hoses - Noise - Pollution of nearby waterway(s) from surface run-off containing suspended solids - Pollution of nearby waterway(s) from suspended solids escaping down land drains	- Refuel using funnel or hose with trigger handle. Mop up small spillage using oil absorbent spill kit. Dispose of contaminated spill materials as hazardous waste. - Daily checks to be carried out on hydraulic hoses by competent person. If there are signs of damage or fatigue, repair / replace immediately. - Top up hydraulic oil at designated fuel/oil depot. Keep at least 30m away from waterway(s) or drain leading to a waterway(s). Always keep spill kit close by. - Equipment to be maintained, operated, and inspected by competent person(s) - Use plant that is suitably silenced - Minimise drop height when filling lorries - If necessary, use screens to reduce direct noise transmission - Items of plant and equipment to be serviced in accordance with maintenance programme - Use only plant conforming with relevant standards and directives on emissions - Ensure doors are well sealed, and kept closed on compressors when working in noise sensitive areas - Operate plant properly so that it does not cause excessive noise – avoid needless revving - Minimise machine ‘idling’ - Inform local community of programme of works - All operatives to be informed not to take instructions from anyone other than a member of the site management team (staff).	Site Manager Site Agent Site Engineer Environmental Designee

			- No excavations to be carried out without permission from site management. This is to avoid accidental damage to existing pipe-work that carries water or sewage. - Existing pipe-work to be identified and marked out on site. Task talk to be given to excavator operators informing them of the position of existing pipe-work carrying water or sewage. - Allow suspended solids to settle out prior to entering a waterway(s). Pump to a settlement tank or pit. Monitor and maintain settlement ponds. - Leave strip of grass alongside waterway of at least 10m, use geotextile wrapped straw bales to filter runoff. Dig cut off trenches where ground slopes to waterway. Lead runoff to settlement pit, before discharging through long grass. - All land drains to be marked out on site and high risk drains temporarily blocked off to prevent carriage of suspended solids to nearby waterway. - Refer to GPP 1: Understanding your environmental responsibilities – good environmental practice; GPP 2: Above ground oil storage; GPP 5: Works and maintenance in or near water; GPP 6: Working on construction and demolition sites; GPP 21: Pollution incident response planning; GPP 22: Dealing with spills.	
Concrete works / Storage of cement	Release of cement to controlled waters	Pollution of water from cement washings from concrete trucks and tools	- Store cement in dry conditions to protect and preserve quality. Do not leave outdoors to deteriorate and become waste. - Use gloves when handling cement to prevent burns and dermatitis. - Wash out concrete delivery trucks in an impermeable wash out pit away from waterways and drains leading to a waterway - Do not wash tools contaminated with concrete in a waterway - Instruct driver of delivery truck to wash out in designated area / wash out pit.	Site Engineer
Shuttering for concrete works	Release of shutter oil to land and water	Pollution of water and contamination of land	- Use shutter release oil that is environmentally friendly - Store shutter release oil in bunded facility in site store - Return containers of shutter oil to the site store at the end of each shift	Site Engineer

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			Don't spray or spill shutter release oil on the ground. Cover ground with polythene.	
Operational activities	Soil compaction	Degradation of soil quality	- Topsoil reinstated when in suitable friable condition as far as practicable. Use of vehicles fitted with low pressure tyres, spreading the vehicle load. Use of tracked vehicles wherever possible. - Trafficking prior to topsoil stripping will be restricted. - Segregation of topsoil and sub soil. Storage of topsoil in accordance with DARD codes of good practice. Soil reinstated in correct sequence.	Site Engineer
Operational activities	Discovery of fallen animals	Possible spread of disease	- If the carcasses have recently been buried and contain fleshy material, the remains should be rendered at an approved rendering plant. - If only bones are discovered these can be reburied. NIEA must be contacted about the suitability of the ground for burial. - Contractor will ensure best practice is followed seeking advice where required from the appropriate authority. - Adhere to the Animal By-Products Regulations.	Site Engineer
Ecology and Landscape	Working close to wildlife	Temporary loss of existing natural habitat	- Establishment of bird / bat boxes - Translocation of acid dwarf shrub habitat if required - Attenuation ponds will provide aquatic habitat enhancement. Attenuation basins will be monitored to assess their condition in hydrological, amenity and ecological terms during construction and operation. - The site will be enhanced with new planting as part of the design proposals. Refer to Site Layout and Landscape Proposals Plans. - Landscape Proposals include new tree and hedge planting in various locations including along Boghill Road. - Areas of Acid Grassland habitat are to be fenced-off or marked with high visibility tape during construction to prevent encroachment by construction machinery.	Site Manager Environmental Designee

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Ecology and Landscape	Working close to existing trees and hedges	- Construction activities can damage trees and make them susceptible to windthrow. In addition, work may need to be carried out in close proximity to trees or may require their removal. - Soil compaction can cause waterlogging and removal of air from the soil making it difficult for tree roots to breath. - Overall net loss of trees to construction activities.	- Extents of existing vegetation are to be retained along Boghill Road, in addition to in other areas of the application site. - Work should be carried out i.a.w. the National Joint Utilities 'Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to Trees' (NJUG 10). - During construction works, all vegetation protection methods shall be in accordance with BS 5837:2012, 'Trees in Relation to Design, Demolition and Construction'. - In order to avoid compaction, there should be no vehicle or plant access within root protection areas. Where accidental compaction has occurred, advice should be sought from an arboricultural consultant on de-compaction measures. - Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights can operate without coming into contact with retained trees. Such contact can result in serious damage to trees and might make their safe retention impossible. Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10m of the stems of retained trees. Fires should not be lit in a position where their flames can extend to within 5m of foliage, branches or trunk. Notice boards, telephone cables or other services should not be attached to any part of the tree.	Site Manager Site Agent Site Engineer Environmental Designee
Ecology and Landscape	Vegetation and hedgerow removal	- Loss of habitat - Damage to vegetation	In order to safeguard any nesting bird species within the application site, all vegetation clearance work will be undertaken outside of the main breeding season (March-August inclusive).	Environmental Designee
Ecology	Working near invasive species	Spread of invasive species	- Species identified includes Japanese Knotweed, Indian Balsam, Rhododendron Ponticum, Snowberry and Pirri-Pirri bur. Japanese Knotweed and Pirri-pirri-burr and included on Schedule (Part 2) of the Wildlife (Northern Ireland) Order 1985 (as amended) making it an offence to knowingly cause it to grow in the wild. - Rhododendron and Snowberry occur near the derelict building to the NW of the site and are unlikely to be disturbed during the construction	Site Manager Site Agent Ecologist

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			phase. It has however been recommended for these invasive species to be subject to an appropriate removal/management strategy to be incorporated within the EMP. - Japanese Knotweed occurs within acid grassland habitat in the west of the site and whilst this is within retained habitat which is unlikely to be disturbed during construction it has also been recommended for removal under an appropriate strategy to be incorporated within the EMP. - Pirri-pirri bur and Indian Balsam should be treated and eradicated prior to spread or removal of soil. Do not disturb seed pods (Indian Balsam).	
Ecology	Livestock	Livestock accessing site	- Provision of stock proof fencing and maintenance of same - Materials should not be stored where livestock can access them - Effective waste management, skips and litter free site	Site Manager Environmental Designee
Ecology	Presence of badgers	Disruption, harm, or injury to badgers	- Some evidence of badger activity has been found on site during surveys - A single sett in the north of the application site found to be inactive in 2024 surveys but precautionary measures will be taken to protect the welfare of any badgers that may be present. - Protective fencing to be installed during construction phase to buffer the single sett from potential disturbance and all contractors made aware of activities that would not be permissible in close proximity to the sett - Other mitigation to be taken relating to trenches/pits during construction; storage of topsoil and storage of chemicals on site - The site will continue to be monitored and all staff made aware of the potential of badgers travelling through the site.	Site Manager Site Agent Ecologist
Ecology	Presence of bats	Disruption, harm, or injury to bats	Evidence of bats found within the ruined stone building to the NW of the site boundary. This building is outside the development area and will remain intact to avoid disturbance. Any trees to be lost (or subject to other works) on widening of Boghill Road would be subject to a detailed inspection by a suitably qualified ecologist prior to any works. In the unlikely event that any roosting bats are identified then NIEA	Site Manager Site Agent Ecologist Environmental Designee

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			would be consulted, and if necessary any works undertaken under licence. • If enabling works to the quarry walls are to be undertaken during the hibernation period (i.e. November to March inclusive and weather dependent) then they will be undertaken under the supervision of a suitably qualified ecologist. In the unlikely event that hibernating bats are identified, NIEA will be contacted with any remaining works undertaken under a protected species licence if required. • Lighting will take into consideration the effect on Bats and will follow guidance from Bat Conservation Ireland Guidance.	
Ecology	Newts	• Disruption, harm, or injury to common newts	• Smooth Newts are present on the site. A comprehensive trapping and relocation and mitigation strategy in accordance with best practice and guidelines will be undertaken under license from NIEA prior to the commencement of development.	Site Manager Site Agent Ecologist Environmental Designee
Ecology	Otters	• Potential habitats • Disruption, harm, or injury.	• Otter activity was identified along Flush River. Prior to construction of the bridges a check will be undertaken for signs of activity. If works considered likely to disturb Otter then a licence will be sought from NIEA.	Site Manager Site Agent Ecologist Environmental Designee
Ecology	Birds	• Disruption, harm, or injury.	General measures to avoid disturbance to nesting birds: • Avoid nesting season March-August, or • Retain the nest in-situ, protected. Delay works within vicinity of nest until vacated. • Inspect hedgerows and trees for breeding birds prior to clearance or removal. Avoid from February to August Similarly, given that some of the quarry buildings supported Swallow nests it is recommended that they be subject to internal inspections prior to demolition and if breeding Swallows are present then demolition should only be undertaken once the young have fledged or outside of the bird breeding season	Site Manager Site Agent Ecologist Environmental Designee

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			In order to maintain breeding habitat for Ringed Plover, appropriate management involving periodic clearance of scrub where necessary will be undertaken to ensure suitable open habitat for this species. Works to the quarry walls will be undertaken under the supervision of a suitably qualified ecologist. In the unlikely event that a Peregrine Falcon nest is identified, NIEA will be contacted with any remaining works undertaken under a protected species licence if required.	
Ecology	Fisheries	Potential impacts to the integrity of the local rivers.	Construction of the new bridges would be undertaken in a sensitive manner which would reduce the impact on the watercourses and would involve constructing the new structure outside of the footprint of the existing bridge and then demolishing the existing bridge thereby reducing any pollution of the watercourse. As already mentioned previously, oil interceptors and trap gullies are proposed at various locations along Boghill Road and these would mitigate any adverse impacts from heavy goods vehicle movements during the operation of the proposed development. Implementation of pollution control measures in line with Guidance for Pollution Prevention (GPP) documents which includes: GPP 1: Understanding your environmental responsibilities – good environmental practice; GPP 2: Above ground oil storage; GPP 5: Works and maintenance in or near water; GPP 6: Working on construction and demolition sites; GPP 21: Pollution incident response planning; GPP 22: Dealing with spills. Earth moving operations that have the potential to give rise to contaminated drainage will be undertaken in compliance with BSI Code of Practice for Earthworks, BS 6031, 1987.	Site Manager Site Agent Ecologist Environmental Designee

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Hydrology	- Storage of fuels - Re-fuelling activities	Pollution of water resources by fuel and oil spills during construction.	- Good housekeeping during construction will be undertaken, for example, the use of drip trays understanding plant and pumps, and the inspection of all plant for fuel and oil leaks before being accepted for delivery onto the working width. - Adherence to all Guidance for Pollution Prevention (GPP) documents which includes: GPP 1: Understanding your environmental responsibilities – good environmental practice; GPP 2: Above ground oil storage; GPP 5: Works and maintenance in or near water; GPP 6: Working on construction and demolition sites; GPP 21: Pollution incident response planning; GPP 22: Dealing with spills, and Control of Pollution (Oil Storage) Regulations (NI)2010 - All fuel and oil drums or containers will be stored in bunded areas / stores along the working width. - Re-fuelling points will be located away from waterways (>30 m), in line with NIEA guidelines. - All fuel tanks and oil drums will be bunded with impervious material. Where more than one container is stored, the bund should be capable of storing 110% of the largest tank or 25% of the total storage capacity, whichever is the greater. Bunds will be constructed in accordance with GGP 2: Above ground oil storage. Any valve, filter, sight gauge, vent pipe or other ancillary equipment must be kept within the bund when not in use. No drainage valve may be fitted to the bund for the purpose of draining out rainwater. - Oil absorbers and grab packs will be available on all vehicles and further materials, including booms, will be carried by the Site team at the main construction site base. An Environmental Emergency Response Plan will be prepared prior to construction in consultation with DAERA WMU	Site Engineer
Hydrology	Use and maintenance of construction plant	Contamination from construction plant	- Plant not to be washed in or near a watercourse - Plant to be inspected daily for defects / leaks. Defects to be reported and repaired immediately - All plant to carry spill kits on board - Plant operatives to be trained in spill response	Plant Operators Site Manager H&S Advisor Environmental Designee

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Hydrology	Storage of chemicals	Pollution of water due to chemical leaks or spillage	- Store chemicals in designated COSHH store and on drip trays - Keep store locked to prevent unauthorised access or vandalism - Display data sheets to inform of specific risks when handling and appropriate clean up and disposal measures	Environmental Designee
Hydrology	Sewage	Pollution due to discharge of sewage from site compound	- Provide an adequately sized package treatment plant and new separate foul pipe along site access road to agreed point of discharge – details and permissions to be granted by statutory authorities. Provide water quality monitoring and storage tank to intercept potential non-compliant flows that would be collected via tanker and disposed off-site.	Site Manager
Hydrology	Use of portable toilets	Pollution of water resources by sewage spillage.	- Portable toilets or welfare units will be provided around the site due to the distance of some areas from the compound - Portable toilets will be emptied regularly by a specialist contractor and disposed off-site in accordance with the Duty of Care. - Waste Transfer Notes will be held on file.	Site Engineer Environmental Designee
Hydrology	Use of Bentonite	Contamination of watercourses with bentonite slurry	- Storage areas to be bunded - Mixing to take place in a bunded area - Store securely in a container well away from drains or watercourses	Site Engineer Environmental Designee
Archaeology	- Topsoil stripping - Soil storage - Movement of heavy machinery - Excavations - Road works	- Damage to archaeological resource during Boghill road upgrade - Destruction of Blacks bridge (noted in Industrial Heritage Database)	- Topsoil stripping will commence when the Archaeologist has obtained the appropriate licence and completed the relevant section of the 'Archaeologist's Environmental Check Point Schedule'. - Construction will avoid all known archaeological sites. - Archaeological sites which cannot be preserved in-situ will be archaeologically excavated with the agreement and under licence from NIEA and recorded in advance of construction works. - An Archaeological watching brief during topsoil stripping and trench excavations will be carried out during construction to deal with unanticipated remains. Archaeological remains which cannot be preserved in-situ will be dealt with as described above. - The Archaeologist will sign off the 'Archaeologist's Environmental Check Point Schedule' for each field stripped. - A programme of post excavation assessment, analysis, reporting and publication will be agreed with NIEA.	Site Manager Archaeologist Site Agent Site Engineer Environmental Designee

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			Staff to be made aware of responsibilities under legislation	
Landscape and visual	Soil strip, and localised hedgerow removal.	Temporary, landscape and visual impacts during construction period	Planting beds to be established and planted with appropriate species, all in accordance with the Landscape Proposals Plan.	Site Manager Site Agent Environmental Designee
Landscape and Visual	General construction activities	Visual impact of the development on the landscape	Implement landscaping and planting proposals as early as possible whilst ensuring that such features are adequately protected and maintained during on-going construction work in accordance with the relevant standards.	Site Manager
Noise and Vibration	Construction operations	Noise and vibration can be a nuisance to people and animals nearby	- In order to create as little disturbance as possible, normal hours of work during construction will be kept to 07:00 - 19:00 Mon-Fri and 07:00 - 13:00 Sat. Hours outside this period and any night-time working which is required will be kept to a minimum and discussed in advance with the relevant Environmental Health Officer. - Deliveries during daytime hours (except during slipforming concrete works) - If required an Extended Hours Working Plan will be developed in Consultation with Antrim and Newtownabbey Borough Council. - All equipment will have silencers fitted where possible. - Select appropriate equipment for tasks and consider noise levels when ordering plant - Local residents will be informed of the programme of works in advance of any noisy activities. - Agree acceptable noise limits in advance	Site Manager Site Agent Site Engineer
Noise and Vibration	Blasting	Noise and vibration can be a nuisance to people and animals nearby	- Blasting will be permitted within the normal site working hours. - Previous site use was a working quarry so local people will be familiar with blasting operations. - Blasting notifications issued to local residents if required	Site Manager Site Agent
Air Quality	Drilling, blasting and stone processing	Dust emissions from quarry type plant and generated from dry road surfaces – negative	- Quarry plant to be fitted with dust suppression measures e.g. covered conveyors, water spray systems etc - Dust suppression on site roads during dry weather - Dusty materials e.g. cement and sands to be covered	Site Manager Site Agent Site Engineer

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	Driving on site roads	- impact on air quality and human health, vegetation - Potential generation of airborne Erionite fibres.	- Wheel washing of vehicles to reduce material on road surface which could generate dust; - Erionite risk management procedures to be followed.	Environmental Designer
Socio-economics	All work activities	Medium positive impact on local employment during construction.	The possibility exists for employment of local labour and suppliers	
Socio-economics	All work activities	Medium positive impact on local services / suppliers during construction.	The possibility exists for employment of local suppliers and support services	
Socio-economics	All work activities	Minor positive impact on use of local accommodation.	Process contractors from mainland Europe will require accommodation for management staff	
Socio-economics	All work activities	Medium positive impact in the event that upgraded access roads are retained.	No action	
Traffic and transport	Construction traffic access and egress from the site	- Potential minor negative impact on local traffic levels - Damage to local road network	- Traffic impact will be less than maximum levels during the operation of the quarry, however greater than current levels - To minimise the impact of construction traffic on the local road network, a Traffic Management Plan will be developed and agreed with DfI Roads. - Condition survey to be undertaken to highlight any damage caused by construction traffic - Employees will be encouraged to share transport - If appropriate, materials will be purchased locally - Deliveries will be planned to avoid congestion - Roads will be cleaned on a regular basis	Site Manager Site Agent Site Engineer

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Traffic and transport	Construction of Boghill Road upgrade	Impact on local residents and access to properties	- Traffic management plan to be developed in close liaison with property owners - Diversion routes to be identified - Adequate signage and traffic management	
Natural Resource	Fuel in transporting plant and materials to site.	Depletion of natural resource	- Use of local suppliers where possible - Minimising journeys through careful planning and optimum use of space.	Procurement Manager All staff
Natural Resource	Use of construction materials	Depletion of natural resource	- The use of construction materials has been minimised. - Almost all of the aggregates required will be produced on site - Identification of construction materials with recycled content eg concrete, structural steel, reinforcement, - Monitor through purchasing department – target >15% recycled content - FSC certified timber products	Site Manager Site Agent
Natural Resource	Use of construction materials	- Waste creation; - Potential generation of airborne Erionite.	- Where possible ensure that materials are either re-used or recycled; - Requirements to be stated within the Site Waste Management Plan; - Erionite risk management procedures to be followed.	Site Manager Site Agent Site Engineer Environmental Designer
Natural Resource	Construction of access roads	- Depletion of natural resource; - Potential generation of airborne Erionite.	Impacts minimised by: - Attention to the siting of temporary compound and parking areas. These should minimise the areas of hard standings. - Use of secondary aggregates, where available, in preference to primary materials, where they meet the relevant specifications; - Reusing imported stone locally subject to waste management requirements. - Erionite risk management procedures to be followed.	Site Manager Site Agent Site Engineer Environmental Designer.

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5.28 Site Waste Management Plan

Waste management and minimisation at the Facility construction site will be planned, implemented, monitored and reviewed using a Site Waste Management Plan (SWMP). The plan will be prepared and implemented in accordance with the Site Waste Management Plans Regulations.

The aim of the Site Waste Management Plan will follow the Waste Hierarchy and therefore to record how waste is prevented, reduced, reused, repaired, recycled, recovered and disposed of on site. This will be achieved by:

- Recording decisions taken to prevent waste through concept and design.
- Forecasting waste produced on site.
- Planning how to reduce, reuse and then recover the forecasted waste.
- Implementing and monitoring the planned activity.
- Reviewing the SWMP and recording lessons learned.

The SWMP is a live document recording how waste is managed and is updated regularly during the course of the project, that will cover all construction phases until completion. The Contractor will review the SWMP on a minimum 6 monthly basis throughout the duration of construction until project completion and all contractors shall comply with the document and subsequent revisions. The SWMP maybe reviewed earlier than every 6 months in response to a Variation to capture any changes during the course of the Works.

Preparing a SWMP encourages the review of current waste reduction and recovery practice levels, highlighting areas where Good and Best Practice can be achieved. The SWMP facilitates the identification and implementation of waste minimisation at the design stage and reuse and recycling opportunities during on site operations, reducing the quantities of construction waste sent to landfill.

The Project team will use the (WRAP) Waste & Resource Action Programme SWMP Template v2.0 which has been designed to enable designers and contractors to use SWMPs to exceed legislative compliance and demonstrate Good and Best Practice in waste minimisation and management in construction.

The Template is divided into 6 Stages that cover the construction project cycle from policy and setup to project completion and use:

- **policy and setup:** administration details and setting targets
 - **preparation and concept design:** initial concept and design decisions to reduce waste
 - **detailed design:** waste forecasts and waste reduction actions
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- **pre-construction:** waste carriers, waste destinations, waste management and recovery actions
- **construction:** recording actual waste movements
- **post completion and use:** KPIs, reporting, comparing actual quantities with estimates and the declaration.

The use of the WRAP Template offers a number of advantages to the Project:

- clear demonstration of compliance with the SWMP Regulations;
- applicable to the size of project and type of construction;
- enable the Project team to identify and demonstrate a progression from Standard to Good and Best Practice;
- minimum data entry by automatically pulling through data and using a predetermined list of waste;
- data can be transferred from WRAP's Net Waste Tool to forecast waste arisings sheet;
- enables calculation of KPIs on waste and materials for projects, and;
- allows for easy identification of areas where improvements can be investigated.

The new Template can be used alongside WRAP's Net Waste Tool (which generates construction project waste forecast data) and WRAP's Waste to Landfill Reporting Portal (which helps in reporting project SWMP performance at a corporate level).

The Template allows the user to select the material waste arisings from a pre-defined list of materials which aligns with BRE's SMARTWaste material classifications.

The EPC Contractors have set a minimum target of 15% for the use of re-used and recycled materials in the works. This includes materials derived from the works and imported for the works. This will be monitored by a Key Performance Indicator and reported on a monthly basis.

The EPC Contractors will also utilise the National Industrial Symbiosis Programme (NISP) to identify any wastes which may have a value to other member companies and explore all opportunities for third party re-use.

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