Lianhetech Seal Sands

Permit Variation Application for Fine Organics Limited

PP3439GG_FOL_Variation Application V008

Contents

1 Variation Application Introduction

Lianhetech Seal Sands is a trading name of Fine Organics Limited.

Fine Organics Limited (FOL) are permitted to operate an installation under of Section 4 Part A (1) sub–sections (a) (i – viii) of the Environmental Permitting ('EPR') (England and Wales) Regulations 2016 (as amended).

In 2025, a new small-scale process known as 'FCM (Flocoumafen)' was introduced into the site's product portfolio. The product is a Rodenticide and is categorised as potent and highly toxic. Additionally, the registered manufacturing process includes the use of EDC (1, 2-dichloroethane). The annual demand is up to 200kg of active product.

This manufacturing process falls under Section 4.4 Part A (1) (a) – Producing plant health products or biocides, which is already an activity in EPR/PP3439GG/V007.

The FCM commercial process will be manufactured in the development laboratories facilities, which will be modified to incorporate a new HVAC, abatement system and emission point.

FOL wishes to formally notify the Environment Agency of these changes in operation through this application for a substantial variation. This report provides the information required to support such an application and is supplemented by reports on specific technical topics which have been completed by an external organisation. FOL is requesting confidentiality on selected supporting documents provided in this application.

The enhanced pre-application reference is EPR/PP3439GG/P001.

2 The Operator

Current Permit Number
EPR/PP3439GG/V007

Issued to Fine Organics Limited ("the operator"), site address is:

Fine Organics Limited
Fine Organics Seal Sands Facility
Seal Sands Road
Middlesbrough
Cleveland
TS2 1UB

Company registration number 01532065.

The Site is used by Lianhetech Seal Sands and is operated and permitted as Fine Organics Limited (FOL) for the manufacture of a range of speciality organic fine chemicals under its Multi Product Protocol (MPP). The operator became part of the Lianhetech Group in 2017, the present site has been manufacturing a range of intermediates and final products to customers in the agrochemical, pharmaceutical and speciality chemicals sectors under tolling agreements since 1984 with a presence on Teesside since 1977.

After making an initial application for permit in 2003 as Laporte Industries Limited, the operator was issued its first permit BV5971IG in 2004. After a set of minor variations to make textual corrections followed by a variation to meet the requirements of the Waste Incineration Directive the permit was issued in 2005 as V004. In 2007 V005 was issued after an application to remove reference to a specific manufacturing process no longer under the operator control, to address improvement condition footnotes and consolidate previous variations.

Under a management buyout, the permit transferred to FOL from Laporte Industries to the current permit number PP3439GG as V001 in 2008. In 2012 a partial transfer of the permit was made to move operational control of the waste incineration plant to Fine Environmental Services (which is part of the Lianhetech Group) followed by a further variation in 2013 to implement the changes introduced by the Industrial Emissions Directive. A consolidated V004 of the permit was issued in 2015 which introduced a change to operating techniques and monitoring methods.

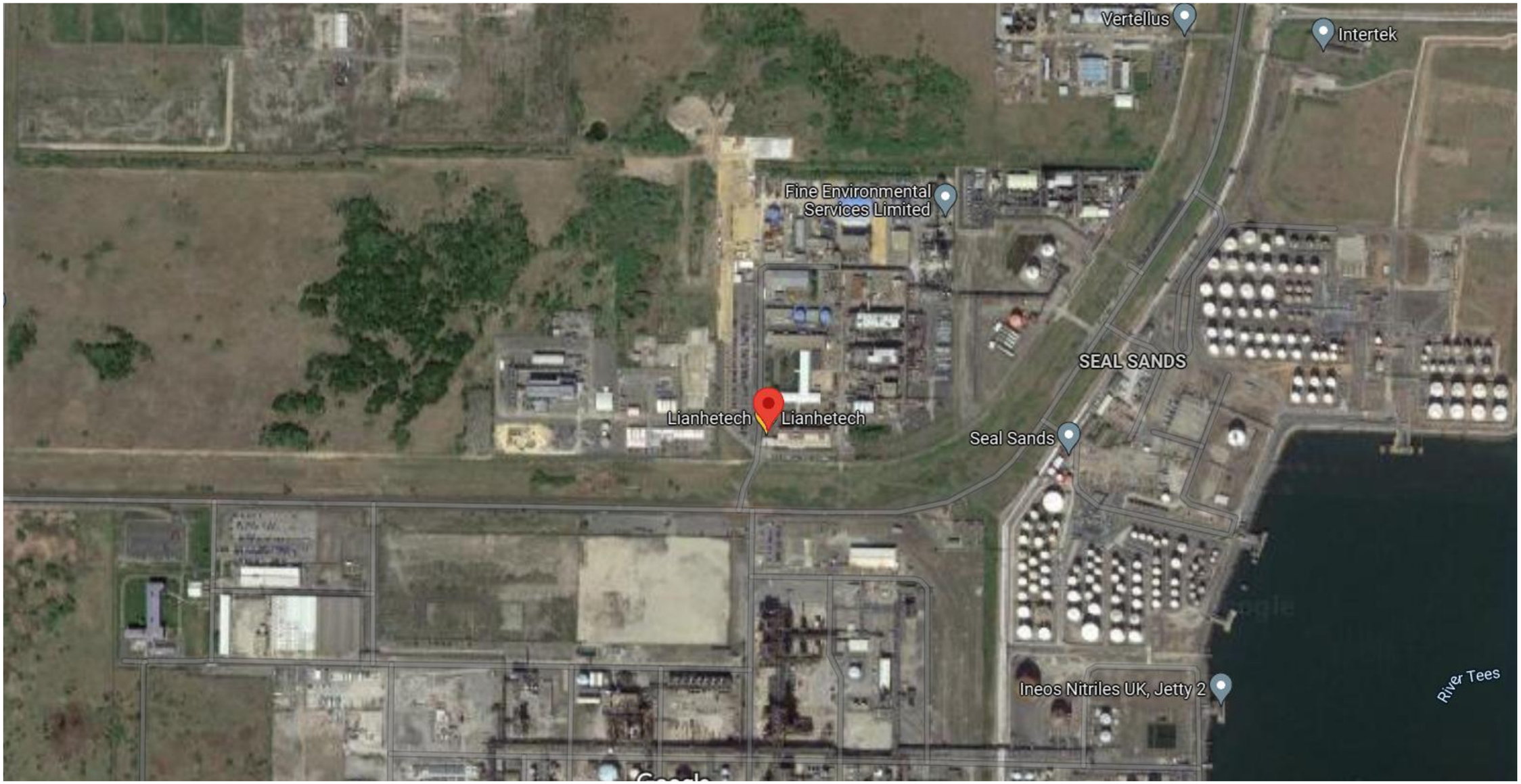
The permit V006 was issued in 2018 after a substantial variation application (V005 application withdrawn by the operator in 2017) to re-route an emission to air point, recommission an ozone generating plant and associated emission point, and include additional monitoring methods to existing emission to air points.

In early 2022, the operator submitted variation application, V007 to include LC900 manufacturing process as annual tonnages will exceed that managed under current under MPP guidance approval, a process improvement option, inclusion of MCP permit and expansion of the site installation boundary. This was then extended, during review of the permit, in 2024, to include the FPM manufacturing process. The final consolidated V007 of the permit was issued in March 2026.

This variation application, V008, is to introduce a new small-scale process known as FCM into the site's product portfolio; the product is a Rodenticide and is categorised as potent and highly toxic. The FCM commercial process will be manufactured in the development laboratories.

The location of the site is shown in the screenshots below.

The National Grid Reference for the site is NZ5369324704.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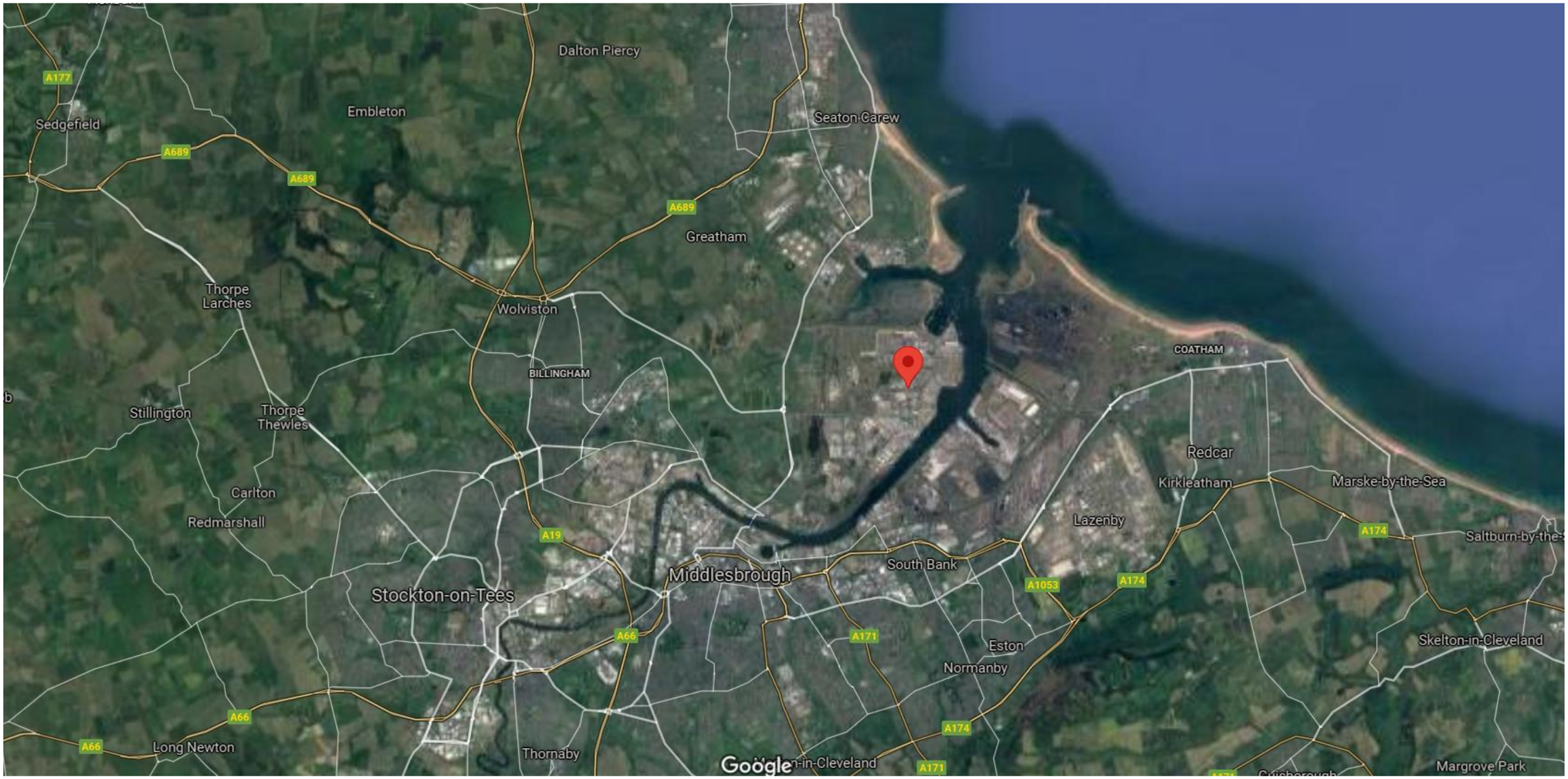
Fine Environmental Services Limited
SEAL SANDS
Lianhetech
Lianhetech
Seal Sands
Ineos Nitriles UK, Jetty 2
River Tees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Thorpe
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BILLINGHAM
COATHAM
Stillington
Thorpe
Thewles
Redcar
Kirkleatham
Marske-by-the-Sea
Carlton
Redmarshall
Lazenby
A174
A19
Middlesbrough
South Bank
A1053
A174
Stockton-on-Tees
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Eston
Normanby
Skelton-in-Cleveland
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Long Newton
Thornaby
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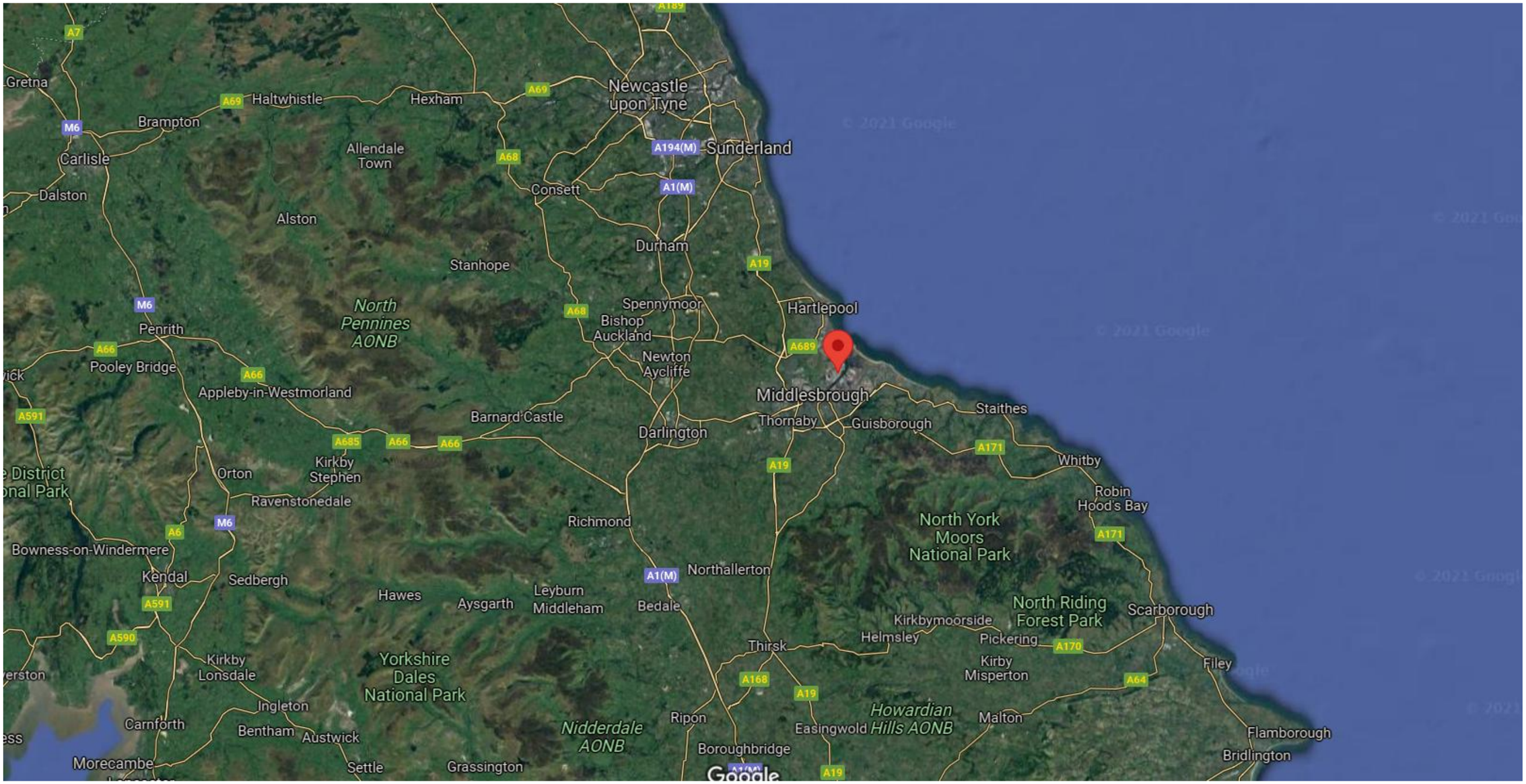
Google
Margrove Park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Hexham
Newcastle upon Tyne
Brampton
Carlisle
Allendale Town
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Dalston
Consett
Alston
Durham
Stanhope
North Pennines AONB
Spennymoor
Hartlepool
Bishop Auckland
Penrith
Pooley Bridge
Newton Aycliffe
Middlesbrough
Appleby-in-Westmorland
Staithes
Barnard Castle
Thornaby
Guisborough
Darlington
Whitby
Kirkby Stephen
Orton
Ravenstonedale
Robin Hood's Bay
Richmond
North York Moors National Park
Bowness-on-Windermere
Northallerton
Kendal
Sedbergh
Hawes
Aysgarth
Leyburn
Middleham
Bedale
North Riding Forest Park
Scarborough
Kirkbymoorside
Helmsley
Pickering
Thirsk
Kirkby Lonsdale
Yorkshire Dales National Park
Kirby Misperton
Filey
Ingleton
Carnforth
Bentham
Austwick
Ripon
Howardian Hills AONB
Easingwold
Malton
Nidderdale AONB
Flamborough
Boroughbridge
Bridlington
Morecambe
Settle
Grassington
Google

3 Non-Technical Summary

Following the pre-application guidance, form Part A and Part C2 and C3 are provided as part of this application. The documents are referenced:

PP3439GG_FOL_V008_Form Part A
PP3439GG_FOL_V008_Form Part C2
PP3439GG_FOL_V008_Form Part C3

3.1 Reason for variation

In 2025, the process 'FCM' was introduced on site, with the intention of starting commercial manufacture mid-2026. Due to the low customer demand of the product (up to 200kg/year), the product will be manufactured in the development laboratories on site, which doesn't currently have a registered environmental monitoring point. Therefore, this application is not suitable for inclusion under the currently Multi-Product Protocol (MPP).

FCM is a second-generation anticoagulant rodenticide derived from 4-hydroxycoumarin, developed in response to the emergence of warfarin-resistant rats. The process involves undertaking the last step of a multi-stage chemical synthesis, consisting of reaction of a tetralol ether with 4-hydroxycoumarin to yield the FCM. The final step is the process is to filter and mill the product into a fine powder, that is then packaged into ~4.15kg bags and shipped to the customer site for final formulation.

The process is outside the range of products previously manufactured on site and the volumes are too small for current manufacturing assets. Therefore, the intention is to manufacture FCM in a modified laboratory area, which will be customised to handle the potent and toxic nature of FCM and also EDC.

3.2 Key changes and impact of change

3.2.1 The FCM manufacturing process

This is a new product introduction for the Lianhetech Seal Sands (LSS) facility, with a proposed start date of July 2026. FCM is a potent active ingredient (AI), classified as highly toxic (LD_{50} = 250 µg/kg; OEL <100 ng/m³ based on single-dose rat studies), and falls outside the range of compounds previously handled at the site. To meet customer demand, Development Laboratories 1 and 2 will be upgraded to support commercial manufacture of FCM using ~50 L scale equipment. The process is designed to produce up to 200 kg per annum.

The FCM process consists of 7 stages:

- Stage 1 – Condensation Reaction
- Stage 2 – Neutralisation and Phase Separation (including waste treatment)
- Stage 3 – EDC Removal by Vacuum Distillation
- Stage 4 – Methanol Solvent Exchange by Atmospheric Distillation
- Stage 5 – Crystallisation
- Stage 6 – Filtration and Drying
- Stage 7 – Milling

Detailed chemistry and process flow diagrams are provided in **Section 10** of this report.

The manufacture of the FCM process will be carried out in existing lab facilities, there is no significant changes that would impact the energy consumption and therefore expected energy efficiency changes are considered minimal.

Further energy efficiency choices in the design, equipment selection and operation are further discussed in **Section 10** of this report.

The project for the FCM process is intended to produce up to 200 kg of FCM per annum, in 2 batches per week loads of approximately 2.5 kg per batch, to fulfil the customer requirements.

This will be the first time the process has been operated commercially at the Seal Sands, and the operating conditions will be monitored and optimized where possible within the regulatory constraints to minimize the usage of raw materials and generation of effluent streams to reduce the environmental impact of the process.

Further details of efficient use of raw materials, waste recover and disposal are provided in **Section 10** of this report.

Due to the commissioning of a new stack and therefore, a new established point source emission to air, referenced A1/5, an air quality impact assessment was commissioned to determine the impact to pollution dispersion from the point source emission and the impact on sensitive receptors. The assessment concluded that process contributions are insignificant and there are no predicted exceedances of the EALs for the protection of human health at the point of maximum ground level impact or any human exposure location outside the site boundary.

The installation has one permitted release point for emission to sewer or effluent treatment plant; this is referenced as release point D1 and is described as discharges to Bran Sands Treatment Works operated by Northumbrian Water. From this change, there are no process waste transfers to Bran Sands via D1 and therefore the current agreement with Bran Sands will remain unchanged.

The site has no existing point sources of emissions to land and does not propose to add a point source to land as part of this project.

The operator is located in an area of significant and similar industrial use, with extensive chemical manufacturing and processing operations. Raw materials and intermediates involved in the new manufacturing process are of low odour potential therefore environmental impact from odour, noise and vibration are considered as low.

There are no nearby residential receptors within 3.5km of the site.

3.2.2 Schedule 3 amendment

For this change, current permit conditions require a Schedule 3 amendment to introduce a parameter limit to be agreed with the Agency for the emission of EDC and methanol from the new stack, with reference emission point, A1/5.

3.2.3 Infrastructure changes

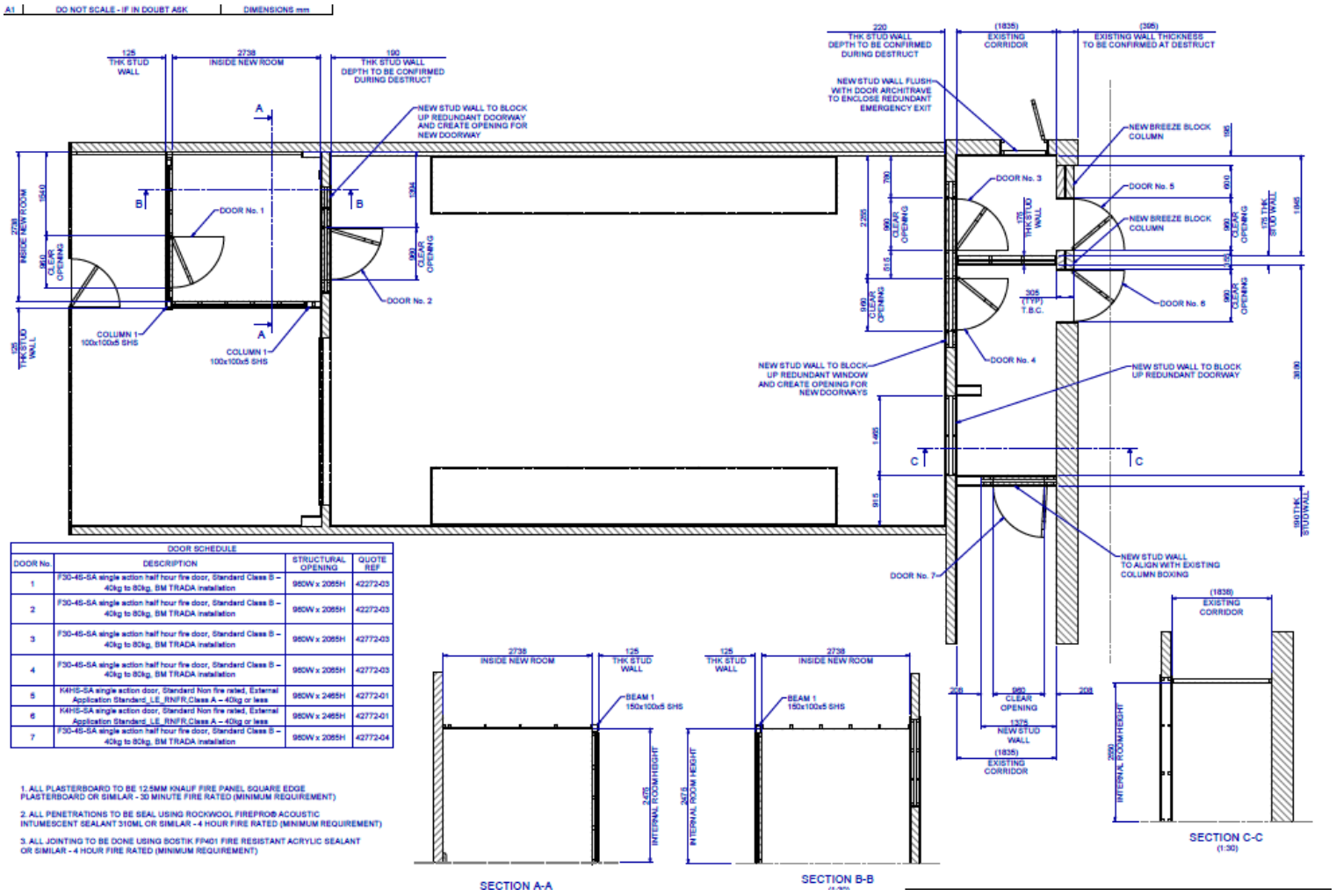
The design and operation of the FCM process will have minimal infrastructure changes, limited to a small modification to the Laboratory 1 & 2 spaces as described below:

- The existing laboratory 1 & 2 main processing area footprint will remain the same, with a minor change of installing new floor-to-ceiling fume cupboards. NOTE: Only half of lab 2 is required for FCM and only 3 out of 11 fume cupboards are being replaced across both labs
- All fume cupboards have secondary containment, in line with CIRIA C736 key requirements, which specifically requires bunds to have a minimum capacity of 110% of the largest tank. The bund capacities are demonstrated below in comparison to the volume within the fume cupboard.

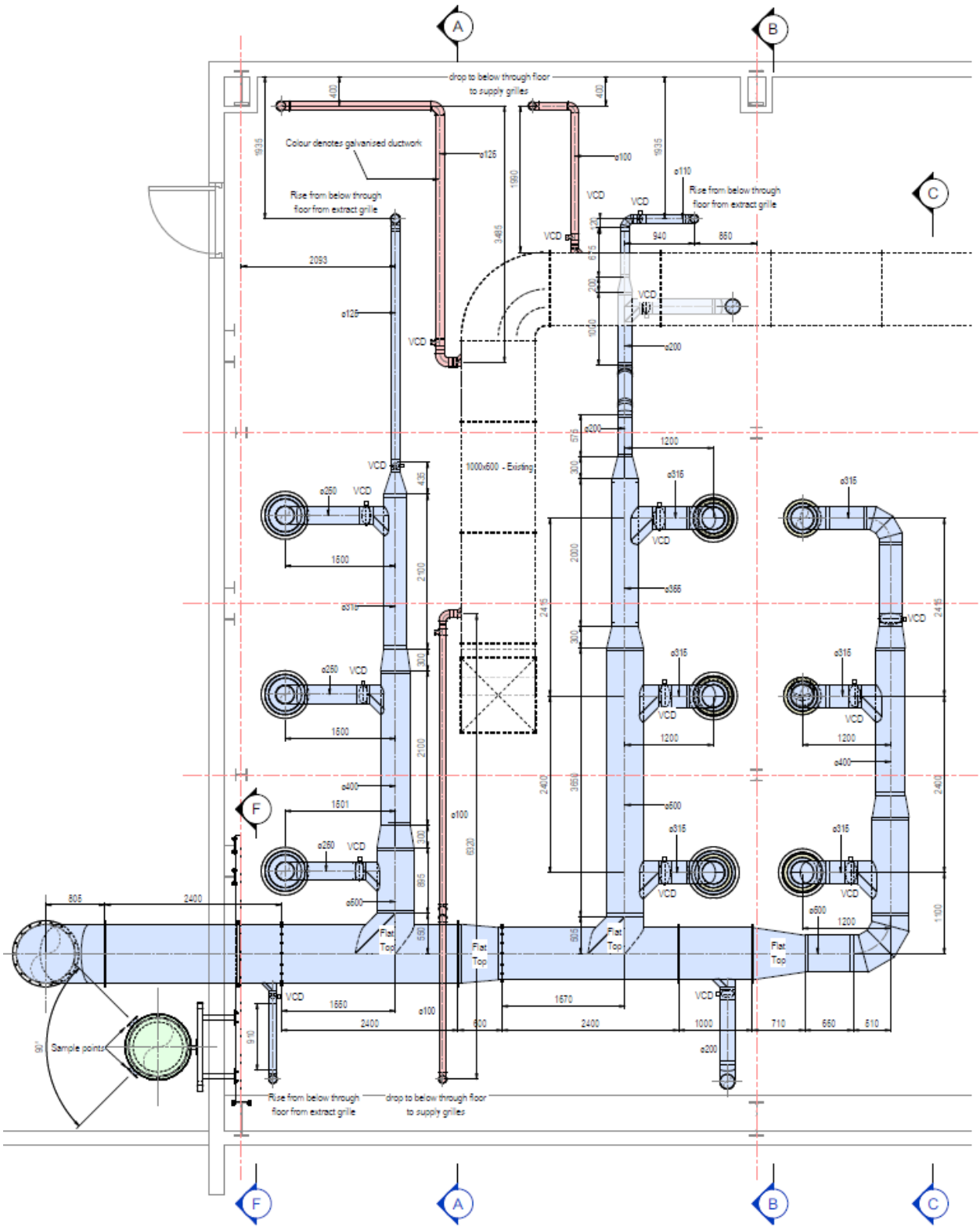
Maximum EDC volumes per fume cupboard

Fume Cupboard	Vessel	EDC Content	Max EDC content per FC	Bund capacity
1	R5	~1.5 kg / 1 L (5-10% EDC in ~20 L of MeOH / FCM mix)	14 L	146.5L
	R3	17.5 kg / 14 L		
	R4	11 kg / 9 L		
2	V3	~20 kg / 18 L (conc. Residues from R1, ~28 kg total)	18 L	100L
	V4	~1.5 kg / 1 L (5-10% EDC in ~20 L of MeOH / FCM mix)		
3	R7	5L	5L	70.6L
	R8	5L		
4	R2	~18 kg / 14 L	56 L	70L
	R6	~70 kg / 56 L		
5	V1	30-34 L (~40 kg)	35 L	130L
	V2	30-34 L (~40 kg)		
	R1	30-34 L (~40 kg) + 2 kg = ~42 kg (~35 L)		
6	V5	Negligible (aqueous washes)	Negligible	65.5L
	Scrubber	Negligible		

- At both ends of Laboratory 1, ancillary areas to create material and personnel airlocks to maintain a negative pressure differential within the main processing room will be incorporated into the current footprint of the building by erecting walls and doors, as shown in the Engineering drawing below.



- The air supply for all FCM areas will come from the existing supply. A new dedicated extract fan and environmental stack system will remove the air from Lab 1 main processing room and associated ancillary rooms, x6 fume cupboards and Lab 2 x3 fume cupboards, as shown in the Engineering drawing below.



- The process equipment will be vented through a carbon bed, prior to the connection to the environmental stack.

As the volumes being handled are small, current site infrastructure is acceptable.

4 Site Plans

4.1.1 Site Plans

Site plans have been included as supporting documents to this application.

The reference for the site plan, with emission point references is:
PP349GG_FOL_Site Plan_SL-0-1605-C

Following the pre-application guidance, form Part C2 is provided as part of this application.

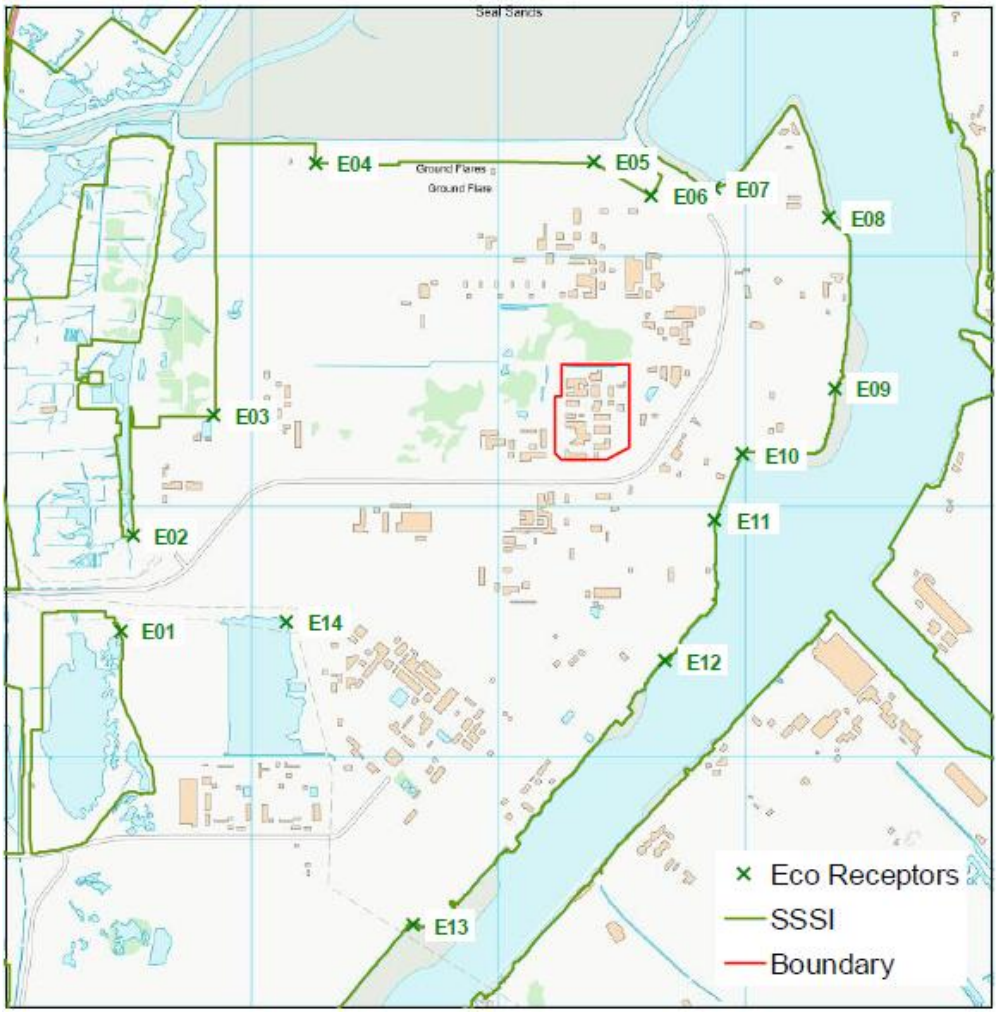
4.1.2 Manufacturing location

As the location of manufacture remains unchanged there is no change the distance or orientation to the nearest human and ecological receptors which are South Bank at 3.5km and Teesmouth & Cleveland Coast at 0.5km E, 1.0km N.

Human Receptors	
Receptor ID	**Description**
H01	Coatham
H02	Dormanstown
H03	Grangetown
H04	South Bank
H05	Port Clarence
H06	Billingham
H07	Billingham St Michael's School
H08	Newton Bewley
H09	Greatham
H10	Seaton Carew

Ecological Receptors	
Receptor ID	**Description**
E01 – E13	Teesmouth and Cleveland Coast
E14	Reclamation pond


H10
H08
H09
H01
H07
H02
H06
H05
H04
H03


Seal Sands
E04
Ground Flares
Ground Flare
E05
E06
E07
E08
E09
E03
E10
E11
E02
E01
E14
E12
E13
Eco Receptors
SSSI
Boundary

5 Site Condition Report

A site condition report was completed in 2021, with variation application V007, which was issued by the Environment Agency in 2026. There are no changes from this variation application, V007 which impact the report completed in 2021 and therefore there is no requirement to update the Site Condition Report.

6 Habitats and Receptors

The nature conservation sites identified to be considered in the application include Special Protection Areas (SPA), Ramsar, Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR) and Local Wildlife Sites (LWS).

The COMAH Regulations Ecology Report for Lianhetech prepared by INCA (Industry Nature Conservation Society), updated July 2021, provides information on these ecologically sensitive sites in the vicinity of the FOL site. The report identifies the most important sites with ecological interest within a 10 km radius and summarises the ecology and nature conservation value of those sites.

The full report is provided as document referenced **PP3439GG_FOL_Ecology Report**.

Air emission modelling has shown that there will be no impact on habitats identified in the screening zone.

6.1 Internationally Designated Sites - Special Protection Area and Ramsar

There are two internationally designated sites within a 10 km radius of the installation: Teesmouth & Cleveland Coast Special Protection Area (SPA) and Teesmouth & Cleveland Coast Ramsar site. SPAs are designated under the EU Wild Birds Directive whereas Ramsar sites are wetlands of international importance. The Ramsar site shares the same boundary as the SPA except where the SPA includes a marine component. The intertidal element of the Teesmouth & Cleveland SPA is also classed as a European Marine Site and shares its interest features with the SPA. The full report details the qualifying features for Teesmouth & Cleveland SPA/Ramsar and the species oh high value or those with special protection.

The boundary of the SPA covers an area from Caste Eden Denemouth in the north to Marske-by-the Sea in the south and includes the River Tees up to the Tees Barrage resulting in a SPA area of 12,226 ha. Historically the Teesmouth & Cleveland SPA and Ramsar have effectively shared the same boundary and interest features, however due to the recent SPA extension and Ramsar extension, the Ramsar only covers those terrestrial extension areas of the SPA down to Mean Low Water and does not extend outside of the SPA. The Ramsar covers 2094 ha.

6.2 Nationally Designated Sites - Sites of Special Scientific Interest

There are two Sites of Special Scientific Interest (SSSI) within a 10 km radius of the installation; Teesmouth & Cleveland Coast and Lovell Hill Pools. Teesmouth & Cleveland Coast SSSI is an amalgamation and rationalisation of the seven SSSIs which were formally present in the Teesmouth area. It extends the original SSSIs geographically to underpin the non-marine elements of the extension to Teesmouth & Cleveland Coast SPA and Ramsar and includes some additional, non-SPA areas as well as adding new interest features.

Sites of Special Scientific Interest (SSSI) within 10 km of FOL	
Teesmouth & Cleveland Coast	Many features: Jurassic geology Quaternary geology Saltmarsh Sand dunes Harbour seal Breeding birds Non-breading birds Invertebrate assemblage
Lovell Hill Pools	Dragonflies assemblage Great Crested Newt

Teesmouth & Coast SSSI is an extensive mosaic of coastal and freshwater habitats centred on the Tees Estuary, including sand dunes, saltmarsh, mudflats, rocky and sandy shire, saline lagoons, grazing marshes, reedbeds and freshwater wetlands. These habitats support rich assemblages of invertebrates, breeding seals and large numbers of breading and non-breading seabirds and water birds.

Lovell Hill Pools is an area of pool and wetland habitats resulting from subsidence of old ironstone mining operations. Lovell Hill has some botanical interest, holds several species of amphibians and has ornithological interest.

6.3 National Nature Reserve

National and Local Nature Reserves (NNR and LNR) are statutory designated sites, which are declared by Local Authorities. To qualify for designation, they must have some substantive nature conservation interest but also have the benefit of providing public education or public enjoyment of nature. Parts of the Teesmouth and Cleveland Coast SSSI are also designated as NNR. The NNR consists of two parts, the intertidal mudflats at Seal Sands and the dunes and grazing marshes around the North Gare. As the interest features of the NNR are a sub-set of the SSSI it is not discussed separately in the full report.

In summary:

Local Nature Reserve (LNR) within 10 km of FOL	
Berwick Hills Community Park	BAP habitat – Reedbeds; Water Vole
Billingham Beck Valley Country Park	BAP habitats- Lowland Fen & Reedbeds
Charlton's Pond	BAP habitat – Eutrophic Standing Waters
Cowpen Bewley Woodland Park	BAP habitat – Lowland Meadow; Great Crested Newt site, dragonflies
Errington Woods	BAP habitat – Lowland Mixed Deciduous Woodland. Great Crested Newt
Eston Moor	BAP habitat – Lowland Heath
Flatts Lane	BAP habitat – Lowland Mixed Deciduous Woodland
Greatham Beck	No BAP habitats.
Linthorpe Cemetery	No BAP habitats.
Norton Grange Marsh	BAP habitat – Lowland Fen
Seaton Dunes & Common	Wintering waterbirds; BAP habitats – Grazing marsh and sand dunes; Common Toad
Summerhill	BAP habitats – Lowland Mixed Deciduous Woodland; Ponds

6.4 Local Wildlife Sites

Local Wildlife Sites are designated by Local Authorities. LWS do not have statutory protection but receive some protection from development through policies in the Local Plans of the respective Local Authorities.

In summary:

Local Wildlife Sites (LWS) within 10 km of FOL	
A19 Gorse Field	BAP habitats – Lowland Meadow; Lowland Fen
Air Products Reedbeds	BAP habitat – Reedbeds
Brenda Road Brownfield	BAP habitat – Open Mosaic Habitat; Great Crested Newt
Brenda Road Sewage Works	BAP habitat – Open Mosaic Habitat; Dingy Skipper butterfly
Brierton Quarry	Former sand quarry, partially refilled. Colonising naturally with scrub and ruderal species. Small area of neutral grassland.
Chaloner Pits	Great Crested Newt

Local Wildlife Sites (LWS) within 10 km of FOL	
Coronation Drive Embankment	BAP habitat – Lowland Meadow
Dunsdale Woods Complex	BAP habitat – Lowland Mixed Deciduous Woodland
Dunsdale Meadow	BAP habitat – Lowland Meadow
Eston Pumping Station	Mosaic of habitats
Gravel Hole	BAP habitat – Lowland Meadow
Greenabella Marsh	BAP habitat – Reedbeds; Waterbirds,
Hartlepool Power Station	Ungrazed grassland with pools and scrub. Common Lizard
Marton West Beck	BAP habitat – Lowland Mixed Deciduous Woodland; Water Vole
Maze Park	BAP habitats – Open Mosaic
Middlebeck	Water Vole
Newham Beck complex	BAP Habitats – Lowland Meadow & Lowland Mixed Deciduous Woodland
North Burn Marsh	BAP habitat Lowland Fen
Norton Bottoms	BAP habitat - Reedbeds
Norton Foundry Tip Grassland	BAP habitat – Lowland Meadow
Old River Tees	BAP habitats – Reedbeds; Saltmarsh
Phillips Tank Farm	Dingy Skipper butterfly; Great Crested Newt; Wintering waterbirds
Portrack Meadows	BAP habitats –Saltmarsh; Open Mosaic Habitat
Queens Meadow	Great Crested Newt; amphibians
Redcar to Saltburn Coast	Coastal grassland; Common Lizard
Rossmere Park	Entire wintering pop of Teesmouth Little Egrets roost here.
Seaton Common	Breeding Common Toad.
Teessaurus Park	BAP habitat – Open Mosaic Habitat

Local Wildlife Sites (LWS) within 10 km of FOL	
The Howls	Ancient semi-natural woodland
Tot Fenny's Field	Lowland Meadow and Lowland Fen.
Whinney Banks Pond	No BAP habitats listed
Wilton Woods Complex	Ancient Semi-Natural Woodland
Zinc Works Field	Ornithological importance, particularly passage migrants

7 Environmental Management System

Following the pre-application guidance, form Part C2 is provided as part of this application.

Fine Organics has a documented Environmental Management System (EMS) which is independently checked by an awarding accredited body and certified against ISO14001:2015 for the development and manufacture of fine chemicals. Current certificate is valid from 23 February 2024 until 09 February 2027 and remains valid subject to satisfactory surveillance audits.

A copy of the certificate is provided as document referenced **PP3439GG_FOL_ISO14001_GB0977969_09Feb27.**

There are no changes to the EMS following introduction of the FCM process to site.

8 Environmental Risk Assessment

Following the pre-application guidance, form Part C2 is provided as part of this application. The site is ISO 14001 accredited, and a key part of its environmental management system is the 'Aspects & impacts register'. As part of the project, the site has completed a risk assessment review of the changes that the project will have in relation to its environmental risk. The review has considered new risks that will be introduced to the site and the impacts on existing risks. The review has also considered impacts on control measures used to mitigate risks. The review has considered the following general topics, based on the requirements of the published EA guidance:

- Air
- Land
- Water
- Waste
- Energy
- Substance Management
- Noise and vibration
- Odour
- Resources

EDC use justification

- FCM is a registered process, and the use of EDC cannot be substituted
- A BAT Assessment has been completed to ensure the use of EDC is controlled and consistent with prevention and minimisation of environmental impact against the best available technique (BAT) reference (BREF) document for manufacture of organic fine chemicals. There have also been considerations for the future BREF document for the sector, which has currently been released for consultation.
- BAT conclusions assessment is provided in document referenced **PP3439GG_FOL_BAT Conclusion Assessment.**

Rodenticide

- FCM is a highly potent and toxic solid, classified among high-hazard substances due to its extreme pharmacological activity and potential for bioaccumulation.
- Due to its hazardous nature, rigorous control measures are essential during all phases of handling, processing, and storage. These include:
    - Use of enclosed equipment and engineering controls
    - Implementation of negative pressure environments
    - High-efficiency particulate air (HEPA) filtration systems
    - Use of personal protective equipment, including respiratory protection

Due to the small-scale laboratory manufacture, fully contained handling systems, and absence of direct release pathways, environmental exposure is not expected.

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Emissions to atmosphere (air) from increased chemical processing	Local population Local habitats close to the site	Air dispersion	• Inherent process design reduces emissions • Closed system material handling where required • Use of condensers and solvent recovery • Use of carbon bed • Powder handling is carried out inside an isolator • Use of HEPA Filter on powder handling system • Screening assessment using air dispersion modelling demonstrates emissions of EDC and methanol are below relevant environmental assessment levels (Document reference: PP3439GG_FOL_Air Emissions Risk Assessment) • Routine maintenance of equipment • Existing site SOPs • Training of personnel in processing • Emissions are controlled through use of abatement systems, in line with Best Available Technology, and scheduled emissions monitoring is undertaken in accordance with permit requirements	Low	Atmospheric pollution Contamination of habitat	Low with risk management in place	Yes Air impact assessment required to confirm risk remains tolerable	Acceptable, low levels of risk following completion of action. Document reference: PP3439GG_FOL_Air Emissions Risk Assessment
Emissions to atmosphere (air) from visible air emissions (smoke or visible plumes)	Local population Local habitats close to the site	Air dispersion	The process doesn't emit visible plume / smoke	Low	Atmospheric pollution	Low	No	Acceptable levels of risk
Emissions to atmosphere (air) from EDC charge station	Local population Local habitats close to the site	Air dispersion (to registered emission point)	• Fully welded transfer pipework • Dry fit coupling on EDC drum • Other joints are within fume cupboards • EDC charge is under vacuum • Vacuum exhaust is directed to carbon bed for abatement of solvent • Charge linework pressure tested (vacuum) for integrity before transfer • System designed to BAT principles for VOC containment • Emissions are controlled through use of abatement systems, in line with Best Available Technology, and scheduled emissions monitoring is undertaken in accordance with permit requirements	Low	Atmospheric pollution	Low with risk management in place	No	Acceptable levels of risk

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Manufacture and handling of rodenticide	Local population Local habitats close to the site	Dust / powder release (fugitive) Waste streams	• Powder handling in isolator • Contained transfers • Use of enclosed equipment and engineering controls • Implementation of negative pressure environments • High-efficiency particulate air (HEPA) filtration systems • No direct environmental release pathways • Use of suitable personal protective equipment (PPE), including respiratory protection	Low	Toxicity to non-target organisms	Low with risk management in place	No	Due to contained handling and absence of exposure pathways, risk to non-target species is negligible
Chemical spill from an accident – general loss of containment from chemical handling	Local population Local habitats close to the site	Air dispersion (to registered emission point) Emissions to water through drains Loss to ground	• Fully contained transfers from vessel to vessel • Discharges into plastic containers • Manual handling activities will be minimised and controlled by risk assessment • Bunding within fume cupboards • Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • Spill absorbent within fume cupboards • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • Pressure relief system, contained within fume cupboard in an emergency / abnormal situation • Laboratory under negative pressure compared to surrounding areas to prevent vapour losses to atmosphere • Powder handling is carried out inside an isolator • Loss of containment within isolator is directed through a HEPA filter • Impact protected packaging for finished product (which is a powder) • Existing site SOPs • Training of personnel in safe handling • HAZOP risk assessment technique formally identifies spill risks • Maintenance of equipment • Operator monitoring of equipment	Low due to containment design of operations	Atmospheric pollution Contamination of habitats Land contamination Shallow ground water aquifer contamination	Low with risk management in place	No	Acceptable levels of risk

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Chemical spill from an accident – transferring substances (including loading and unloading vessels)	Local population Local habitats close to the site	Air dispersion (to registered emission point) Emissions to water through drains Loss to ground	• Inherent process design significantly reduces risk from vessel transfers • Fully welded transfer pipework • Bunding within fume cupboards • Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • Spill absorbent within fume cupboards • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • All joints are within fume cupboards • Existing site SOPs • Integrity of equipment is tested through leakage rate under vacuum before batches start which identifies leak risks before they occur • Training of personnel in safe handling • HAZOP risk assessment technique formally identifies spill risks • Maintenance of equipment • Operator monitoring of equipment	Low due to containment design of operations	Atmospheric pollution Contamination of habitats Land contamination Shallow ground water aquifer contamination	Low with risk management in place	No	Acceptable levels of risk
Chemical spill from an accident – overfilling vessels	Local population Local habitats close to the site	Air dispersion (to registered emission point) Emissions to water through drains Loss to ground	• EDC charge into fume cupboard with use of bund system (secondary containment) • EDC charged from drum under dead vacuum, charge would auto-stop if the vessel became full of liquid • Existing site SOPs • Training of personnel • HAZOP risk assessment technique formally identifies overfill risks • Maintenance of equipment, • Operator monitoring of equipment	Low due to containment design of operations	Atmospheric pollution Contamination of habitat Land contamination Shallow ground water aquifer contamination	Low with risk management in place	No	Acceptable levels of risk

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Chemical spill from an accident – plant or equipment failure / damage including storage	Local population Local habitats close to the site	Air dispersion (to registered emission point) Emissions to water through drains Loss to ground	• EDC storage is segregated, locked and within bund (secondary containment) • EDC drum in use is in bunded area; Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • All vessels are within fume cupboards with bunds • Integrity of equipment is tested through leakage rate under vacuum before batches start to identify leak risks before they occur • High standard of equipment installation for primary containment systems • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • Training of personnel in spill management • HAZOP risk assessment technique formally identifies spill risks • Maintenance of equipment • Operator monitoring of equipment	Low due to containment design of operations	Atmospheric pollution Contamination of habitat Land contamination Shallow ground water aquifer contamination	Low with risk management in place	No	Acceptable levels of risk
Chemical spill from an accident – EDC transport from storage area to use area	Local population Local habitats close to the site	Air dispersion (fugitive emission not to a registered emission point) Emissions to water through drains Loss to ground	• Trained FLT drivers • FLT drivers will transport EDC from storage area to drop off point approx. 2 – 3 times a year • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • Transfer by drum lifter from drop off point to charging station • Emergency spill response plan in place (WI/S/049) • Training of personnel in spill management • Baseline soil and groundwater assessment completed • Groundwater sampling every 5 years and soil sampling every 10 years or following any confirmed loss to ground • Monitoring suite will include contaminants relevant to EDC (e.g. hydrocarbons, solvents, metals as applicable) and these results are reviewed against UK environmental quality standards	Low to medium due to infrequency of task	Atmospheric pollution Contamination of habitat Land contamination Shallow ground water aquifer contamination	Moderate with risk management in place	Yes – update WI/S/049 to incorporate this infrequent task into Emergency spill response plan	With engineered containment, trained operators, established spill response procedures, and periodic soil and groundwater monitoring in place, the risk of long-term groundwater contamination is considered medium but controlled, with no further action required at this time beyond routine review. In the event of a full drum loss, secondary containment and drainage controls prevent any off site environmental impact.

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Chemical spill from an accident – EDC charging station	Local population Local habitats close to the site	Air dispersion (fugitive emission not to a registered emission point) Emissions to water through drains Loss to ground	• Dry fit coupling to prevent opening the container and fugitive emissions to atmosphere • EDC drum in use is in bunded area; Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • Charging EDC by vacuum therefore no potential loss to atmosphere due to overpressure	Low	Atmospheric pollution Contamination of habitat Land contamination Shallow ground water aquifer contamination	Low with risk management in place	No	Acceptable level of risk
Inadequate bunding	Local population Local habitats close to the site	Air dispersion (fugitive not to registered emission point) Emissions to water through drains	• Use of bund systems (secondary containment) • Bund calculations • Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • Existing site SOPs • Training of personnel in spills management • Maintenance of equipment, including bund systems • Operator monitoring of bunds	Low due to containment design of operations	Atmospheric pollution Contamination of habitat	Low with risk management in place	No	Acceptable levels of risk
Use of chemicals to manufacture products	Local population Local habitats close to the site	Land and water	• High standard of equipment installation for primary containment systems • Use of bund systems (secondary containment) • Secondary Containment in line with CIRIA C736; chemical storage bunds hold 110% of the capacity of the largest container stored. • Drainage system fit for purpose as secondary containment to protect tanks prior to discharge to Effluent Treatment Plant • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water • Existing site SOPs for effluent testing • Training of personnel in spills management • HAZOP risk assessment technique formally identifies spill risks • Maintenance of equipment • Operator monitoring of equipment	Low due to management systems	Atmospheric pollution Contamination of habitat	Low with risk management in place Chemical handling to remain within current site EPR operational boundary	No	Acceptable levels of risk

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Fire water run-off	Effluent treatment plant	Loss to hard standing floor	• No additional risk from the introduction of the FCM process to the laboratory • Contained drainage system with interception points across site which allows isolation in the event of a fire to ensure containment across site • Any contaminated firewater would be contained on site and managed via controlled disposal routes	Low	Impact on biotreatment process	Low – no additional risk	No	No increased risk due to small inventory and contained storage
Flooding	Local habitats close to the site Effluent treatment plant	Emissions to water through drains (dedicated pipeline)	A flood risk assessment has been previously completed for the site and remains unchanged as a result of this project	Low	Impact on biotreatment process Contamination of habitat	Low risk with management in place	No	No change in level of risk
Generation of hazardous and non-hazardous waste from chemical processing	Local population Local habitats close to the site	Air, land, water	• Inherent process design utilises solvent recovery processes where possible • Existing SOPs are in place for waste handling • Internal waste management competency	Low, due to existing established management systems	Impact associated with general waste burden is lifecycle impacts from the waste treatment processes that will be necessary. For example: incineration, biotreatment, anaerobic digestion, landfill among others	Low risk with management in place	No	Acceptable levels of risk
Raw material delivery / internal transfer vehicle accident – loss of containment of raw material or waste	Local population	Air, land, water	• Dedicated vehicle areas for process activities and holding • Traffic management systems on site • Gatehouse tracking of vehicles on site and site access management arrangements • Containment and management procedures • Contained drainage system with interception points across site which allows isolation in the event of a spill • All drainage on site is directed to holding tanks prior to discharge to an effluent treatment plant with no direct discharge to surface water	Low	Public nuisance (Minor or negligible levels)	Low risk with management in place	No	Acceptable levels of risk

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Consumption of natural resources including electricity, natural gas and gas oil	Local population Local habitats close to the site	Air dispersion	• Infrastructure changes to this process are minimal and therefore energy usage impact is insignificant • The plant has been designed with due consideration of energy efficiency • Energy efficiency will be managed as part of the EMS and energy usage and reduction will be reviewed periodically.	Low	Atmospheric pollution Use of natural resources (gas and gas oil) Flue gas emissions include CO_2, a greenhouse gas contributing to climate change Heat to atmosphere	Low with risk management in place	No	Acceptable levels of risk (insignificant increase of energy usage)
Noise and vibration of machinery and operations	Local population	Noise travel	The area is a dedicated industrial area, known by the local council and considered within local development planning activities The distance to the closest populated area (Port Clarence) is over 4 km	Low	Public nuisance	Low with risk management in place	No	Acceptable levels of risk
Fugitive emissions – litter	Local population	Land	No additional impact from this process	Low	Public nuisance	Low with risk management in place	No	Acceptable levels of risk. Additionally, it is noted that overall manning levels are unlikely to be significantly increased at the end of construction activities
Fugitive emissions – pests	Local population	Land	• Good site housekeeping • The site has a contract company specialised in pest control for monitoring and general requirements	Low	Public nuisance	Low with risk management in place	No	Acceptable levels of risk. The project does not impact the current pest attraction or control arrangements
Fugitive emissions – odours	Local population	Air dispersion	• Design and operation of process • Dedicated areas for process activities and holding • Containment and management procedures • The distance to the closest populated area (Port Clarence) is over 4 km	Low	Public nuisance	Low with risk management in place	No	Acceptable levels of risk. No additional impact from project.

HAZARD What has the potential to cause harm?	**RECEPTOR** What is at risk? What do I wish to protect?	**PATHWAY** How can the hazard get to the receptor?	**RISK MANAGEMENT** What measures will you take to reduce the risk?	**PROBABLILITY OF EXPOSURE** How likely is this contact?	**CONSEQUENCE** What is the harm that can be caused?	**OVERALL RISK?** What is the risk that remains?	**ACTION REQUIRED** Yes or No	**CONCLUSION**
Employees travelling to work	Local population and habitats	Air, land and water	• Construction short duration (~2 months) with a small number of additional contractors • Management by Construction boundaries (CDM) • Dedicated car parking areas	Low due to management systems	Public nuisance Atmospheric pollution Use of petrol / diesel emitting CO_2, a greenhouse gas contributing to climate change	Low with risk management in place	No	Acceptable levels of risk. Additionally, it is noted that overall manning levels are unlikely to be significantly increased at the end of construction activities
General and construction activities	Local population Local habitats close to the site	Air, land and water	• Construction short duration (~2 months) with a small number of additional contractors • Management by Construction boundaries (CDM) • Existing SOPs are in place to control and manage construction activities	Low due to management systems	Public nuisance	Low with risk management in place	No	Acceptable levels of risk

9 BAT Assessment – Organic Fine Chemicals

Following the pre-application guidance, form Part C3 is provided as part of this application.

The new process has been assessed for prevention and minimisation of environmental impact against the best available technique (BAT) reference (BREF) document for manufacture of organic fine chemicals which is the sectoral BREF for the site.
Details of the BAT conclusions are provided in document referenced **PP3439GG_FOL_BAT Conclusion Assessment.** The assessment's conclusions demonstrate how the site achieves BAT for the proposed change.

In summary:

- Prevention of environmental impact.

  Process and plant design
  - Full HAZID, HAZOP, LOPA/SIL assessments undertaken during design to eliminate hazards and prevent environmental harm.
  - Closed and contained systems: all reactors, separation units and vacuum systems are fully enclosed, preventing releases to the environment.
  - Use of contained fume cupboards, airlocks and isolators, each with appropriate abatement (e.g. carbon filters, HEPA filtration).
  - High integrity equipment selected to avoid leaks (e.g. sealed pipework, minimal connections).
  - Secondary containment has been designed in line with CIRIA C736 requirements to ensure it is impermeable, durable, and has a minimum capacity of 110% of the largest contents (e.g. vessel / tank etc). As an upper tier COMAH site, it is required to demonstrate in the site COMAH Safety Report that all measures necessary are taken to prevent MATTEs and limit the consequences of any that do occur.

  Control of emissions
  - VOC prevention through condensers, activated carbon system and local carbon filters.
  - No direct wastewater emissions; all liquids are contained and collected as waste.
  - No emissions to land, no flaring, no odorous materials handled.
  - Air Emissions Risk Assessment has been carried out for this permit variation application, reference, **PP3439GG_FOL_Air Emissions Risk Assessment**

  Storage & spill prevention
  - All materials stored in bunded warehousing, with COSHH compliance, secondary containment and impermeable surfacing.
  - Spill kits and defined emergency response procedures are in place.

- Minimisation of environmental impact.

Resource efficiency

- Low inventory batch reactors, smooth vessel internals and minimal pipework reduce residues and cleaning waste.
- Optimised reaction chemistry to maximise yield and minimise by-products.

Minimising air emissions

- VOC minimisation through:
  - Condensation and recovery.
  - Activated carbon polishing.
- Venting occurs only via one controlled emission point, minimising dispersion.

Minimising wastewater

- The new process generates no wastewater; all aqueous streams are collected as waste, removing risk to surface or groundwater.

Minimising waste

- Process design reduces waste generation and cleaning demand through:
  - Optimised batch sequencing.
  - Improved separation efficiency (distillation, crystallisation, filtration).
  - Controlled solvent use and condensate recycling where appropriate.

Noise & odour minimisation

- Equipment specified to <80 dB and operated in fully enclosed areas.
- Insignificant impact of noise to neighbours
- No odorous materials and therefore no odour impact expected.

- Management and treatment of waste streams.

Waste characterisation & handling

- All waste streams identified and periodically reviewed under the waste management system.
- Appropriate waste containers used for safe controlled collection; stored in bunded areas.

Waste hierarchy application

- All wastes are managed according to prevention → reuse → recycling → recovery → disposal.
- Treatment/disposal routes selected in line with the waste hierarchy and BAT requirements.

Liquid waste management

- No liquid discharge to sewer or controlled waters.

- All liquid streams from phase separation, solvent washes and filtrates are collected and sent for specialist disposal/recovery.

Solid waste / particulate control

- Solid handling within HEPA filtered isolators ensures no particulate release; solids go directly to waste containers.

VOC containing off gas management

- Off gases pass through:
  - Condensers (recovery of EDC, methanol).
  - Activated carbon adsorption (final polishing prior to discharge).

- Environmental management.

The operator has environmental, health & safety and quality management systems which are certified to ISO 14001, 45001 and 9001 respectively, valid until 09/02/2027.

10 Technical Descriptions of Proposed Changes to Permit Conditions and Controls

The following section has been structured in alignment with the site's existing permit's conditions, emissions and monitoring requirements.

Fine Organics Limited is claiming confidentiality on the supporting documents provided in this section of the application where this is stated in the title of the document.

10.1 The FCM Manufacturing Process

This is a new product introduction for the Lianhetech Seal Sands (LSS) facility, with a proposed start date of July 2026. Flocoumafen (FCM) is a potent active ingredient (AI), classified as highly toxic (LD_{50} = 250 µg/kg; OEL <100 ng/m³ based on single-dose rat studies), and falls outside the range of compounds previously handled at the site.
To meet customer demand, Development Laboratories 1 and 2 will be upgraded to support commercial manufacture of FCM using ~50 L scale equipment. The process is designed to produce up to 200 kg per annum.

The FCM process consists of 7 stages:

- Stage 1 – Condensation Reaction
- Stage 2 – Neutralisation and Phase Separation (including waste treatment)
- Stage 3 – EDC Removal by Vacuum Distillation
- Stage 4 – Methanol Solvent Exchange by Atmospheric Distillation
- Stage 5 – Crystallisation
- Stage 6 – Filtration and Drying
- Stage 7 – Milling

Further details of the process are provided in the document referenced, **PP3439GG_FOL_Confidential Document 10.1.**

The PFD's of the process are provided in the following documents:
PP3439GG_FOL_Confidential Document_PFD-C1-SHEET 1
PP3439GG_FOL_Confidential Document_PFD-C1-SHEET 2
PP3439GG_FOL_Confidential Document_PFD-C1-SHEET 3

10.2 Energy efficiency

As detailed in section 3.2.3, the infrastructure changes to this process are minimal. The modification to the laboratory facility is limited to the erection of new walls and doors with an additional extraction fan and stack for the HVAC. Therefore, overall, the energy use for FCM will be insignificant.

The plant has been designed with due consideration of energy efficiency. Energy efficiency will be managed as part of the EMS (as required by ISO 14001 and permit conditions) and energy usage and reduction will be reviewed periodically.

Energy use is monitored via the Climate Change Agreement, and UK Emissions Trading schemes submission requirements with targets set to reduce the emission of carbon equivalents year on year. These targets are referenced in the operators Climate Change Agreement and Hospital and Small Emitter Permit.

The site has two main key energy supplies, natural gas and electricity. Natural gas is used to raise the 10 bar steam requirements for the site. A small amount of gas oil is also used, although this is insignificant compared with the use of natural gas and electricity.

Following the pre-application guidance, form Part C3 is provided as part of this application.

10.3 Efficient use of raw materials

Raw material requirements are recorded in the Product Master List on the Business Management System and usage per batch is recorded on individual batch-card records and captured in a monthly materials usage report. Regular reviews take place which highlight where improvements can be implemented during the campaign and address any immediate over usage of materials. However, it should be noted freedom to change the process is largely fixed by regulatory requirements, process hazard control and from our customer's internal data. Where possible, solvent (EDC) reuse and recycling will be employed.

The project for the FCM process is intended to produce up to 200 kg of FCM per annum, in 2 batches per week of approximately 2.5 kg loads per batch, to fulfil the customer requirements

This will be the first time the process has been operated commercial at the Seal Sands, and the operating conditions will be monitored and optimized where possible within the regulatory constraints to minimize the usage of raw materials and generation of effluent streams to reduce the environmental impact of the process.

Fine Organics Limited is claiming confidentiality on the supporting documents provided in this section of the application.

As a full list of substances are considered commercially sensitive and confidential, and if placed on the public register would be in breach of customer confidentiality agreements and provide competitors with confidential business information, confidentiality is required on the following referenced document, **PP3439GG_FOL_Confidential Document_Substance Hazard Classification,** which shows reagent details and intermediate substances identities.

The following table lists the substances with a hazard statement code for environmental hazard with limited details as follows:

Substances with an environmental hazard statement	
Substance	**Hazard Phrases**
FCM	H310: Fatal in contact with skin H330: Fatal if inhaled H300: Fatal if swallowed H360D: May damage the unborn child H372: Causes damage to organs (Blood) through prolonged or repeated exposure H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long lasting effects.

10.4 Waste recovery and disposal

The following operating techniques will be designed and installed to minimise the impact of waste generation:

- Suitably designed processes
- Recovery processes for waste streams
- Process Optimisation and Continuous Improvement programmes
- Current site operating procedures for the management of waste will be followed.

A combination of different waste streams will be generated, specifically:

Waste Type	**State**	**Hazards**
EDC / Methanol distillate	Liquid	Toxic, Flammable liquid (contains EDC in Methanol)
Filtration liquors (Mother and wash liquors from FCM process)	Liquid	Highly Potent, Toxic, flammable liquid (containing FCM, Methanol and EDC)
Acidic aqueous wastes	Liquid	Acidic, containing traces of highly potent material (FCM)
Used PPE (Tyveks, overshoes, gloves, air hoods, respirator covers)	Solid	Potential to contain traces of highly potent, toxic material (FCM)
Bottles, packaging, wipes, vials and sampling equipment	Solid	Contains flammable (methanol / EDC), &/or highly potent, toxic material (FCM)

EDC distillate is also generated during the process, and this will be recycled.
All waste streams generated during the process will be sent for incineration.

10.5 Point source emissions to sewer

The installation has one permitted release point for emission to sewer, effluent treatment plant or other transfers off-site. This is defined as release point D1 and is described as discharges to Bran Sands Treatment Works operated by Northumbrian Water from the aqueous effluent balancing tank on the Installation.

Document reference **PP349GG_FOL_Site Plan_SL-0-1605-C** shows the location of the emission point D1 on the site plan.

Table S3.2

Emission point reference location	Source	Parameter	Limit	Reference period	Monitoring frequency	Monitoring standard
D1 on site plan	Aqueous effluent balancing tank	No parameter set	No limit set*	--	--	--

*Limits set by trade effluent consent to discharge

No parameters, emission limits or monitoring requirements are set in the permit as these are addressed in the trade effluent consent to discharge issued to Fine Organics by Northumbrian Water Ltd, the water undertaker and operators of Bran Sands.

The design and operation of the FCM process is such that it does not have an impact on the consented discharge to Bran Sands. Therefore, no changes to the existing monitoring and reporting of emissions to sewer required by the permit are proposed.

10.6 Point source emissions to air

The environmental risk assessment carried out against the proposed changes identified the need for an air impact assessment. The assessment used detailed dispersion modelling to assess the potential impacts resulting from emissions to air associated with the FCM project.

The air emissions report provided and referenced as **PP3439GG_FOL_Air Emissions Risk Assessment** support this variation application.

Impacts of the following pollutants have been assessed at appropriate receptor locations against appropriate assessment levels:

- Methanol
- EDC

Detailed atmospheric dispersion modelling has been undertaken with due consideration to relevant guidance and the modelling approach is based upon the following stages:

- review of emission sources, pollutant emission rates and characteristics;
- identification of sensitive receptors; and
- prediction of process contribution through dispersion modelling and evaluation against relevant EALs.

The emissions rates of both EDC and MeOH are:

- EDC - Maximum emission rate 3.3 grams per hour (g/hr) or 6.5 g per batch process.
- MeOH - Maximum emission rate 2 g/hr or 4.64 grams per batch process.

To maintain a precautionary approach, it has been assumed that the maximum emission rate will be continuous and emit 24/7 for 365 days per year. This approach also allows consideration of concurrent cumulative emissions from A1/3 and A1/2.

The assessment concluded that process contributions are insignificant and there are no predicted exceedances of the EALs for the protection of human health at the point of maximum ground level impact or any human exposure location outside the site boundary.

The schematic demonstrating the abatement philosophy for Lab 1 & Lab 2 are provided in the documents referenced as follows:

- **PP3439GG_FOL_FCM Lab 1_Schematic**
- **PP3439GG_FOL_FCM Lab 2_Schematic**

10.6.1 FCM Manufacturing process

The FCM manufacturing process will vent to the new air emission point A1/5.

Document reference **PP349GG_FOL_Site Plan_SL-0-1605-C** the location of the emission point A1/5 on the site plan.

Site location description	Point source reference	Function	Release height	Average volumetric flow
R&D Labs	A1/5	Main discharge stack after abatement	11.6 m	6.79m^3/s

There are no evolved process gas emissions from FCM manufacture. The emissions from the FCM manufacturing process are primarily volatile organic compounds (VOC), for example, dichloroethane and methanol. The following operating techniques will be designed and installed to minimise the loss of volatiles to air:

- Suitably sized condensers with appropriate cooling transfer fluid
- Temperature alarms and trips to trip the process to cooling

The management of the emission point for the building will be maintained which consist of carbon filtration on the extract of the fume cupboards and a carbon bed from the processing equipment extracts which feeds stack A1/5 via an extract fan. Extract vents from the FCM process are drawn into the stack via a 25000 m^3/h fan.

10.6.2 Schedule 3 amendment

This variation proposes the introduction of a new point source emission to air from a newly installed stack, referenced as Emission Point A1/5.

The new emission point will release emissions containing 1,2-dichloroethane (EDC) and methanol, reported as Total Volatile Organic Compounds (TVOC). These emissions will arise from operational activities associated with the process.

In accordance with current permit conditions and the Environmental Permitting (England and Wales) Regulations, a Schedule 3 amendment is required to introduce the relevant emission parameters and associated limits for EDC and TVOC for this new stack.

It is proposed that:

- A new emission point, A1/5, is added to Schedule 3.
- Emission parameters for EDC and methanol (as TVOC) are included.
- Appropriate emission limit values (ELVs), monitoring requirements, and reference conditions are to be agreed with the Environment Agency as part of this variation.
- The emission limits will take into account BAT, environmental risk, and relevant guidance applicable to VOC emissions.

There are no other changes proposed to existing emission points or permit conditions as part of this amendment.

10.7 Point source emissions to land

The site has no existing point sources of emissions to land and does not propose to add a point source to land as part of this variation.

10.8 Emissions not controlled by limits

To prevent pollution to the local environment of substances not controlled by emission limits, the following controls have been implemented to the process.

Substances are contained in process equipment, including vessels, headers and receivers, the interactions between this equipment are always performed in a closed system manner. This includes all transfers between the equipment.

In equipment where high condensation is expected due to low pressure or high temperature, condensers are used to minimize emissions, these condensers are running at low temperature and have been sized to cope with high condensation steps.

All process equipment has its independent vent, which feeds into a common line leading to an activated carbon drum, sized to cope with process requirements.

All equipment is located inside Fume Cupboard running at 0.5m/s extraction flow, when process drainage or process sampling is required, activities have been designed to be short duration, as well as minimising the open container exposure, all within the Fume Cupboard environment. Each Fume Cupboard used for the process has been fitted with Carbon Filters, prior to reach the stack.

All waste streams which are sealed and double bagged before leaving the Fume Cupboard are collected in waste drums and sent to incineration with no further human interaction.
All samples extracted from process are prep for lab analysis using a high containment sampling enclosure which has carbon and HEPA filter extraction.

10.9 Odour

The materials, intermediates and products involved in the FCM manufacturing process are of low odour potential. The design of the plant, equipment and operation of the process are such that there will be no release points to air other than those described above.

Fine Organics Limited have an environmental management system which includes an odour management procedure.

Given the ‘no change’ to the odour environment from the proposed changes and the absence of any odour monitoring requirement in the current permit, no additional monitoring of emissions to air is therefore proposed as a result of the FCM process and other changes described in this variation application. The nearest residential or sensitive receptors are within 3.5km of the site.

10.10 Noise and vibration

The Fine Organics Limited site is in an area of significant and similar industrial use, with extensive chemical manufacturing and processing operations. There are no nearby residential or sensitive receptors within 3.5 km of the installation.

10.11 Monitoring and reporting

The Operator will undertake monitoring and reporting of emissions in accordance with the requirements of the Environmental Permit and relevant Environment Agency guidance. Monitoring will be carried out at the frequencies and using the methods specified within the permit, or as otherwise agreed in writing with the Agency. Where applicable, monitoring will be undertaken using recognised standards and appropriate quality assurance procedures to ensure data accuracy and reliability. Results from monitoring will be recorded, reviewed, and maintained as part of the site's environmental management system. Any exceedances of permit limits, abnormal operations, or incidents with potential environmental impact will be reported to the Environment Agency in line with permit conditions. Routine reporting will be submitted to the Agency via the appropriate reporting mechanisms within the required timescales. Monitoring records will be retained and made available for inspection upon request.

No changes to existing monitoring and reporting arrangements are proposed as part of this variation, other than those necessary to reflect the introduction of the new emission point and associated parameters.

11 Accident and Fire Prevention and Management Plans

As part of the site's existing accredited environmental management system, systems are in place related to accident prevention and management. Examples of the types of prevention measures that are used on the site to prevent and mitigate environmental incidents are:

- The optimisation of the process chemistry route to reduce the amounts of hazardous material on site to a minimum
- Reducing the handling of materials to a minimum using automated and computer-controlled production sequences, thereby reducing the probability that spills and releases could occur
- Applying reputable standards of equipment engineering design, to ensure a high level of primary containment reliability
- Employee training programs are in place to ensure staff understand the correct manufacturing methods for the substances to be used and actions to take in an incident event
- Extensive use of bunding has been incorporated into the site's layout design (secondary containment) to contain spills should they occur
- A comprehensive and well-designed site drainage system (tertiary containment), including the use of a drainage catch tank that can be isolated if needed in an incident

Lianhetech considers the design of the facility to achieve the following:

- Effective arrangements are in place to minimise the likelihood of a fire happening including compliance with the DSEAR regulations and rematching arrangements
- Fires will be extinguished quickly using a fire protection system
- Plans and layout are effective to minimise the spread of fire within the site and to neighbouring sites

11.1 Assessment of potential major environmental incidents

In line with Lianhetech's procedures and Works Instructions, WI/TE045 – Design Review; WI/TE048 Hazard Management System; and TE/023 – New Process Introduction the FCM process has been subject to a HAZOP (Hazard Study 3) review. The objectives of the study were to identify all major hazard scenarios including major accidents to the environment. The HAZOP study was carried out by a multidiscipline team and conducted in the software program, PHAWorks.

The hazard study completed identified that due to the low volumes associated with the process and the contained nature of the laboratory, no potential major accident to the environment events were identified during the hazard study.

11.2 Incident Investigation

The company has a comprehensive system for recording and investigating all accidents, incidents and near misses. The site's requirements are documented in its quality system procedure, S/003 Safety, Health and Environment Event Reporting and Investigation. The depth of the investigation depends on the actual or potential severity of the incident. All staff are actively encouraged to report all accidents, incidents and near misses that they become aware of, and any member of staff may start off a report by filing a statement of the event. The event is recorded electronically, and an investigation is started by the line supervisor. The report requires the actual and potential severity as well as the frequency to be determined. Low potential incidents are not investigated further. Accidents or incidents with a high potential are investigated using the root cause analysis (RCA) methodology, and the company has personnel suitably trained.

All other events are investigated using a system based on established Loss Causation Models. This establishes the immediate and basic or underlying causes. Corrective actions are assigned, together with timeframes. Once the corrective actions have been completed, the report is closed out.

All new and outstanding reports are reviewed weekly by Area Managers, Shift Operations Leaders and the Safety Department to ensure that the investigation has been properly carried out and that progress is being maintained. Reports may be returned to Area Managers/Shift Operations Leaders for further investigation. Completed reports are signed off at this meeting. Some reports are signed off prior to the meeting by the SHE manager and the area manager/Shift Operations Leader where the report was raised. This only happens if there has been a discussion between the two parties regarding the report. It will also be decided during this meeting if there are any learning points that should be discussed at the AIMs meeting.

Significant events or events with learning points are discussed at the Daily Senior Leadership Meeting and are then briefed to staff at the beginning of the next shift.

For RCA investigations, a multi-disciplinary team is set up. This includes a representative from the shop floor. A detailed technical report is published for all RCA investigations.

11.3 Emergency response plan

Details of the site emergency response plan is provided in Emergency Response procedure S/002. This procedure is subject to review on at minimum 3-yearly basis and was last formally reviewed in March 2026. The organisation and responsibilities of the Emergency Response Team are documented within the procedure.

The company maintains emergency response teams that are trained in use of fire hoses and ground monitors. They can be deployed to set up water curtains and help the Fire Brigade in cooling bulk tanks etc. They are also trained in techniques for rolling foam onto spillages to suppress gas or fume evolution or minimise fire risks.

All emergency response team members are trained in the use of self-contained breathing apparatus and can be used to make safe plant and equipment to prevent escalation of fire or environmental damage. Facilities are available on site to construct temporary containment bunds for spillages, and to neutralise them.

Due to the potent nature of FCM, a specific emergency response procedure has been produced. The output of this has been captured in WI/S/049.

During an incident there are several different levels of communication. The site has an extensive digital radio telephone network covering the whole site. This is the main communication for the site in the event of an emergency. There is unit permanently installed in the Emergency Control Centre (ECC). Communications with neighbouring sites is primarily through the CEAS system. Telephone numbers of all the sites are listed in the ECC. Communications with the Competent Authorities and other bodies such as the Cleveland Emergency Planning Unit is by Cleveland electronic alert protocol or phone. A list of all emergency contacts is included in Emergency Response procedure S/002.

12 Forms

- Part A
  - PP3439GG_FOL_V008 Form Part A
- Part C2
  - PP3439GG_FOL_V008 Form Part C2
- Part C3
  - PP3439GG_FOL_V008 Form Part C3
- Part F1
  - PP3439GG_FOL_V008 Form Part F1

13 Fees

Following the pre-application guidance, form Part F1 is provided as part of this application, document is referenced **PP3439GG_FOL_V008 Form Part F1.**

Application fee:
£12,485.06

PO reference is:
0259574

BACS payment reference number is:
PSCAPPINSTFINEO002
Payment date: 16th April 2026.

Payment receipt is provided as document reference **PP3439GG_FOL_PSCAPPINSTFINEO002.**

联化科技股份有限公司
Lianhe Chemical Technology Co.,Ltd.

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