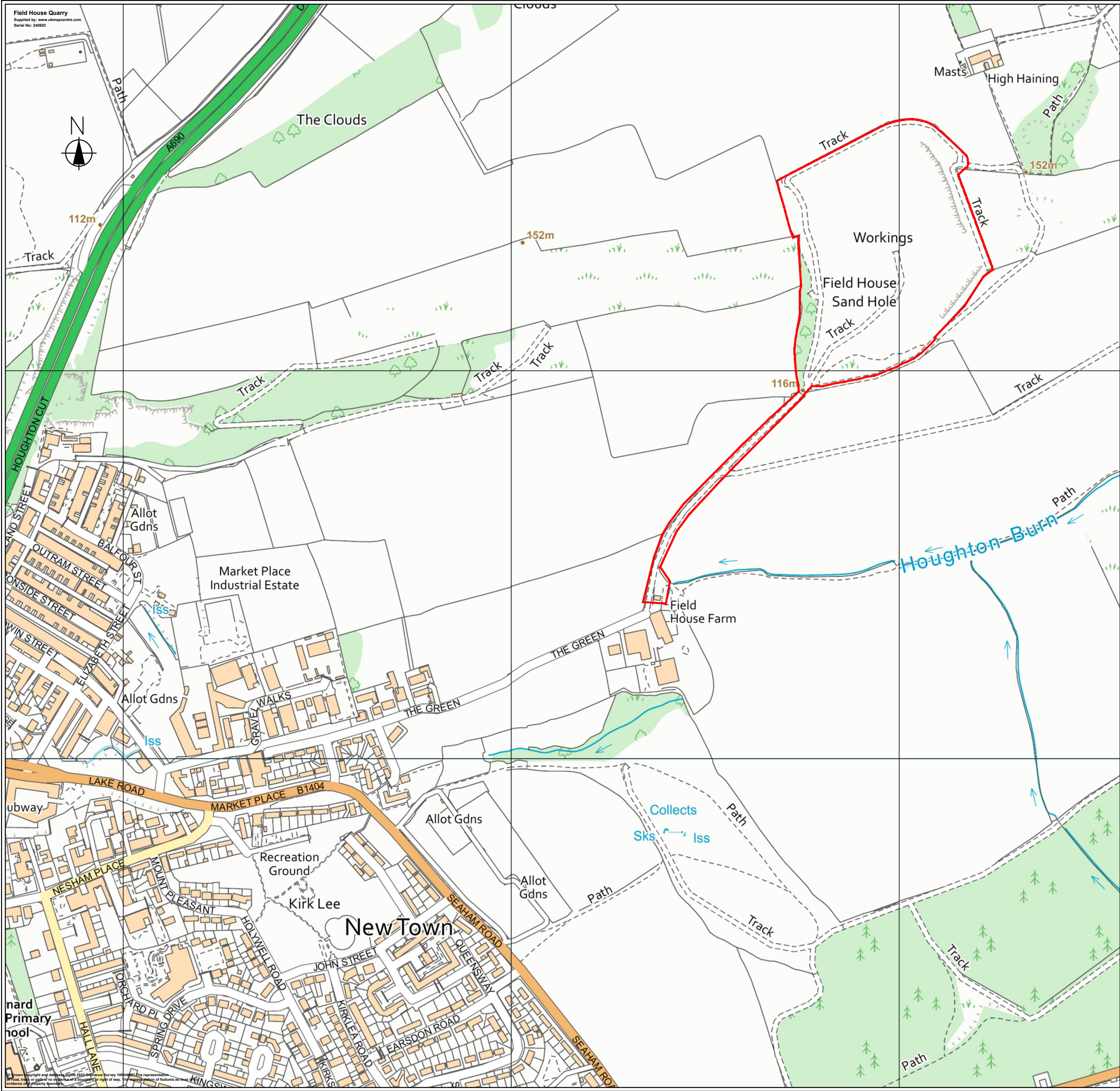


Section 2





Key

Site Location



19 Main Street, Ponteland
Newcastle Upon Tyne, NE20 9NH

Client

A McCall & Sons Ltd.

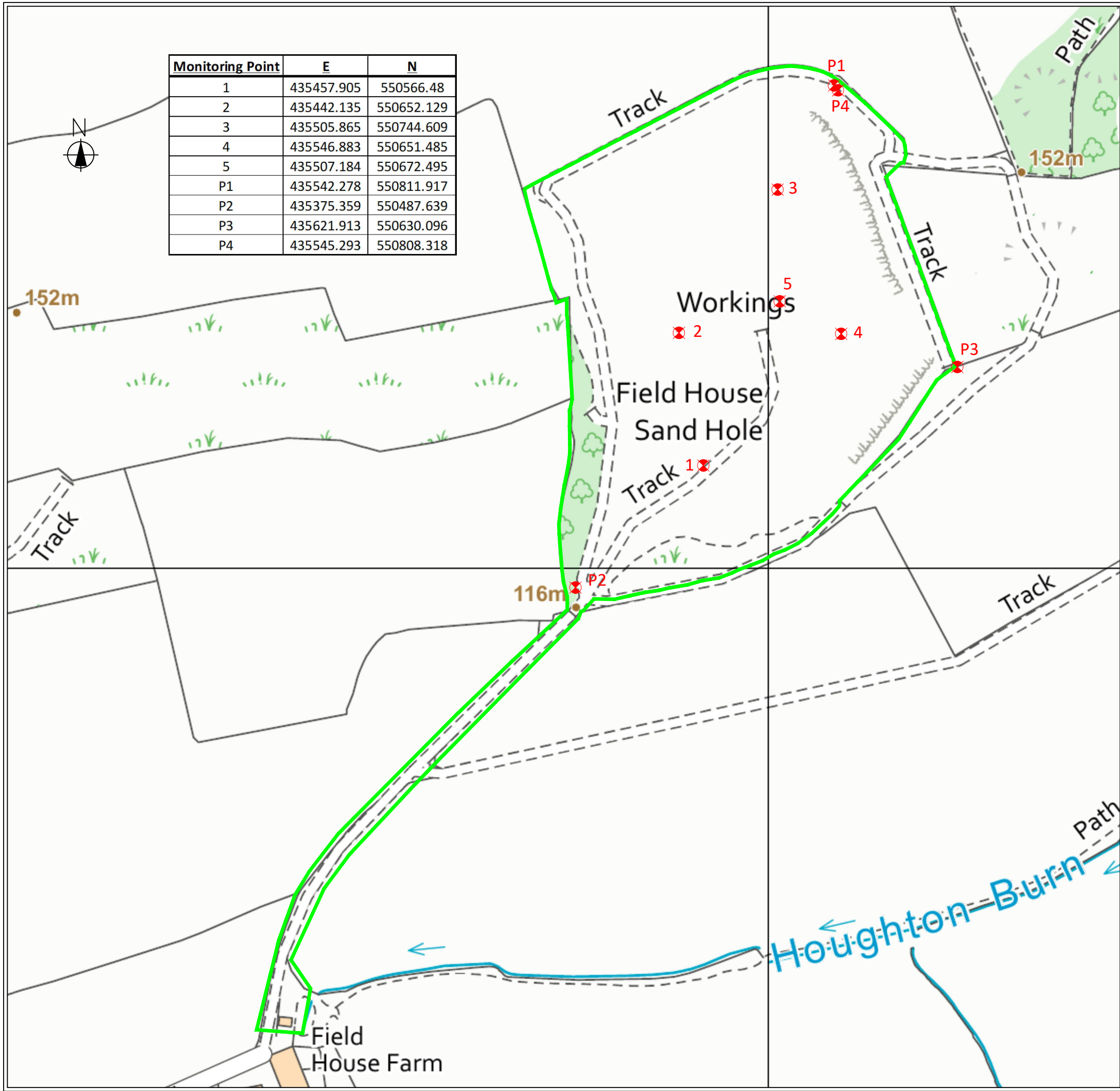
Site

Field House Sand Quarry
Houghton Le Spring, County Durham
DH5 8LX

Title

Site Location Plan

Scale		1:5000	@ A3
Drawing No.		5004/1/001	
Rev	Date	Description	
File	5004.1.001 Site Location Plan		
Date	05/22	Engineer	JH
Drawn	JN	Checked	JH



Monitoring Point	E	N
1	435457.905	550566.48
2	435442.135	550652.129
3	435505.865	550744.609
4	435546.883	550651.485
5	435507.184	550672.495
P1	435542.278	550811.917
P2	435375.359	550487.639
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Key

- Site Permit Boundary
- Monitoring Point Locations and Reference



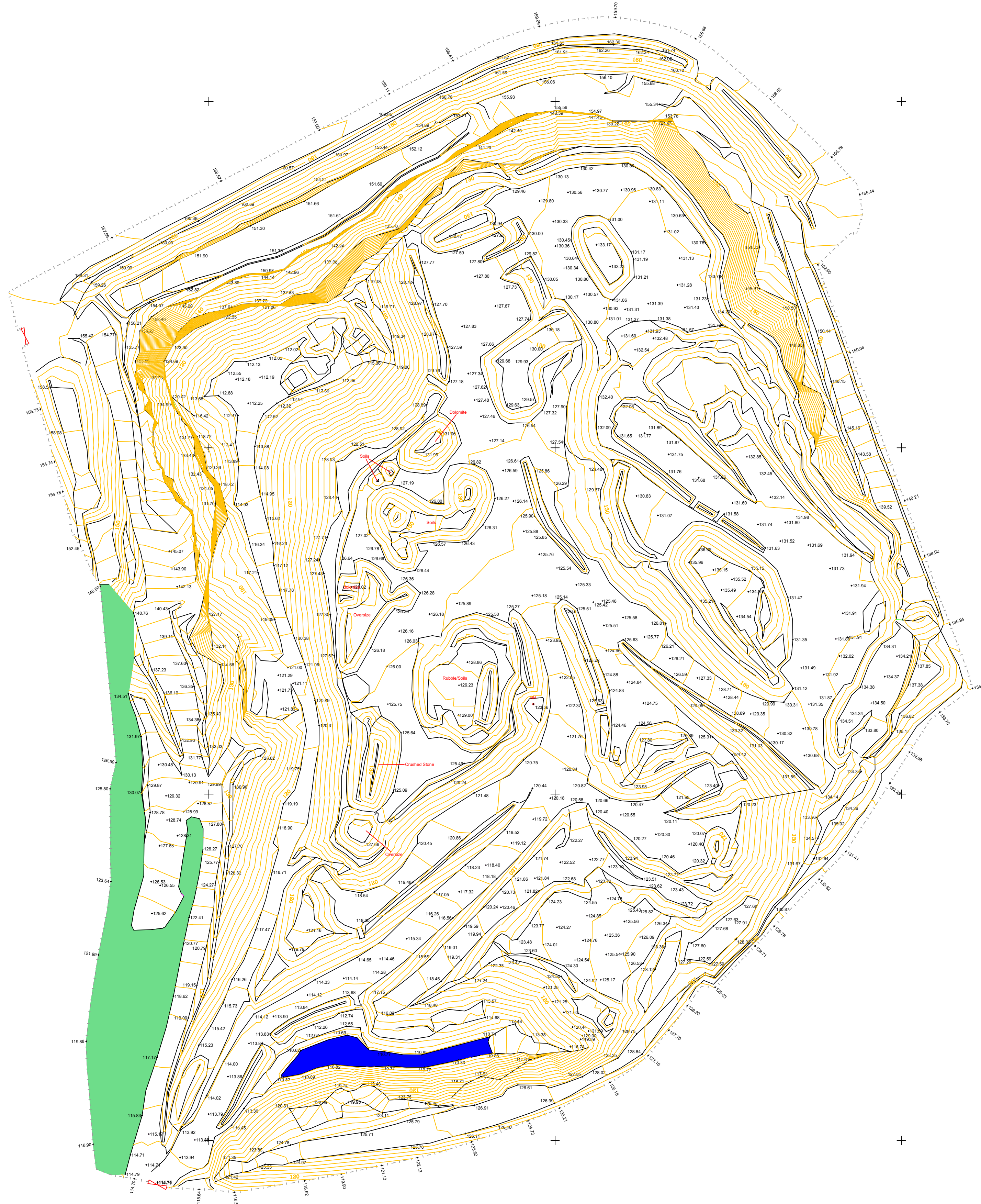
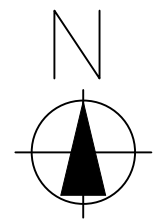
19 Main Street, Ponteland
Newcastle Upon Tyne, NE20 9NH

Client
A McCall & Sons Ltd.

Site
Field House Sand Quarry
Houghton Le Spring, County Durham
DH5 8LX

Title
Site Permit Boundary

Scale	1:2500	@ A3
Drawing No.	5004/1/002	
Rev	Date	Description
File	5004.1.002 Site Permit Boundary	
Date	05/22	Engineer JH
Drawn	JN	Checked JH



Notes

All Positions and levels to OS Grid (OSTN15)

KEY

- Landform Breakline
- Existing Ground Level
- Area Heavily Overgrown

John Nelson Surveying Services Ltd.

First Floor Suite
6 High Street
Sedgefield
Stockton on Tees
County Durham
TS21 3AR

Tel: 01740 622 231
Fax: 01740 621 444

Client

A McCall & Sons Ltd.

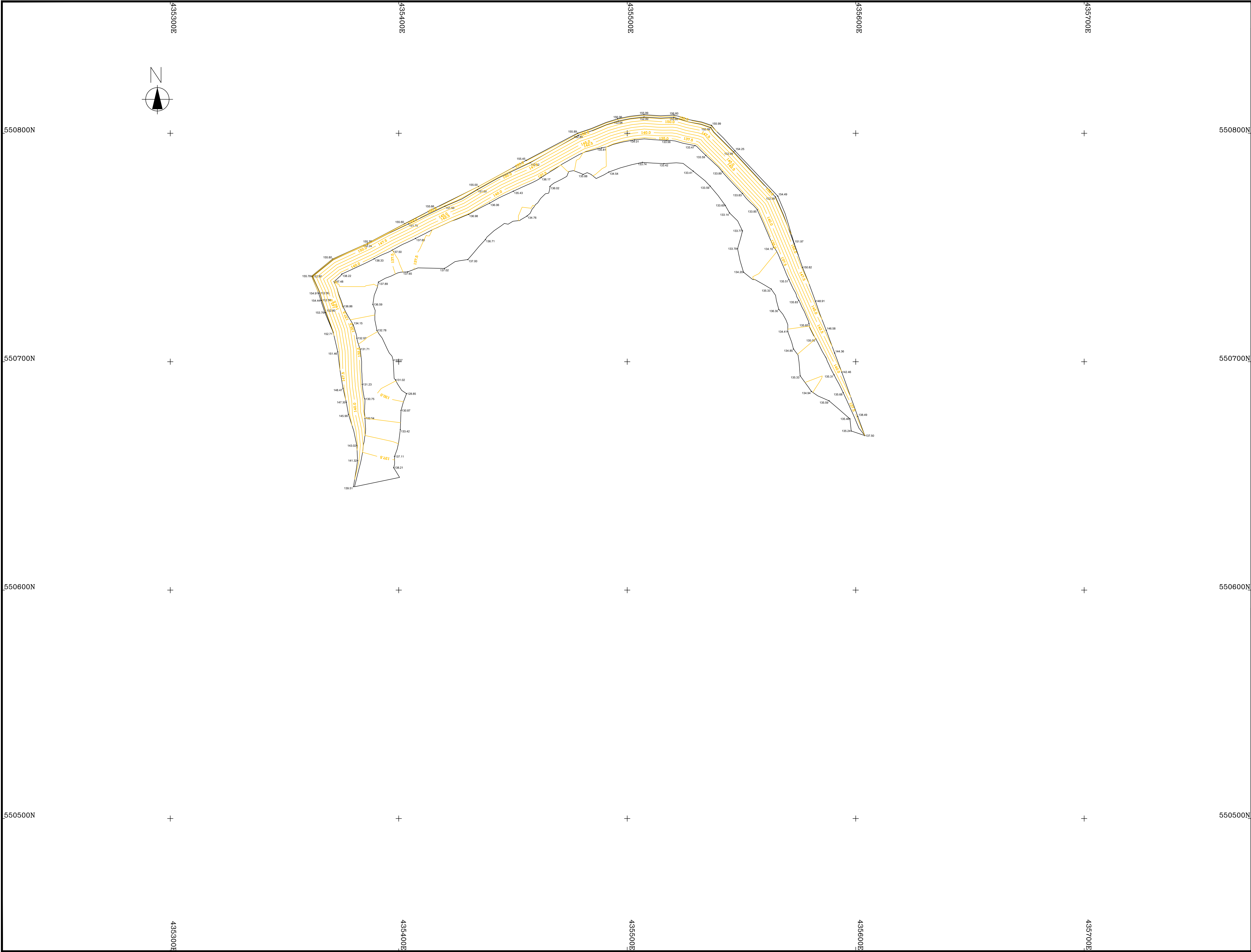
Project

Field House Sand Quarry
Update Survey May 2021

Surveyed	Date	Drawn	Date	Scale
JN	01/06/21	JN	01/06/21	1:1000@A1

drawing no.

8328/JN/001



Notes

All Positions and levels to OS Grid (OSTN15)
Rock Stability Assessment to be Carried out to Assess Acceptable Cut angle.

KEY

Landform Breakline

+ 118.02 Proposed Ground Level

- - - - Fence Line

N

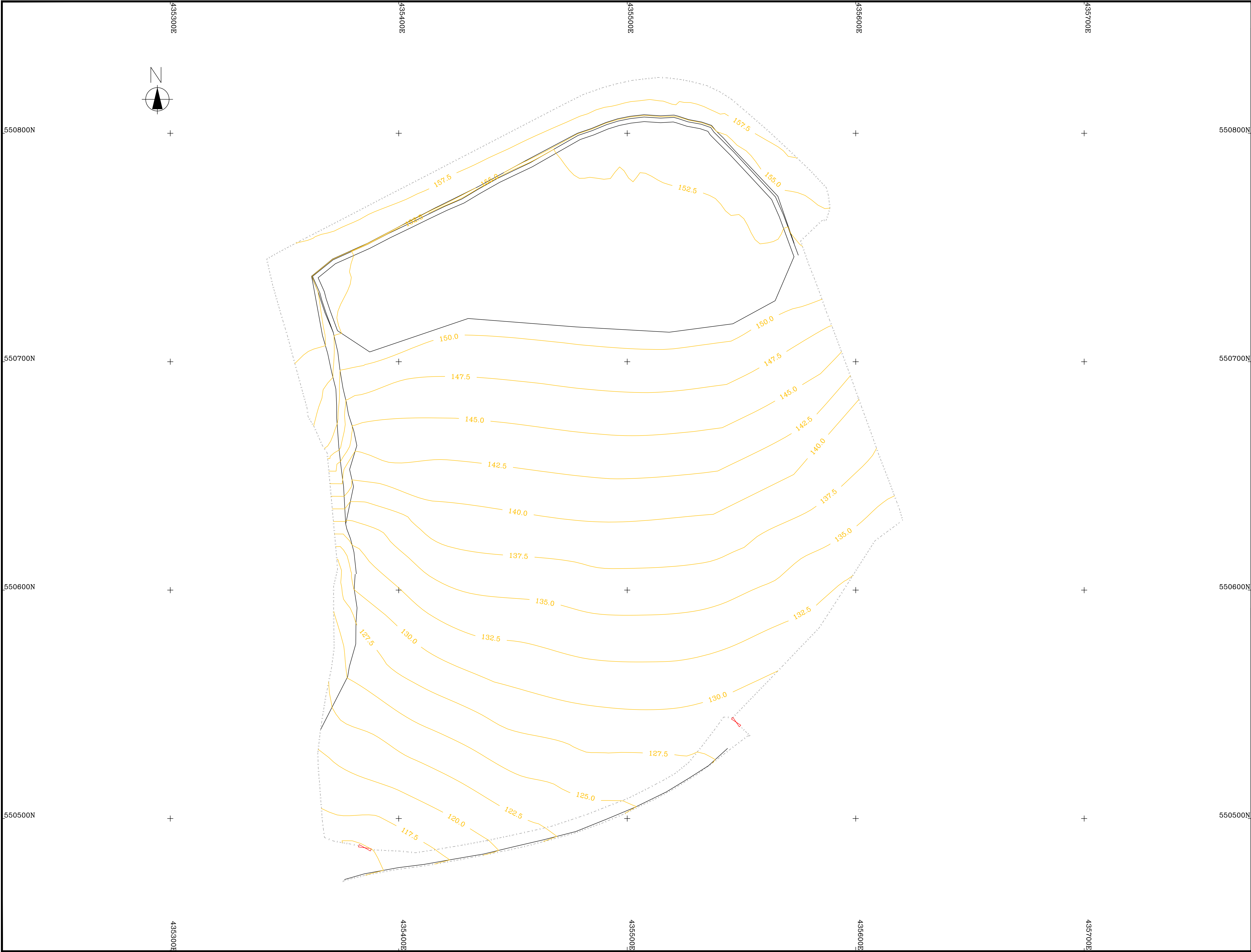
Orientation to North

79.0

Proposed Mineral Excavation Level

Existing Ground Levels
May 2021

Suffix	Revision	Date	Initial	
John Nelson Surveying Services Ltd. First Floor Suite 6 High Street Sedgefield Stockton on Tees County Durham TS21 3AR Tel: 01740 622 231 Fax: 01740 621 444				
Client A McCall & Sons Ltd.				
Project Field House Sand Quarry Proposed Excavation Profile of Rock				
Surveyed JN	Date 01/06/21	Drawn JN	Date 09/11/21	Scale 1:1000@A1
drawing no. 8328/JN/002				



Notes

All Positions and levels to OS Grid (OSTN15)
Slope Stability Assessment Needs to be carried out dependant on nature of Soils import.

KEY

—

Landform Breakline

+ 118.02

Restoration Ground Level

- - - -

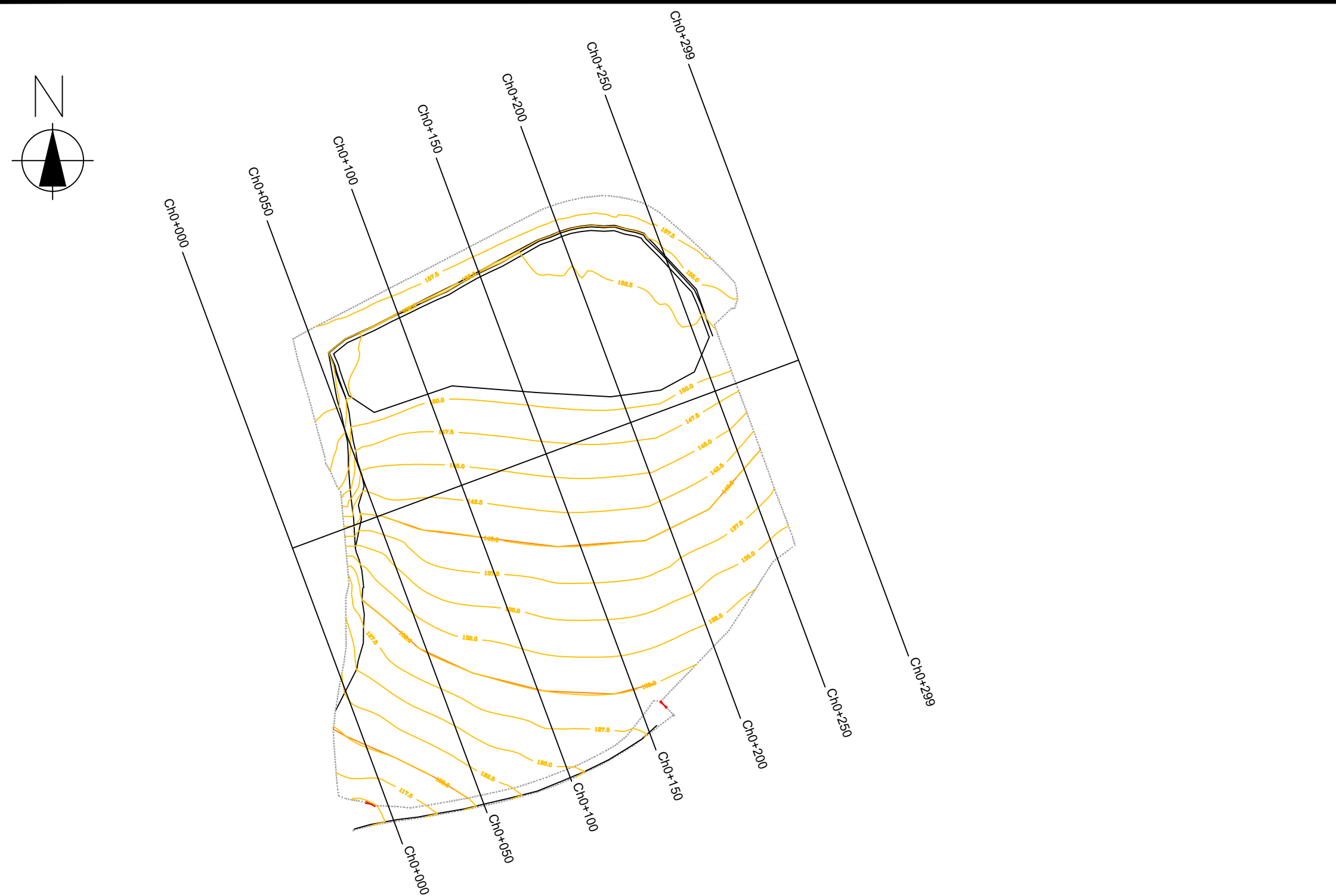
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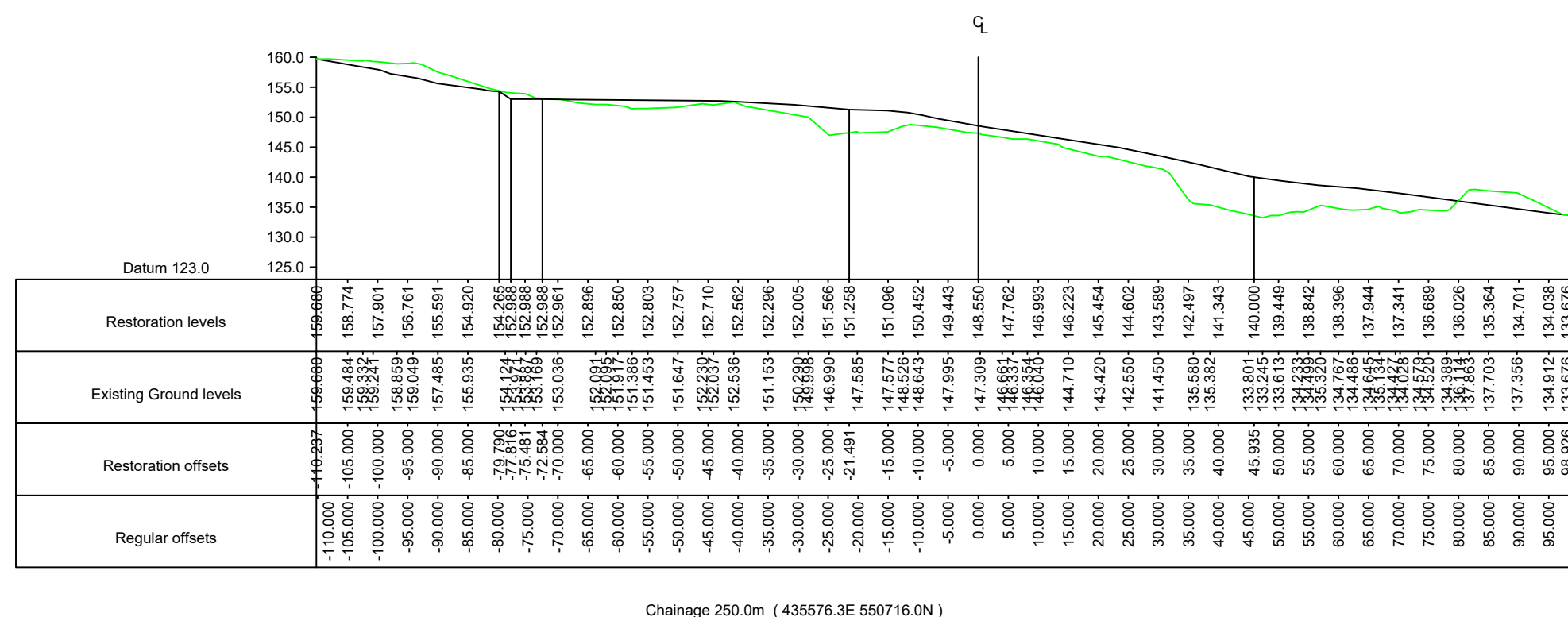
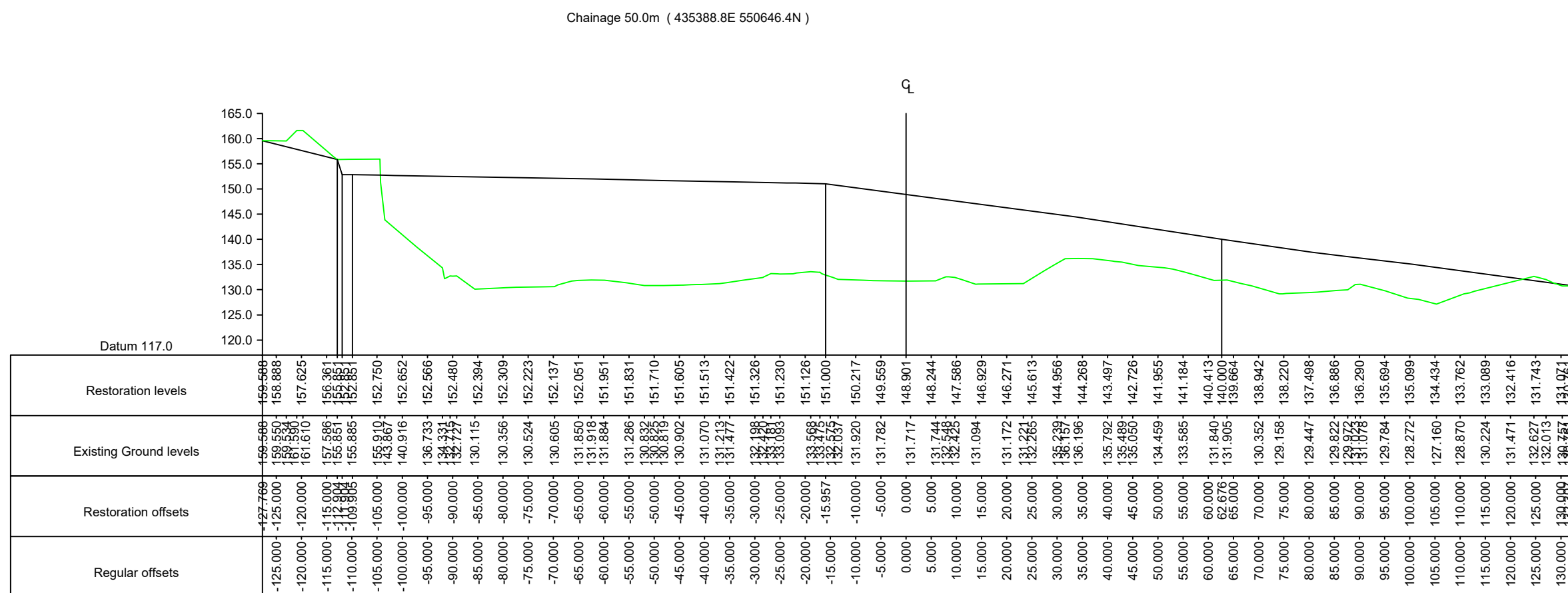
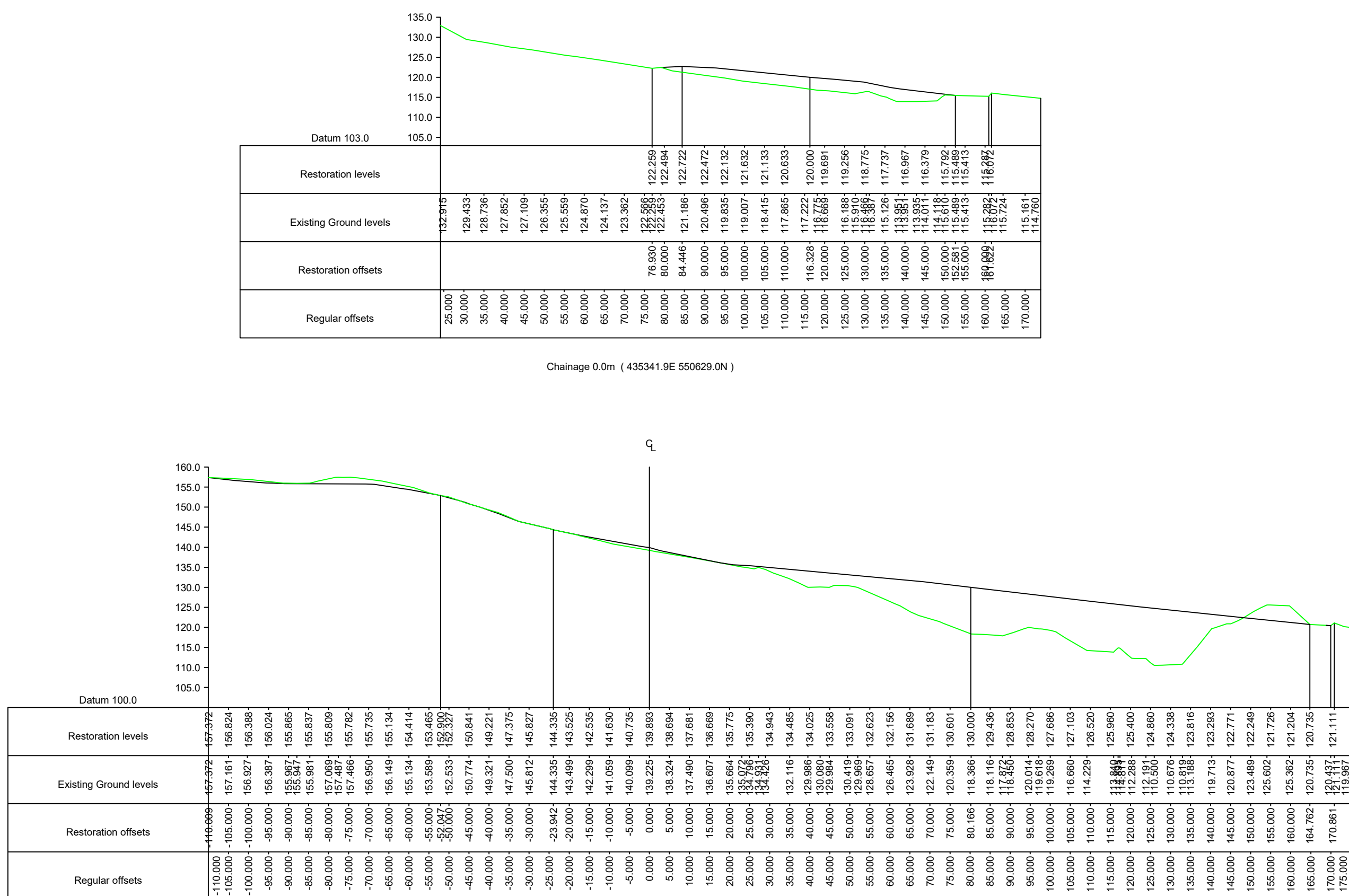
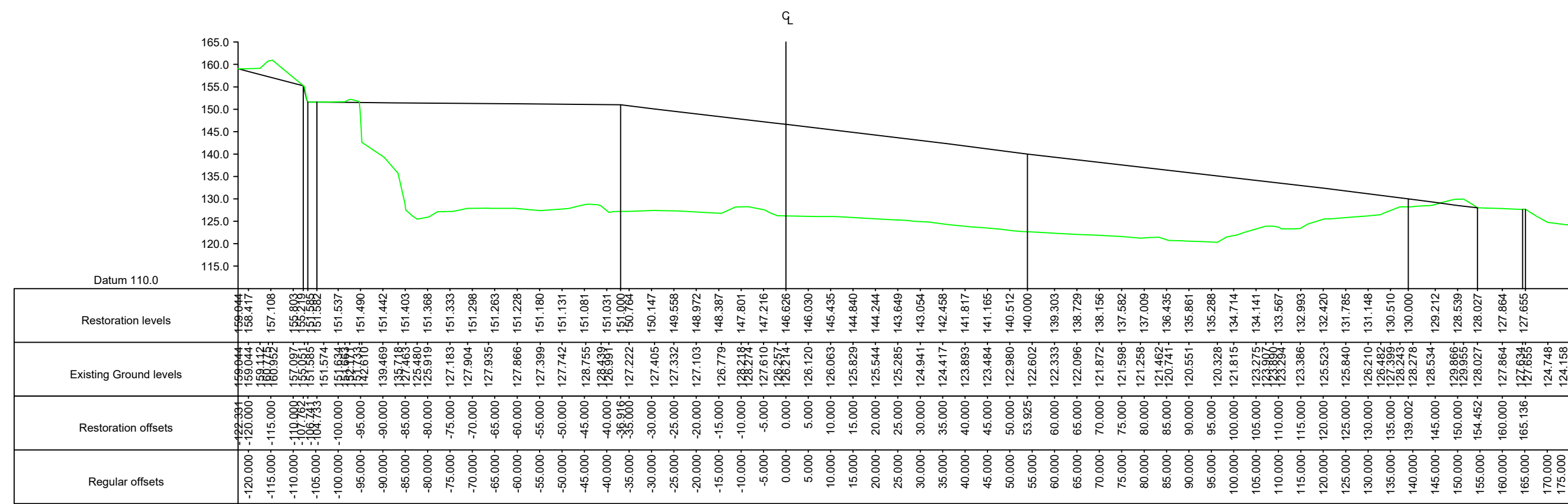
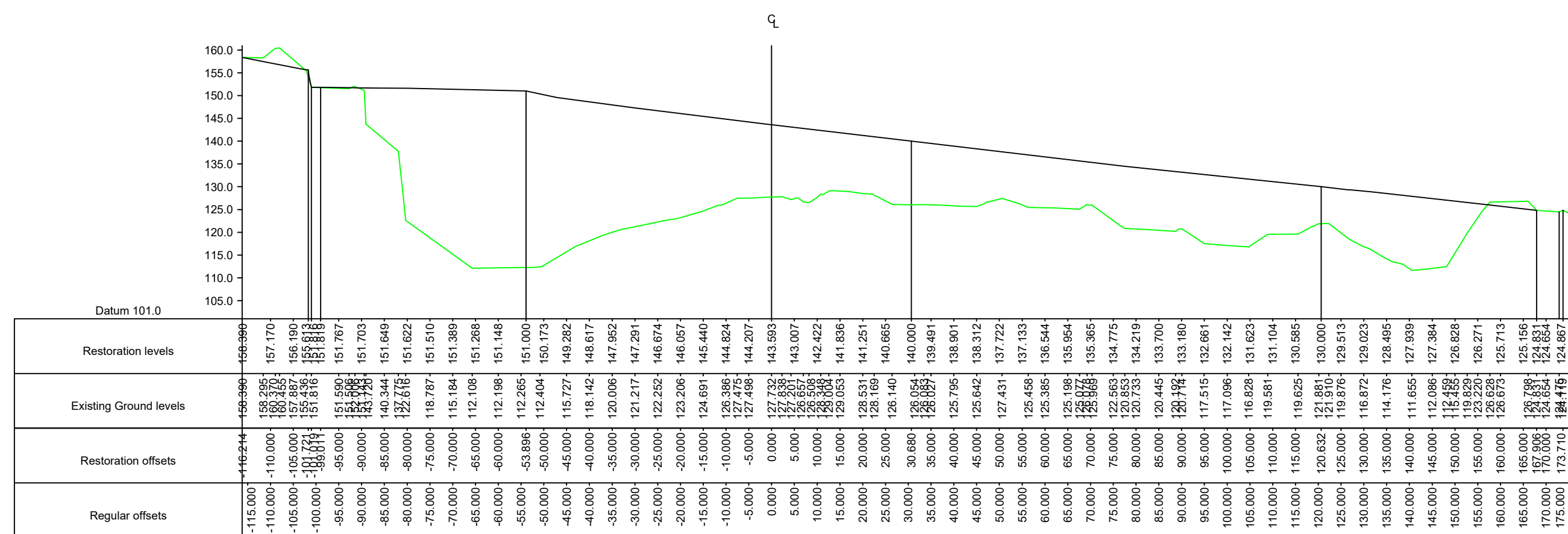
Orientation to North

—79.0—

Proposed Restoration Contours



Scale 1:2500



Notes

All Positions and levels to OS Grid (OSTN15)

KEY

Proposed Restoration
Level

Topographical Survey
May 2021

Orientation to North

Proposed Restoration Contours

Suffix	Revision	Date	Initial
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**John Nelson Surveying
Services Ltd.**

First Floor Suite
6 High Street
Sedgefield
Stockton on Tees
County Durham
TS21 3AR

Tel: 01740 622 231
Fax: 01740 621 444

Client

A McCall & Sons Ltd

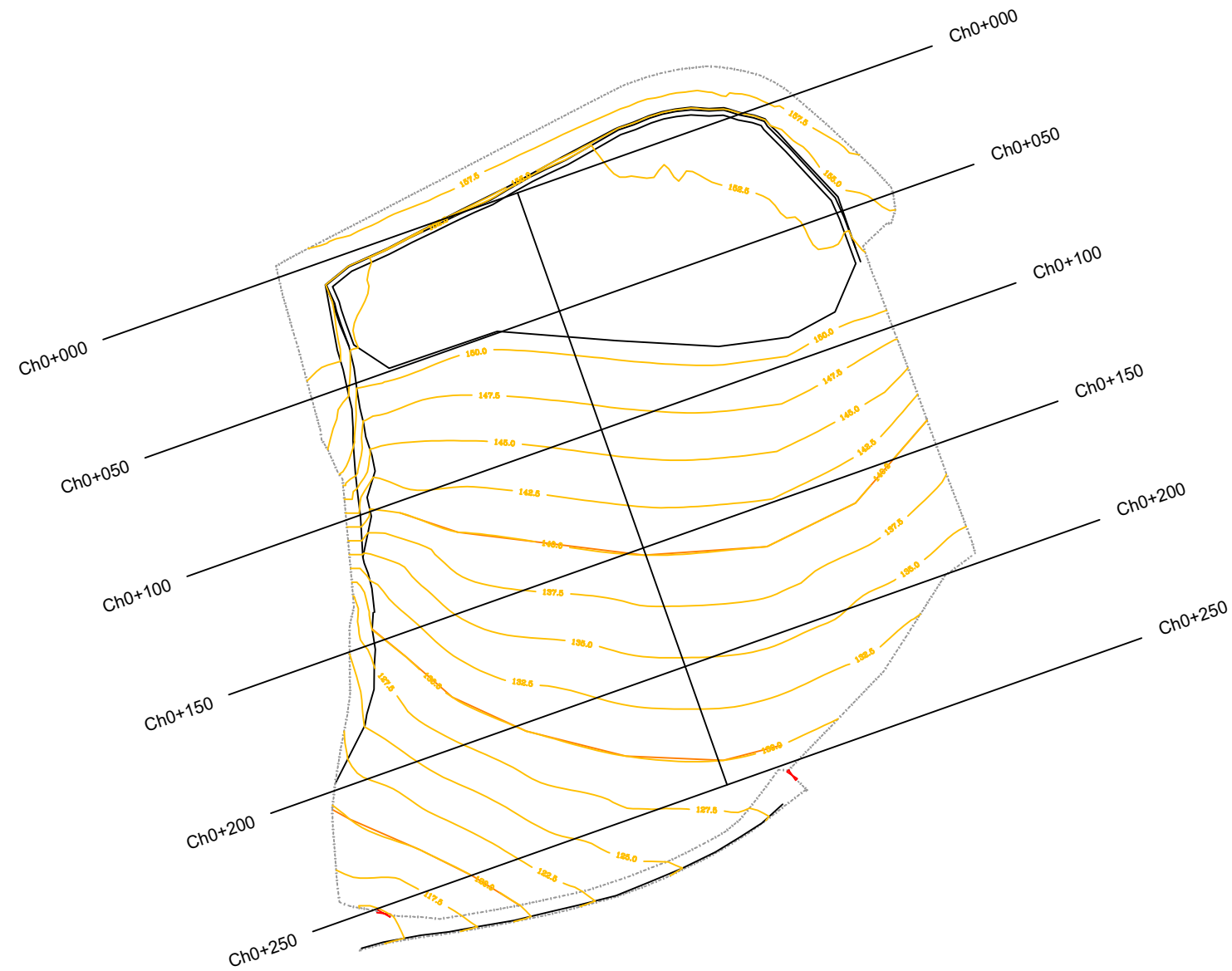
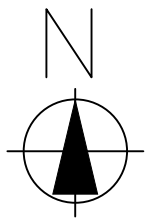
Project

Field House Sand Quarry
Sections Through Proposed vs Existing
Sheet 1 of 2

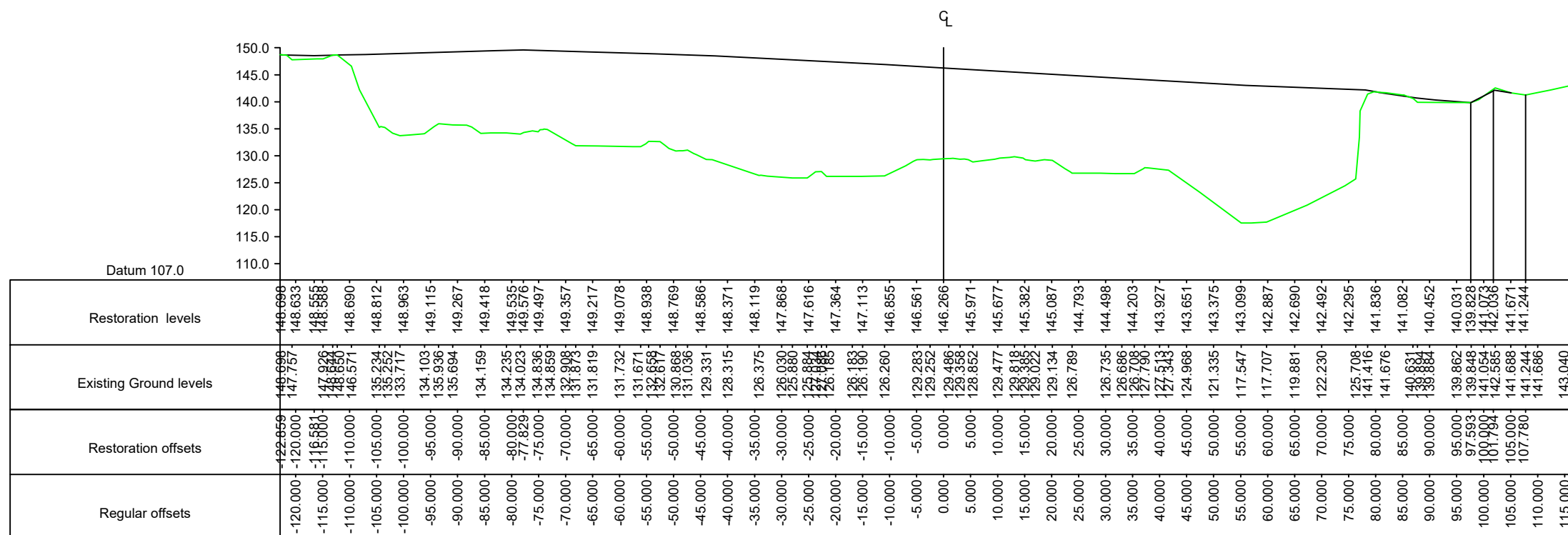
Surveyed JN	Date 01/06/21	Drawn JN	Date 09/11/21	Scale 1:1000@A
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drawing no.

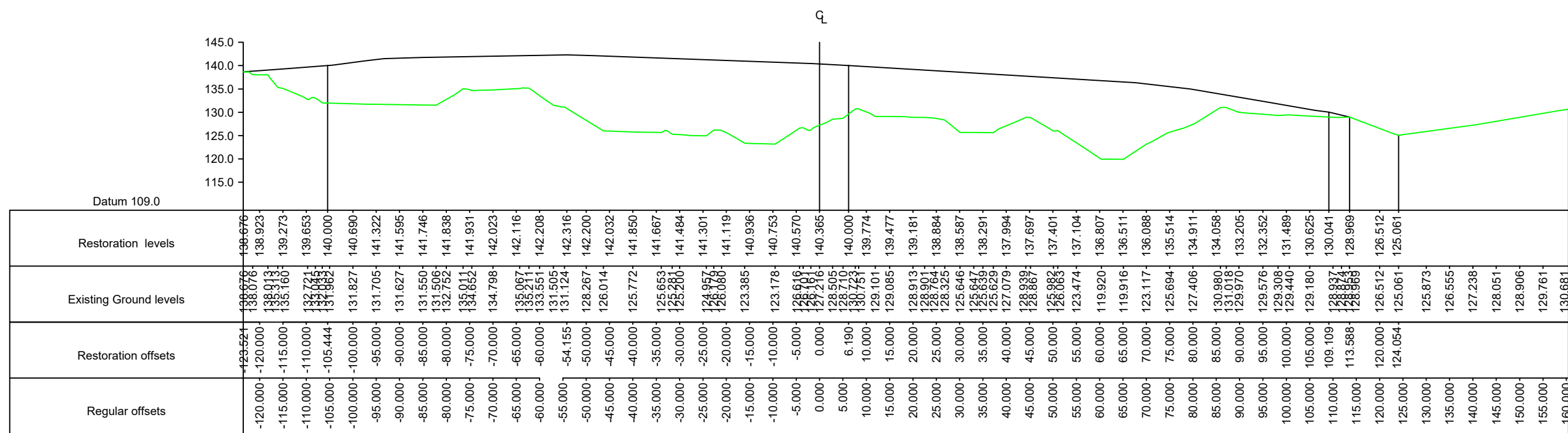
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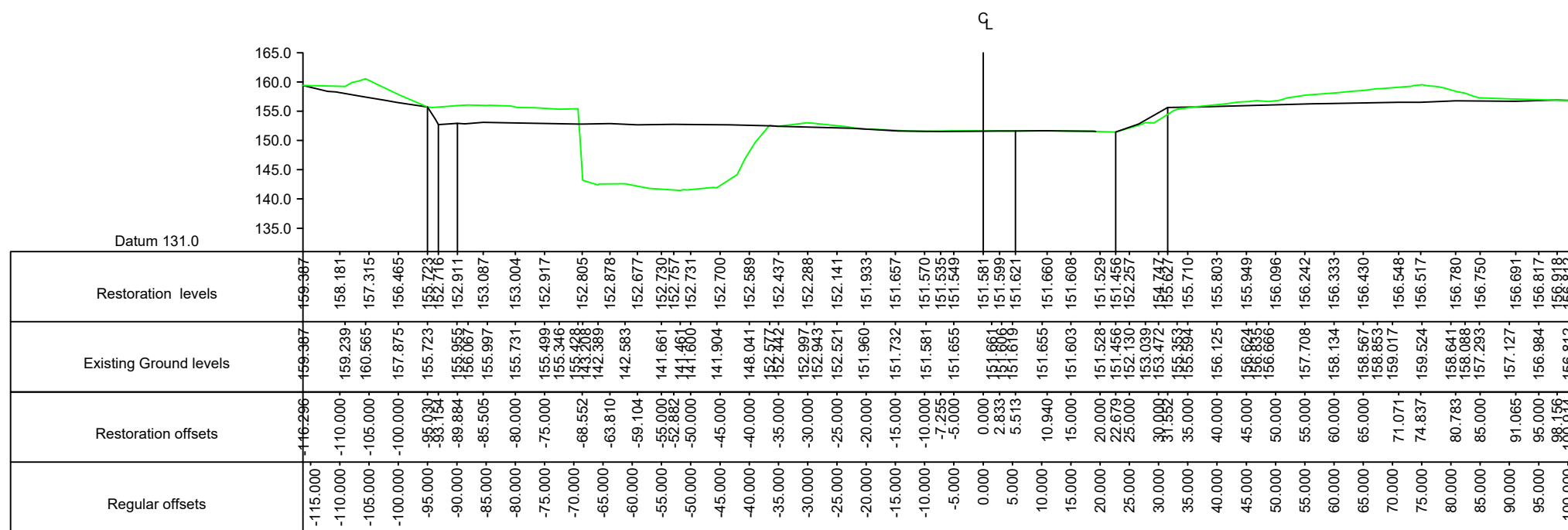
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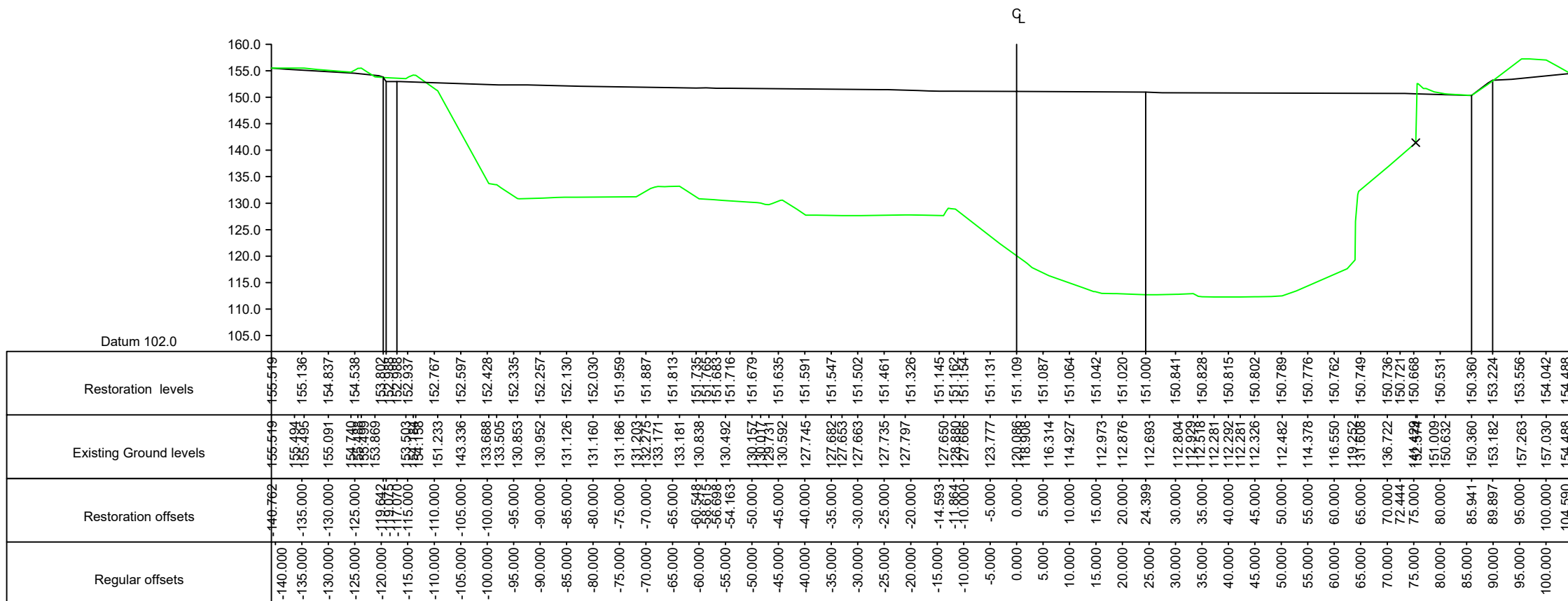
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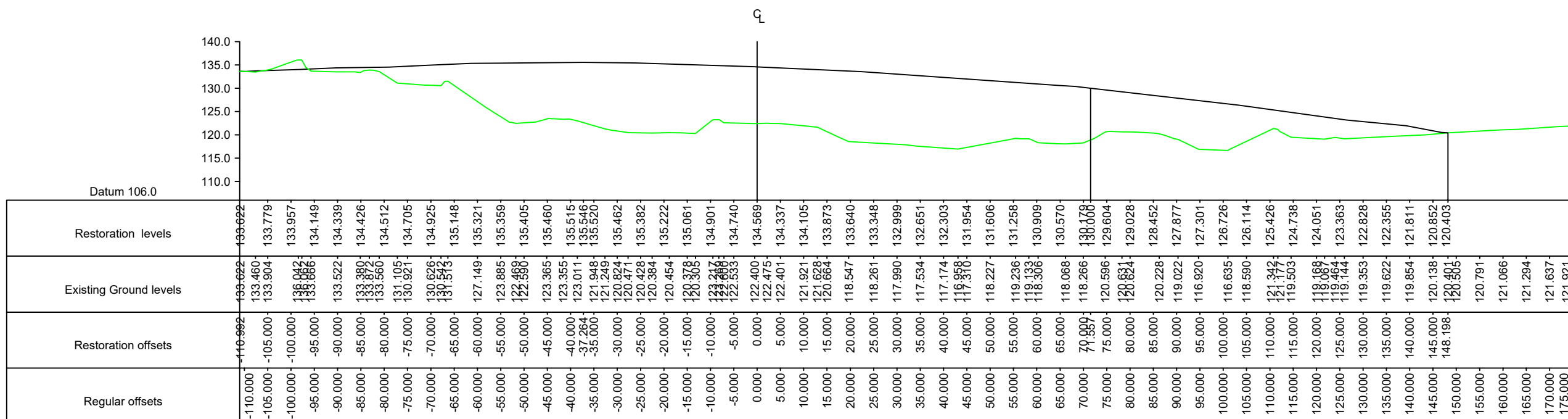
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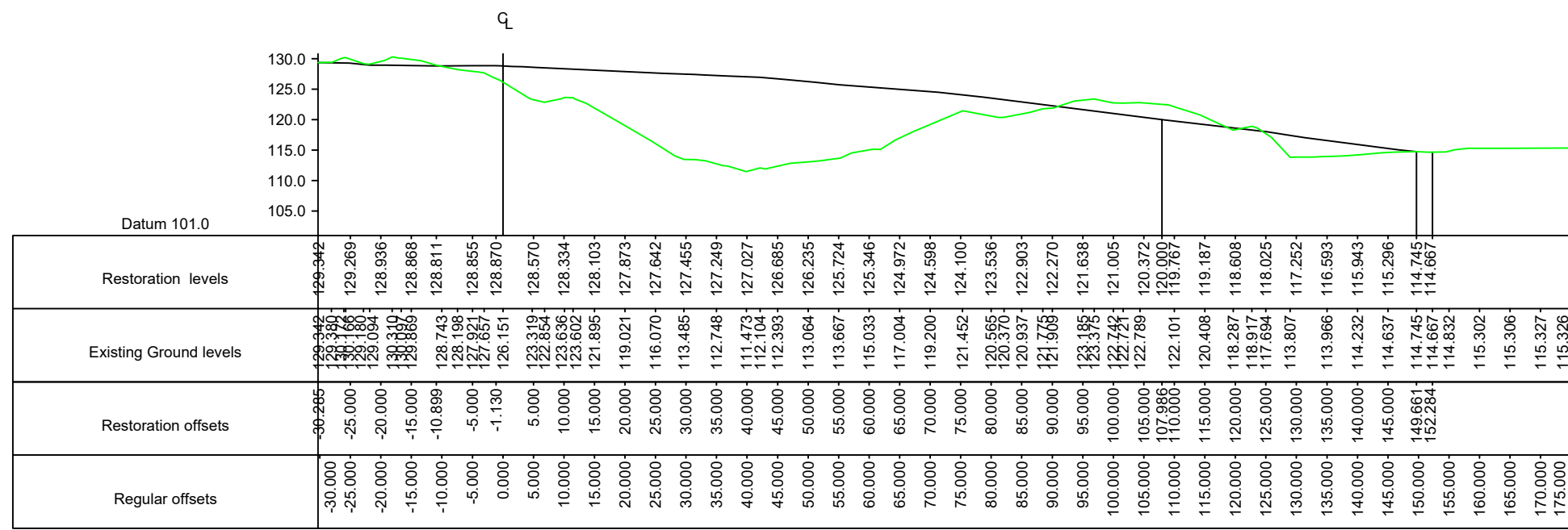
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Chainage 250.0m (435521.8E 550538.4N)

Notes

All Positions and levels to OS Grid (OSTN15)

KEY

Proposed Restoration Level

Topographical Survey May 2021



Orientation to North

79.0

Proposed Restoration Contours

Suffix Revision Date Initial

John Nelson Surveying Services Ltd.

First Floor Suite
6 High Street
Sedgefield
Stockton on Tees
County Durham
TS21 3AR

Tel: 01740 622 231
Fax: 01740 621 444

Client

A McCall & Sons Ltd.

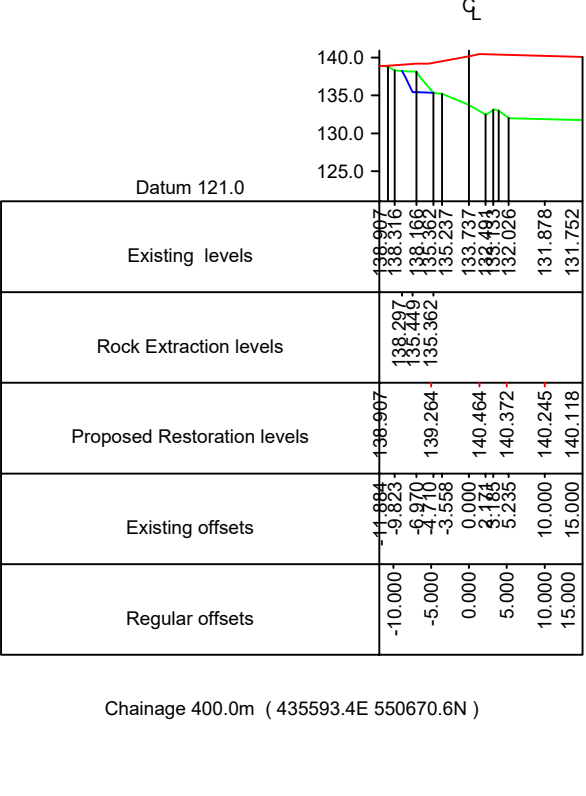
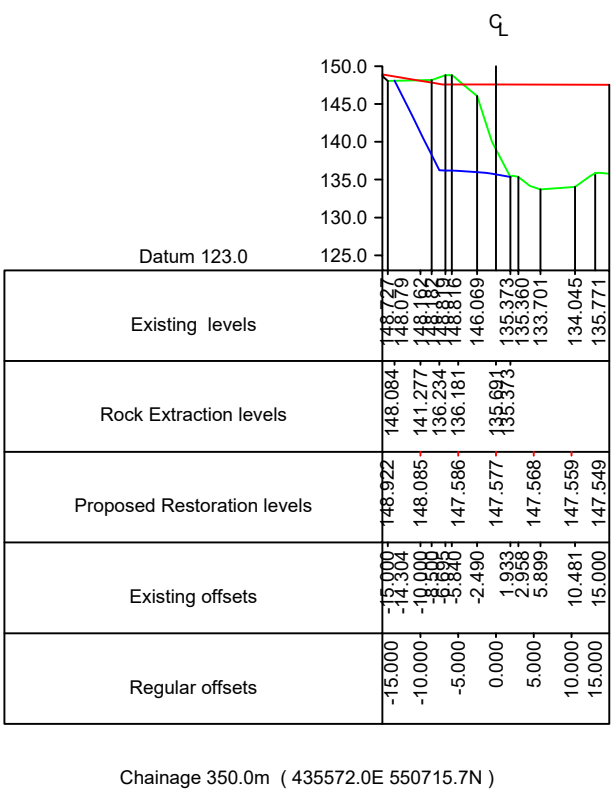
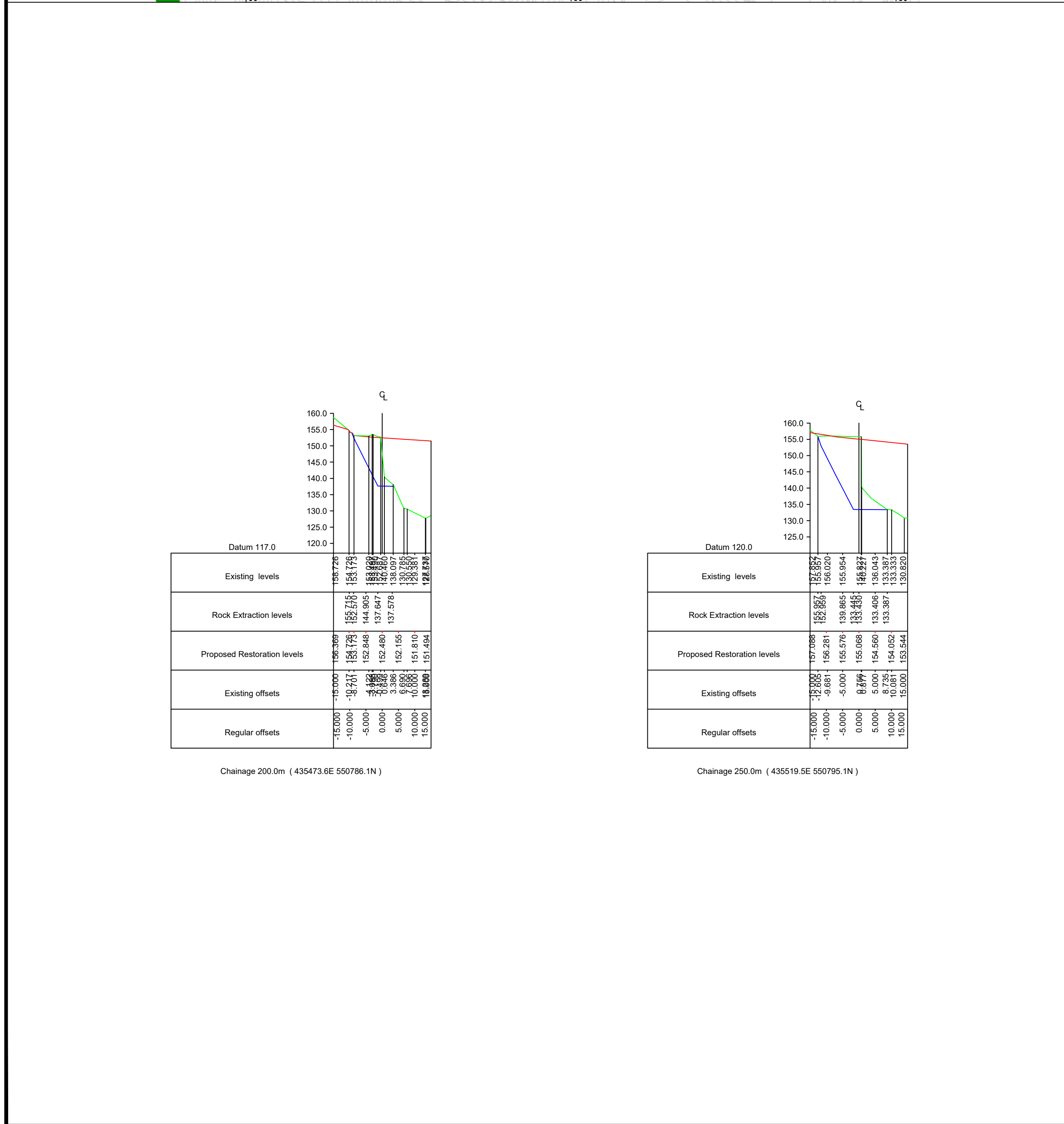
Project

Field House Sand Quarry
Sections Through Proposed vs Existing
Sheet 2 of 2

Surveyed Date Drawn Date Scale
JN 01/06/21 JN 09/11/21 1:1000@A1

drawing no.

8328/JN/005



Notes				
All Positions and levels to OS Grid (OSTN15)				
KEY				
	Proposed Restoration Level			
	Topographical Survey May 2021			
	Proposed Rock Excavation Level			
	Orientation to North			
	Proposed Restoration Contours			
Suffix	Revision			Initial
John Nelson Surveying Services Ltd. First Floor Suite 6 High Street Sedgfield Stockton on Tees County Durham TS21 3AR Tel: 01740 622 231 Fax: 01740 621 444				
Client				
A McCall & Sons Ltd.				
Project				
Field House Sand Quarry Sections Through Proposed Rock Excavation Profile				
Surveyed	Date	Drawn	Date	Scale
JN	01/06/21	JN	14/11/21	1:1000@A1
drawing no. 8328/JN/006				

Section 3





Non Technical Summary

Field House Quarry Permit Variation

Field House Farm

Market Place

Houghton-le Spring

Tyne & Wear

DH5 8AJ

Olive Compliance Ltd

Street, Ponteland, Newcastle upon Tyne, NE20 9NH

info@olivecompliance.com

This report has been prepared by Olive Compliance Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use A McCall and sons Ltd; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Olive Compliance Ltd.

Olive Compliance Ltd disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

A McCall and Sons Ltd has instructed Olive Compliance Ltd (Olive) to prepare an application for an Environmental Permit variation application for the Field House Quarry situated at: Quarry Weighbridge Market Place, Houghton Le Spring DH5 8AJ under the Environmental Permitting (England and Wales) Regulations 2016.

The application is for a variation to Environmental Permit GP3994ZQ/A001. The permit variation will allow the operator to store and treat waste to produce soil, soil substitutes and aggregate. Permitted wastes do not include hazardous wastes. The total quantity of waste that can be stored and subsequently treated at the site shall be no more than 99,000.

1.1 The Site

The site (centred at NGR NZ3550005060) is located at:

Field House Farm, Market Place, Houghton-le Spring, Tyne & Wear, DH5 8AJ

The site is principally bounded as detailed in Table 1.

Boundary	Description
North	Agricultural land
East	Agricultural land , Local Hanning Hill SSSI
South	Agricultural land
West	Agricultural land

The site location and environmental site setting is shown on Drawings 001 and 002.

1.2 Current Environmental Permit

The original site permit for quarry restoration via acceptance of inert waste was made in 2004 and was then varied in 2007 when the current permit was issued. The waste acceptance of inert waste is undertaken following pre acceptance checks and supply of chemical Waste Acceptance Analysis to show waste meets inert waste criteria.

1.3 Proposed Permit Variation

From the permit issue date the site had a Terex crusher/screener in operation in the quarry. A number of years later the EA have deemed that the use of the crusher and screener were not included on the permit and therefore the operator has been invited to undertake a permit variation to include the activities as DAA's.

Therefore we wish to include the following R codes with the current D codes.

- **R13:** Storage of wastes pending the operations numbered R3 and R5.
- **R3:** recycling or reclamation of organic substances which are not used as solvents.
- **R5:** Recycling or reclamation of other inorganic materials.

In undertaking these activities, the site is limited to: consisting only of sorting, separation, screening, crushing and blending of waste for recovery as a soil, soil substitute or aggregate into different components for recovery.

As part of the variation the current HRA wording should be updated to modern condition format requiring the HRA to undergo an update every 6 years.

The site wishes to accept soils and aggregates to either recover and sell as a product or as use as cover material on the inert landfill.

There are no increases in annual tonnages, no changes to the list of wastes received or changes to management and technically competent management status.

The current restoration profiles have been provided in Drawing Ref Numbers;

Drawing Ref:

8328/JN/001 – Site Survey

8328/JN/002 – Proposed elevation profile of rock

8328/JN/003 – Restoration Contours

8328/JN/004 - Sections Through Proposed vs Existing Sheet 1 of 2

8328/JN/005 - Sections Through Proposed vs Existing Sheet 2 of 2

8328/JN/006 - Sections Through Proposed Rock Excavation Profile

1.4 Waste Types

The site is permitted to accept the below wastes.

Those items in bold can be accepted without testing, all others will require additional testing to confirm compliance with the criteria for inert waste as specified in The Landfill (England and Wales) Regulations 2002.

EWC Code	Description	Restrictions
01 01 02	Wastes from mineral non-metalliferous extraction	
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 07	
01 04 09	Waste sand and clay	
01 04 10	Dusty and powdery wastes other than those mentioned in 01 04 07	
01 04 12	Tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11	
01 04 13	Wastes from stone cutting and sawing, other than those mentioned in 01 04 07	
10 11 03	Waste glass based fibrous materials	Only without organic binders
10 11 12	Waste glass other than those mentioned in 10 11 11	
10 12 08	Waste ceramics, bricks, tiles and other construction materials (after thermal processing)	
15 01 07	Glass packaging	
17 01 01	Concrete	Selected C&D waste only⁽²⁾
17 01 02	Bricks	Selected C&D waste only⁽²⁾
17 01 03	Tiles and ceramics	Selected C&D waste only⁽²⁾
17 01 07	Mixtures of concrete, bricks, tiles & ceramics	Selected C&D waste only⁽²⁾
17 02 02	Glass	
17 05 04	Soil and stones⁽¹⁾	Excluding topsoil, peat; excluding soil and stones from contaminated sites

17 09 04	Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	
19 12 05	Glass	
19 13 02	Solid waste from soil remediation other than those mentioned in 19 03 01	
20 01 02	Glass	Separately collected glass only
20 02 02	Soil and stones⁽¹⁾	Only from garden and parks waste; Excluding topsoils and peat

2.0 Application Contents

In view of the foregoing, the application comprises the following elements:

1. Application forms (Parts A, C2, C4 and F1);
2. Non-Technical Summary (NTS);
3. Drawings (Drawings);
4. Operating Procedures (OT);
5. Management System Documents;
6. Environmental Risk Assessment ERA);
7. Ecology Report;
8. Hydrological Risk Assessment (HRA);
9. WAMITAB; and
10. Directors Information

2.1 Application Forms

Parts A, C2, C4 and F1 of the Environment Agency's application forms have been completed in support of the application and are enclosed as Section 1 of the application.

2.2 Non-Technical Summary

As part of the application this non-technical summary (NTS) is a concise document that provides a description of the application process should also provide an effective outline of all the key points set out in an Environmental Statement.

This document is supplied in Section 2 of this application.

2.3 Drawings

8328/JN/001 – Site Survey

8328/JN/002 – Proposed elevation profile of rock

8328/JN/003 – Restoration Contours

8328/JN/004 - Sections Through Proposed vs Existing Sheet 1 of 2

8328/JN/005 - Sections Through Proposed vs Existing Sheet 2 of 2

8328/JN/006 - Sections Through Proposed Rock Excavation Profile

These documents are supplied in Section 3 of this application.

2.4 Operating Techniques

A McCall and Son Ltd operate their own in-house management system which ensures that:

- The risks that the activities pose to the environment are identified;
- The measures that are required to minimise the risks are identified;
- The activities are managed in accordance with the management system;
- Performance against the management system is audited at regular intervals; and
- The Environmental Permit is complied with.

The management system is supplemented by the Operating Techniques document (Operating Techniques) which outlines the operating techniques at the site and demonstrates conformance with the requirements of relevant Environment Agency (EA) guidance.

A summary of the management system is included in the Operating Techniques document included as Section 4 of the application and a summary of the key technical standards for the management of the recycling facility is included in Section 4.0 of this non-technical summary.

Operating Procedures that are currently in place at the site remain in place.

2.5 Environmental Management System

McCALLS operate their own in-house management system.

A copy of the management system is included as Section 5 of the application and a copy of the company's WRAP Protocol.

2.6 Environmental Risk Assessment

An Environmental Risk Assessment (ERA) has been undertaken and submitted with the permit variation application to assess and mitigate risks associated with the proposed changes on the site. There will be no point source emissions to groundwater, surface water or air resulting from the waste activity and neither will there be any site waste arising or global warming potential.

Therefore only 'Amenity and Accidents' remains applicable for assessment in this instance, and includes the consideration of odour, noise and vibration, fugitive emissions (including dust, mud, litter and pests) and accidents.

The ERA concludes that with the implementation of risk management measures, as described in the ERA, potential hazards from the facility are unlikely to be significant.

The Environmental Risk Assessment is supplied in Section 6 of this application.

2.7 Habitats Risk Assessment

High Haining Hill SSSI (NZ 356 507) for the main habitat of CALCAREOUS GRASSLAND – Lowland lies directly to the East of the site with its boundary adjacent to the quarry perimeter. The SSSI has been considered by OS Ecology and the record show it as being in an unsatisfactory state from the periods of Audit for 1997 until 2011 where by the SSSI has not been managed and scrub growth has developed which has been detrimental to the listed species. The adjacent quarrying operations have been ongoing for many years and are unlikely to be detrimental to the SSSI.

In line with assessment requirements for Calcareous grassland an Ecological Survey was undertaken by OS Ecology in July 2022. Conclusions from the survey were that the Quarry is not having an impact upon the SSSI and also once restored would give an opportunity to extend the SSSI habitat to within the quarry boundary.

This document is supplied in Section 7 of this application.

2.8 Hydrological Risk Assessment Review

A HRA Review is required as part of the Environmental Permit conditions.

The current condition states:

3.2.4 The operator shall submit to the Agency a review of the Hydrogeological Risk Assessment:

- (a) between 9 and 6 months prior to the fourth anniversary of the granting of the permit, and
- (b) between 9 and 6 months prior to every subsequent 4 years after the fourth anniversary of the granting of the permit.

As part of the variation the current HRA wording should be updated to modern condition format requiring the HRA to undergo an update every 6 years.

The HRA Review is required to support the Permit Variation and included in section 8 of the application.

2.9 Wamitab

Operations at the site will be under the overall control of a technically competent person who holds the relevant Certificate of Technical Competence (COTC) under the Waste Management Industry Training and Advisory Board (WAMITAB) scheme.

Evidence of competence is supplied within the application in Section 9 of this application.

2.10 Directors Information

Directors' information is supplied in Section 10 of this application.

3.0 Key Technical Standards

The key technical standards which will be employed to ensure that the proposed activities do not give rise to a significant environmental impact are summarised below:

- The Environmental Permitting (England and Wales) Regulations 2016;

- Develop a management system: environmental permits, August 2022;
- Control and monitor emissions for your environmental permit, February 2016;
- Environmental permitting: landfill sector technical guidance;
- Landfill operators: environmental permits (Inert Waste);
- Risk assessments for your environmental permit, February 2016.

In summary, the rules and operating procedures employed at the site will ensure that:

- All waste is managed in accordance with the Environmental Permit and legal requirements;
- Any tanks or containers used for the storage of any liquid fuel oil or other potentially polluting liquids/materials shall at all times be labelled as to the contents, and will be fit for purpose;
- Vehicles and plant will be appropriately maintained to ensure that operation will not give rise to unacceptable noise or vibration levels; and
- The risk of fugitive emissions (dust, noise, odour, pest and litter) is minimised;

Procedures are in place for the regular inspection and maintenance of storage areas and associated infrastructure, including site surfacing, drainage systems and containment measures. Records will be maintained detailing any action taken to repair infrastructure and faults. An Accident Management Plan is maintained and regularly reviewed to assess and minimise environmental risks and hazards of accidents and their consequences.

4.0 Conclusion

The overall conclusion from the studies undertaken in support of the permit variation application is that there is unlikely to be a significant environmental impact upon potentially sensitive receptors as a result of the proposed Environmental Permit variation for the Field House Quarry Facility.

McCall & Sons (Houghton Le Spring) Ltd is fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best industrial practices and with the implementation of the company's management system.

Section 4



OLIVE
Compliance



OLIVE

Compliance

OPERATING TECHNIQUES

Field House Quarry

Permit Variation

Field House Farm

Market Place

Houghton-le Spring

Tyne & Wear

DH5 8AJ

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1.0 Introduction

A McCall and Sons Ltd (MCCALLS) has instructed Olive Compliance Ltd (Olive) to prepare an application for an Environmental Permit variation application for the Field House Quarry situated at: Quarry Weighbridge Market Place, Houghton Le Spring DH5 8AJ under the Environmental Permitting (England and Wales) Regulations 2016.

The application is for a normal variation to Environmental Permit GP3994ZQ/A001.

The permit variation will allow the operator to store and treat waste to produce soil, soil substitutes and aggregate. Permitted wastes do not include hazardous wastes. The total quantity of waste that can be stored and subsequently treated at the site shall be no more than 99,000tonnes per annum.

The site wishes to accept soils and aggregates to either recover and sell as a product or as use as cover material on the inert landfill.

There are no increases in annual tonnages, no changes to the list of wastes received or changes to management and technically competent management status.

This non-technical summary provides a summary of the regulated facility, an explanation of exactly what is being applied for, and a summary of the key technical standards and control measures that will be implemented at the site as a result of the proposed changes.

1.1 Report Structure

This report describes the operating techniques that are to be implemented at the facility to ensure compliance with the conditions of the Environmental Permit. The report has been drafted to satisfy the requirements of Environmental Agency (EA) Guidance¹ and is divided into the following Sections.

Section 1	Introduction
Section 2	Management
Section 3	Operations
Section 4	Emissions and Monitoring
Section 5	Information
Section 6	Closure

¹www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

2.0 Management

2.1 Management System

McCALLS operate their own in-house management system which ensures that;

- the risks that the activities pose to the environment are identified;
- the measures that are required to minimise the risks are identified;
- the activities are managed in accordance with the management system;
- performance against the management system is audited at regular intervals; and
- the Environmental Permit is complied with.

The management system is supplemented by this document which outlines the operating techniques at the site and demonstrates conformance with the requirements of relevant Environment Agency guidance.

2.2 Management Structure and Responsibilities

The Site Manager is responsible for day-to-day operations and compliance with the Environmental Permit.

Whenever the site is open to receive or dispatch wastes, or will carry out any of the waste management operations, it will be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the permit regarding:

- waste acceptance and control procedures;
- operational controls;
- maintenance;
- record-keeping;
- emergency action plans; and
- notifications to the Environment Agency.

2.2.1 Technical Competence and Training

The site will be managed by sufficient staff, competent to operate the site. The management system will deliver the following:

- all staff will have clearly defined roles and responsibilities;
- records will be maintained of the skills required for each post;
- records will be maintained of the training and relevant qualifications undertaken by staff to meet the requirement of each post; and
- operations will be governed by standard operating instructions.

Operations at the site will be under the overall control of a technically competent person who holds the relevant Certificate of Technical Competence (COTC) under the Waste Management Industry Training and Advisory Board (WAMITAB) scheme.

Certificates are included within the application for the Technically Competent Manager.

An assessment of staff training needs will be carried out to identify the posts for which specific environmental awareness training is needed, and to determine the scope and level of such training.

The assessment of training needs will be reviewed on an annual basis.

Details of staff training procedures and recording are included in Section 11.2 of the management system.

The training programme will ensure that relevant staff are aware of the following:

- regulatory implications of the permit for the site and their specific work activity;
- all potential environmental effects from operations under normal and abnormal circumstances;
- the need to report deviations from the permit; and
- prevention of accidental emissions and the action to be taken should accidental emissions occur.

2.2.2 Site Security

Details of site security is included in SOP3.7 of the management system.

In order to prevent unauthorised access, a number of site security measures will be in place at the site including;

- Fencing and gated entrance/exit;
- CCTV in all operational areas; and
- Daily site monitoring.

The site will be inspected at the commencement of each working day. Any defects or damage which compromises the integrity of the enclosure will be made secure by temporary repair as soon as is practicable. Permanent repairs will be affected as soon as practicable.

All inspections, any defects, damage or repairs will be recorded in the site diary.

2.2.3 Permit Surrender

To assist in permit surrender, records will be maintained to demonstrate how the land beneath the site has been protected at all times between the date of permit issue and the end of permit operations.

Records to be maintained will include:

- maintenance of site surfacing;
- maintenance of site infrastructure and buildings;
- maintenance of drains and sumps; and
- actions taken to clean up incidents and spillages.

2.2.4 Display of Environmental Permit

A copy of the Environmental Permit will be kept available for reference by all staff and contractors whose work may have an impact on the environment. All staff will be informed where the Environmental Permit is kept.

2.2.5 Managing Documentation and Records

Controls will be in place to ensure that all documents are issued, revised and maintained in a consistent fashion.

The documents that will be included within the scope of the controls are as follows:

- policies;

- responsibilities;
- maintenance records;
- procedures;
- monitoring records;
- results of audits;
- results of reviews;
- complaints and incident records; and
- training records.

Records will be made and kept up to date on a daily basis to reflect deliveries, on site treatment and dispatches. All records relating to waste acceptance will be maintained and kept readily available on site and kept for a minimum of 2 years after the waste has been removed off site.

2.2.6 Reporting Non-Compliance and Taking Corrective Action

Procedures as detailed in SOP 3.25 will ensure appropriate corrective action is taken in response to problems identified at the site. The procedure will ensure that non-conformances are reported, investigated and rectified, and that failures and weaknesses are prevented. The following aspects will be considered:

- actual or potential non-compliance;
- system failure discovered at internal audit;
- suppliers or subcontractors breaking the agreed operating rules;
- incidents, accidents, and emergencies;
- malfunction, breakdown or failure of plant;
- other operational system failure; and
- complaints.

The action taken in response to the non-conformance may include:

- obtaining additional information on the nature and extent of the non-conformance;
- discussing and testing alternative solutions;
- modifying procedures and responsibilities;
- seeking approval for additional resources and training; and
- contacting suppliers and contractors (as applicable).

2.2.7 Auditing and Legal Compliance

There will be a formalised internal inspection and auditing procedure to ensure the facility is audited at defined intervals and that the progress of corrective and preventative action is monitored.

The frequency and nature of the audits is outlined in SOP3.8.

2.2.8 Monitoring, Measuring and Reviewing Environmental Performance

A formalised management structure will review environmental performance, and ensure any necessary actions are taken.

The nature of these reviews is outlined in Section 2 of the EMS.

2.2.9 Operational Control, Preventative Maintenance and Calibration

The management system will complement operational procedures so as to ensure effective control of site operations, the use of approved suppliers and contract services, the maintenance of operational equipment and the calibration of monitoring equipment.

All plant and equipment will be subject to a programme of planned preventative maintenance which will follow the inspection and maintenance schedule recommended by the manufacturer.

The relevant procedures are contained in SOP 3.19 of the EMS.

2.2.10 Design and Construction Quality Assurance

All relevant elements of the site (not already constructed) will be designed in accordance with recognised standards, methodologies and practices.

The design process will use a risk-based approach and will be appropriately documented using drawings, specifications and method statements where appropriate to provide an adequate audit trail.

A competent and suitably qualified person will supervise the construction activities.

2.3 Accident Management Plan

The company recognises the importance of the prevention of accidents that may have environmental consequences and that it is crucial to limit those consequences.

An accident management plan will be implemented and maintained at the site to ensure the site and site staff are fully prepared for any such incidents. The accident management plan will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence.

The following accident management plan describes the techniques that will be implemented to minimise the risks posed to the environment. Activities affecting the health and safety (H&S) of operatives, contractors and visitors will be separately managed in compliance with H&S regulation and company H&S Policy.

The accident management plan is included in SOP 3.18 of the EMS.

2.3.1 Hazard Identification

The following accident hazards have been identified from the Environment Agency's Generic Risk Assessments;

- Unauthorised Waste Acceptance;
- Flooding;
- Arson and/or Vandalism;
- Accidental Fire; and
- Spillage of Liquids.

The company will employ a number of measures to prevent the realisation of these hazards to the environment and human health.

2.3.2 Unauthorised Waste

Acceptance of unauthorised materials has the potential to cause harm to the environment and human health for example the receipt of dusty wastes could impact the amenity of the site's neighbours. All wastes received at the site will be subject to inspection and checking against the declaration on the waste transfer note. In the event that unauthorised waste is delivered to the site, the waste will be segregated and stored in a designated quarantine area within the building prior to export from site to a suitably permitted facility for recovery or disposal.

The waste acceptance procedures are included in SOP 3.3 of the EMS.

2.3.3 Fire Prevention

The risk of accidental combustion of the waste types accepted at the site is low. Notwithstanding this, to prevent and minimise the potential impact of fire, a brief summary of the measures which will be employed is as follows:

- incompatible materials will not be accepted at the site;
- the plant inspection schedule will include checks of electrical equipment within the site to ensure that any faults are identified and repaired;
- fire extinguishers will be provided at designated locations;
- smoking will not be permitted in the operational areas of the site;
- working practices will ensure the assessment of fire hazards and training of employees in fire prevention, e.g. the use of fire extinguishers and emergency procedures; and
- no wastes will be burned on the site and any fire at the site will be treated as an emergency.

In the event of a major fire, the following action will be taken:

- the Operator/Site Manager and Fire Brigade will be notified immediately and the Environment Agency as soon as practicable;
- the burning area will be isolated, and attempts will be made to extinguish the fire utilising the onsite fire extinguishers if safe to do so; and
- the site and buildings will be evacuated.

2.3.4 Loss of Containment

Loss of containment could lead to spillage and leakage of potentially contaminating liquids. To prevent loss of containment and minimise the risk and impact of releases the following measures will be implemented:

- *Containment system:* any facilities for the storage of oils, fuels or chemicals will be sited above ground on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound will be at least the equivalent to the capacity of the tank plus 10%. All filling points, vents and gauges will be located within the bund. No oils or fuel are stored in any of the permitted areas.
- *Storage tanks:* any storage tanks will be constructed to the appropriate British Standard;
- *Inspection:* storage tanks will be inspected visually on a daily basis by the site staff to ensure the continued integrity of the tanks, and identify the requirement for any remedial action;
- *Spill kits:* materials suitable for absorbing and containing minor spillages will be maintained on site; and
- *Monitoring techniques:* the site staff will undertake daily monitoring for evidence of spillage and leakage.

In the event of any potentially polluting leak or spillage occurring on site, the following action will be taken:

- Minor spillages will be cleaned up immediately, using sand or proprietary absorbent. The resultant materials will be placed into containers and will then be removed from site and disposed of at a suitably permitted facility. The incident will be logged in the site diary.
- Any dry wastes spilled on site will be collected and transported to the appropriate area of the site.
- In the event of a major spillage, which is causing or is likely to cause polluting emissions to the environment, immediate action will be taken to contain the spillage and prevent liquid from

entering surface water or drains. The spillage will be cleared immediately and placed in containers for offsite disposal, and the Environment Agency will be informed.

The spillage procedure, included in Section SOP3.17 of the EMS, details further information in regard to spillages on site.

2.3.5 Security and Vandalism

As detailed in SOP3.7 Security Management the following security measures are in place;

- *Site perimeter*: the site benefits from fencing around the whole site perimeter (land boundaries);
- *Inspection*: gates and perimeter fencing around extending around the site will be inspected regularly by the operations staff to identify deterioration and damage, and the need for any repairs;
- *Maintenance and repair*: fencing and gates will be maintained and repaired to ensure their continued integrity. In the event that damage is sustained repairs will be made by the end of the working day. If this is not possible, suitable measures will be taken to prevent any unauthorised access to the site and permanent repairs will be affected as soon as practicable;
- *Authorised access system*: all visitors to the site will be required to register in the visitor's book and sign out again on exit to minimise the risk of unauthorised visitors being present on site; and
- *Monitoring techniques*: operational procedures, including regular inspections will ensure continual monitoring of security provision at the site;
- *CCTV*: is installed at the entrance of the site.

In the event of a breach of security at the site, the cause will be investigated, and appropriate mitigation measures implemented. Records to be maintained include inspections and maintenance of security fencing and gates, breaches of security, investigations and actions taken.

2.3.6 Flooding

The site is not identified to be in a flood risk area.

3.0 Operations

3.1 Process Description

Wastes will be accepted in accordance with waste acceptance procedures set out below. Wastes accepted at the site for storage only for import and export purposes. No treatment is undertaken to wastes.

3.2 Permitted Activities

The waste management carried out are described and limited to those within the site permit. The activities are specified in Annex I and Annex II of the Waste Framework Directive 2008 as follows:

3.3 Waste Acceptance

3.3.1 Permitted wastes

The inert wastes are permitted for the restoration of closed areas, with excluding the below waste.

Table 1 – Annual Waste Input

Table S1.5 Annual waste input limits	
Category	Limit Tonnes/ Year
Inert Waste	99,000
Inert Waste for restoration of closed areas - (Inert waste excluding the following wastes) 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 07 01 04 10 Dusty and powdery wastes other than those mentioned in 01 04 07 10 11 03 Waste glass based fibrous materials 10 11 12 Waste ceramics, bricks, tiles and other construction materials (after thermal processing) 15 01 07 Glass packaging 17 01 01 concrete 17 01 02 bricks 17 01 03 tiles and ceramics 17 01 07 mixtures of concrete, bricks & ceramics 17 02 02 glass 19 12 05 glass 20 01 02 glass	99,000
Total	99,000

The below wastes are permitted for acceptance on site.

- (1). For the purposes of waste acceptance, soil includes naturally occurring sands and clays.
- (2). Selected construction and demolition waste (C&D waste): with low contents of other types of materials (like metals, plastic, organics,

wood, rubber, etc). The origin of the waste must be known.

No C&D waste from constructions, polluted with inorganic or organic dangerous substances, e.g. because of production processes

in the construction, soil pollution, storage and usage of pesticides or other dangerous substances, etc, unless it is made clear that

the demolished construction was not significantly polluted.

No C&D waste from constructions, treated, covered or painted with materials, containing dangerous substances in significant amounts.

Table 2 – Permitted Wastes for recovery and recycling

EWC Code	Description	Restrictions
01 01 02	Wastes from mineral non-metalliferous extraction	
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 07	
01 04 09	Waste sand and clay	
01 04 10	Dusty and powdery wastes other than those mentioned in 01 04 07	
01 04 12	Tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11	
01 04 13	Wastes from stone cutting and sawing, other than those mentioned in 01 04 07	
10 11 03	Waste glass based fibrous materials	Only without organic binders
10 11 12	Waste glass other than those mentioned in 10 11 11	
10 12 08	Waste ceramics, bricks, tiles and other construction materials (after thermal processing)	
15 01 07	Glass packaging	
17 01 01	Concrete	Selected C&D waste only⁽²⁾
17 01 02	Bricks	Selected C&D waste only⁽²⁾
17 01 03	Tiles and ceramics	Selected C&D waste only⁽²⁾
17 01 07	Mixtures of concrete, bricks, tiles & ceramics	Selected C&D waste only⁽²⁾
17 02 02	Glass	
17 05 04	Soil and stones⁽¹⁾	Excluding topsoil, peat; excluding soil and stones from contaminated sites
17 09 04	Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	
19 12 05	Glass	
19 13 02	Solid waste from soil remediation other than those mentioned in 19 03 01	
20 01 02	Glass	Separately collected glass only
20 02 02	Soil and stones⁽¹⁾	Only from garden and parks waste; Excluding topsoils and peat

3.3.2 Hours of Operation

The facility will be open to receive wastes and operate between the following hours, in line with the current planning permission.

3.3.3 Load Inspection and Waste Control

All vehicles bringing waste material to the site will report to the site office where the load will be visually inspected if possible, in order to confirm its description and composition against the relevant waste transfer note, and other accompanying documentation. All wastes will undergo a further visual inspection during deposition within the stockpile area.

Wastes will only be accepted at the site if the description in the accompanying documentation is in accordance with the permit and that onsite inspection confirms waste is consistent with the description provided.

Should the wastes be found not to conform during the initial visual inspection, then the details will be recorded and the vehicle turned away. Should wastes already be discharged within the stockpile area and deemed not to conform or otherwise not be permitted then the waste will be picked out and:

- reloaded on to the delivery vehicle; or
- removed to a designated quarantine area as appropriate

Records of non-compliant waste received at the site will include details on:

- the quantity;
- characteristics;
- origin;
- delivery date and time; and
- the identity of the producer and carrier

Wastes will not be accepted unless the site is adequately resourced to receive the waste.

A record will be kept in the site diary of all rejected wastes. The waste producer and the Environment Agency will be notified of significant non-conformance.

3.3.4 Means of Measurement

The quantity of waste accepted and despatched from the facility will be measured via the onsite use of the weighbridge or calculated by recording the volume of waste entering the site.

All wastes entering the site will be recorded upon arrival and the waste and recyclable components removed from site for disposal for further recovery or reuse will also be recorded on exit.

3.4 Waste Storage

Maximum waste storage on site at any one time will be managed in accordance with the site Environmental Management System.

All wastes are stored on hardstanding awaiting use or recycling.

3.5 Waste Treatment

Wastes accepted at the site is stored awaiting direct use on the landfill or will be segregated for treatment undertaken in accordance with the site EMS and WRAP Protocol for aggregate waste.

3.6 Site Infrastructure and Equipment

3.6.1 Site Identification Board

A site identification board which is easily readable from outside the entrance during hours of daylight will be provided at or near the main site entrance.

The identification board will be inspected at least once per week. In the event of damage or defect that significantly affects the legibility of the board it will be repaired or replaced within a timescale agreed with the Environment Agency.

The board will display the following information:

- Site name and address;
- Permit holder;
- Permit number (s);
- Emergency contact name and telephone number;
- Environment Agency national telephone numbers; and
- Days and hours site is open to receive waste.

3.6.2 Plant and Equipment

All items of plant and equipment used on site will be maintained in accordance with manufacturer's recommendations.

4.0 EMISSIONS AND MONITORING

The site will be operated so that there will be no point source emissions to air, surface water, groundwater or land.

4.1 Surface Water and Groundwater

The site will accept permitted wastes only and will be operated to prevent fugitive emissions to surface water and groundwater.

4.1.1 Engineered Containment

All inert waste will be stored and treated on hardstanding.

4.1.2 Containment Bunding

All potentially polluting materials for example oils and fuels will be stored in containers provided with secondary containment. Containers and secondary containment will be impermeable, resistant to the stored materials and constructed to the appropriate British Standard.

Containers will be surrounded by a leakage containment bund capable of containing at least 110% of the volume of the largest container within the bund or 25% of the total container volume within the bund, whichever is the greater.

Pipework will be routed within banded area ensuring no penetration of the secondary container. Tanker connection points will be within the bund.

Containers/Tanks will be inspected visually on a daily basis by the site staff to ensure the continued integrity of the containment and identify the requirement for any remedial action.

4.2 Odour

No putrescible or readily degradable wastes will be accepted at the site. Due to the strict control of the waste that will be accepted at the site, odour is not expected to pose a significant risk.

4.3 Dust

No waste consisting solely or mainly of dusts, powders or loose fibres will be accepted at the site. Due to the types of waste accepted and the strict control of the waste that will be accepted at the site, dust is not expected to pose a significant risk.

In the event the generation of dust occurs during storage or treatment of wastes, this will be monitored and mitigation methods such as dampening will be employed to reduce the risk of fugitive dust emissions.

These wastes will not be stored longer than 48 hours unless otherwise agreed with the Environment Agency.

Daily site inspections will be carried out by site staff during the course of their normal working activities.

The procedure for managing complaints is included in SOP3.20 of the EMS.

The management of dust emissions is detailed in SOP 3.13 Dust Management of the EMS.

4.4 Noise

Waste acceptance operations will only be carried out during operational hours. All equipment will be maintained and operated in accordance with manufacturer's guidance and will be maintained in good working order.

The site will be operated so as to minimise noise emissions from the site. Measures that will be taken at the site include:

- locating plant away from noise-sensitive receptors where possible;
- the avoidance of dropping materials from height;
- switching plant off when not in use;
- the imposition of a speed limit for vehicles delivering waste to the site. The site has 10mph Speed Limit This will reduce noise associated with high engine speeds;
- the training of all personnel in the need to minimise site noise, and will be responsible for monitoring and reporting excessive noise when carrying out their everyday roles;
- regularly maintaining site plant and machinery to minimise noise resulting from inefficient operation of pumps, generators and engines;
- in the event that reversing alarms are found to give rise to complaints, alternative alarms or technology will be investigated;
- the regular maintenance of site surfaces to prevent the development of potholes will significantly reduce the noise generated particularly by empty vehicles exiting the site;
- consideration will be given to the fitting of noise suppression kits on items of plant and equipment; and
- all plant will be maintained in accordance with manufacturer's recommendations to minimise noise emissions.

Any complaint received will be logged in the site diary. The Site Manager will investigate the complaint and will take action to identify the source of the noise and implement remedial measures where appropriate.

The measures employed at the site to minimise the emission of noise will be regularly reviewed by the Site Manager and additional measures will be employed where required.

The procedure for managing complaints is included in SOP 3.20 of the EMS.

The management of noise emissions is detailed further in SOP 3.10 of the EMS.

4.5 Pests

Due to the nature of the wastes proposed to be accepted at the site, it is not anticipated that pests will pose a risk at the facility.

The facility will be inspected by both site management and operatives for infestations of pests, vermin and insects on a routine basis.

A specialist pest control contractor will be deployed if required.

The management of pests is further detailed in SOP3.12 of the EMS.

4.6 Litter

Due to the nature of the waste to be accepted on site, it is not anticipated that litter will pose a serious risk. However, the boundary of the site and its environs will be regularly checked and any litter and clean it up. The site will benefit from a perimeter fence which will limit the potential for litter to escape off-site.

It will be the responsibility of the site staff to monitor the site for any signs of escaping materials either from within the site or from vehicles delivering or removing materials to and from the site.

Inspections will be carried out on a daily basis and a record maintained within the site diary.

The management of litter is detailed further in SOP 3.13 of the EMS.

4.7 Mud and Debris

The top section of the road site is surfaced with concrete, tarmacadam and hardstanding and fully drained. It is therefore not expected that mud will feature as a problem for the site within the site, the following measures will be taken in order to prevent the deposition or tracking of mud or debris from the site onto public areas or highways:

- site surfaces will be maintained free of significant quantities of mud
- wheel cleaning facility on site
- all operational areas will be subject to monitoring by staff throughout the working day
- all vehicles leaving operational areas will, before leaving the site be checked to ensure that they are clear of loose waste and that any products being exported from the site are secure.

In the event that mud, debris or waste arising from the site is deposited onto public areas outside the site, the following remedial measures will be implemented:

- the affected public areas outside the site will be cleaned; and

- traffic will be isolated from sources of mud and debris within the site to prevent further tracking of mud and debris, and measures will be taken to clear any such sources as soon as practicable.

5.0 INFORMATION

All relevant notifications and submissions to the Environment Agency regarding the site will be made in writing and will quote the permit reference number and the name of the permit holder.

Records will be maintained for at least 3 years, however in the case of off-site environmental effects, and matters which affect the condition of land and groundwater the records shall be kept until permit surrender. Duty of Care records will be kept for a minimum of 2 years with hazardous consignment notes retained for 3 years or the lifetime of the permit.

6.0 Reporting and Notifications

6.1 Environmental Monitoring

The operator shall, unless otherwise agreed in writing by the Agency, undertake the monitoring for the parameters, specified in the following tables in schedule 4 of the permit:

- Groundwater specified in table S4.1;
- Leachate specified in tables S4.3;
- Landfill gas specified in table S4.2;
- Particulate matter specified in table S4.4.

The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

A topographical survey of the site referenced to Ordnance Datum shall be carried out:

- annually, and
- prior to the disposal of waste in any new cell or new development area of the landfill, and
- following closure of the landfill or part of the landfill.

The topographical survey shall be used to produce a plan of a scale adequate to show the surveyed features of the site.

6.2 Changes in Technically Competent Persons

The Environment Agency will be informed in writing of any changes in the technically competent management of the site and the name of any incoming person, together with evidence that such person has the required technical competence.

6.3 Waste Types and Quantities

A summary report of waste types and quantities accepted and removed from the site for each quarter, will be submitted to the Environment Agency within 1 month of the end of the quarter unless otherwise required by the permit conditions.

A report or reports on the performance of the activities over the previous year shall be submitted to the Agency by 31 January (or other date agreed in writing by the Agency) each year.

Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit.

6.3.1 Relevant Convictions

The Environment Agency will be notified of the following events:

- The company or directors being convicted of any relevant offence; and
- any appeal against a conviction for a relevant offence and the results of such an appeal.

6.3.2 Notification of Change of Operator's or Holder's Details

The Environment Agency will be notified of the following:

- any change in the operator's trading name, registered name or registered office address; and
- any steps taken with a view to the company going into administration, entering into a company voluntary arrangement or being wound up.

6.3.3 Adverse Effects

The Agency will be notified without delay following the detection of the following:

- any malfunction, breakdown or failure of equipment or techniques;
- any accident;
- fugitive emissions which have caused, is causing or may cause significant pollution; and
- any significant adverse environmental and/or health effect.

7.0 Closure

This report has been prepared by Olive Compliance Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of A McCall and Sons Ltd no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Olive Compliance Ltd.

Olive Compliance Ltd disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Section 5



A McCall & Sons Ltd	ENVIRONMENTAL MANAGEMENT SYSTEM Contents	EMS: EMS/CON
		Version: 1 Effective: October 2022
Authored by: KD	Produced by: Olive Compliance Limited	Approved by: K Bennison

Section 1	Standard Operation Procedures
SOP/1.1	Pre Acceptance Procedure
SOP/1.2	Waste Acceptance Procedure
SOP/1.3	Non-Conforming Waste Procedure
SOP/1.4	Waste Segregation and Storage Procedure
SOP/1.5	Weighbridge Operation
SOP/1.6	Traffic Management
SOP/1.7	Security Management
SOP/1.8	Daily Site Monitoring
SOP/1.9	Monitoring and Control Management
SOP/1.10	Noise Management
SOP/1.11	Odour Management
SOP/1.12	Pest Management
SOP/1.13	Litter Management
SOP/1.14	Dust Procedure
SOP/1.15	Training Procedure
SOP/1.16	Accident Management Plan
SOP/1.17	Spillage Procedure
SOP/1.18	Fire Prevention
SOP/1.19	Maintenance Procedure
SOP/3.20	Complaints Management
SOP/1.21	Waste Sorting & Treatment
SOP/1.22	Waste Outputs
SOP/1.23	Contingency Planning
SOP/1.24	Emergency Preparedness
SOP/1.25	Incidents and Non conformances
SOP/1.26	Record Keeping
SOP/	Closure

A McCall & Sons Ltd	ENVIRONMENTAL MANAGEMENT SYSTEM Contents	EMS: EMS/CON
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Authored by: KD	Produced by: Olive Compliance Limited	Approved by: K Bennison

Section 2

Forms

Form 2.1	Daily Site Inspection Sheet
Form 2.2	Monthly EH&S checklist
Form 2.3	Monthly EH&S checklist
Form 2.4	Non-Conformance Report
Form 2.5	Waste Rejection Note
Form 2.6	Accident and Incident Record
Form 2.7	Complaints Record Form
Form 2.8	Permit to Work/Cert of Safety
Form 2.9	Plant/Vehicle Inspection Sheet (example)
Form 2.10	Maintenance Records - Electronic Records(example)
Form 2.11	Maintenance Checklists - Electronic Records) (example)
Form 2.12	Staff Responsibilities - Electronic Records (example)
Form 2.13	Training Records – Electronic Records (example)
Form 2.14	Training Matrix – Electronic Record (example)
Form 2.15	Induction checklist

Section 3

WRAP Protocol

Section 4

Permits and Site Plans

WRAP PROTOCOL

Field House Quarry

Field House Farm
Market Place
Houghton-le Spring
Tyne & Wear
DH5 8AJ



OLIVE
Compliance

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1. INTRODUCTION

This document is the Quality Manual for the manufacture of aggregates from inert waste at :

Field House Quarry
Field House Farm
Market Place
Houghton-le Spring
Tyne & Wear
DH5 8AJ

It is based on the WRAP 'Quality Protocol for the production of aggregates from inert waste', further complimented by the Factory Production Control (FPC) Annexes of the European Standards on Aggregates.

References to procedures in the Company Integrated Management System are identified and are available separately.

This protocol will be reviewed annually in line with management system reviews

This manual has been approved by:

Kathryn Bennison
Managing Director.

2. RELATED DOCUMENTATION

Document	Reference	Issue	Expiry
EA Waste Recycling Permit	EAWML UP3839BE	2007	N/A
Management System	Management System	Sept 2022	
Weigh Bridge Calibration	Crosby	2021	

Copies of all documents listed above are retained in the site office.

3. ORGANISATION AND RESPONSIBILITIES

Responsibilities regarding recycling operations are identified below.

Aggregate Recycling Centre Manager

Overall responsibility for the recycling operation including:

- Implementation and review of the FPC
- Liaison with the Laboratory Technician with regard material quality
- Organising plant maintenance
- Control of subcontractors

Laboratory Manager - Outsourced

- System documentation including non-conformance reporting
- Providing support to the lab technician
- Liaison with the Aggregate Recycling Centre Manager with regard material specification matters and testing regime

Laboratory Technician – Outsourced

- Sampling and testing of material
- Preparation and delivery of samples for UKAS testing
- Collation of test results

Weighbridge

- Weighing and recording of waste on arrival
- Initial visual inspection of waste wherever practicable
- Reviewing of transfer notes/waste information
- Notifying management of suspected irregularities

Recycling Operatives

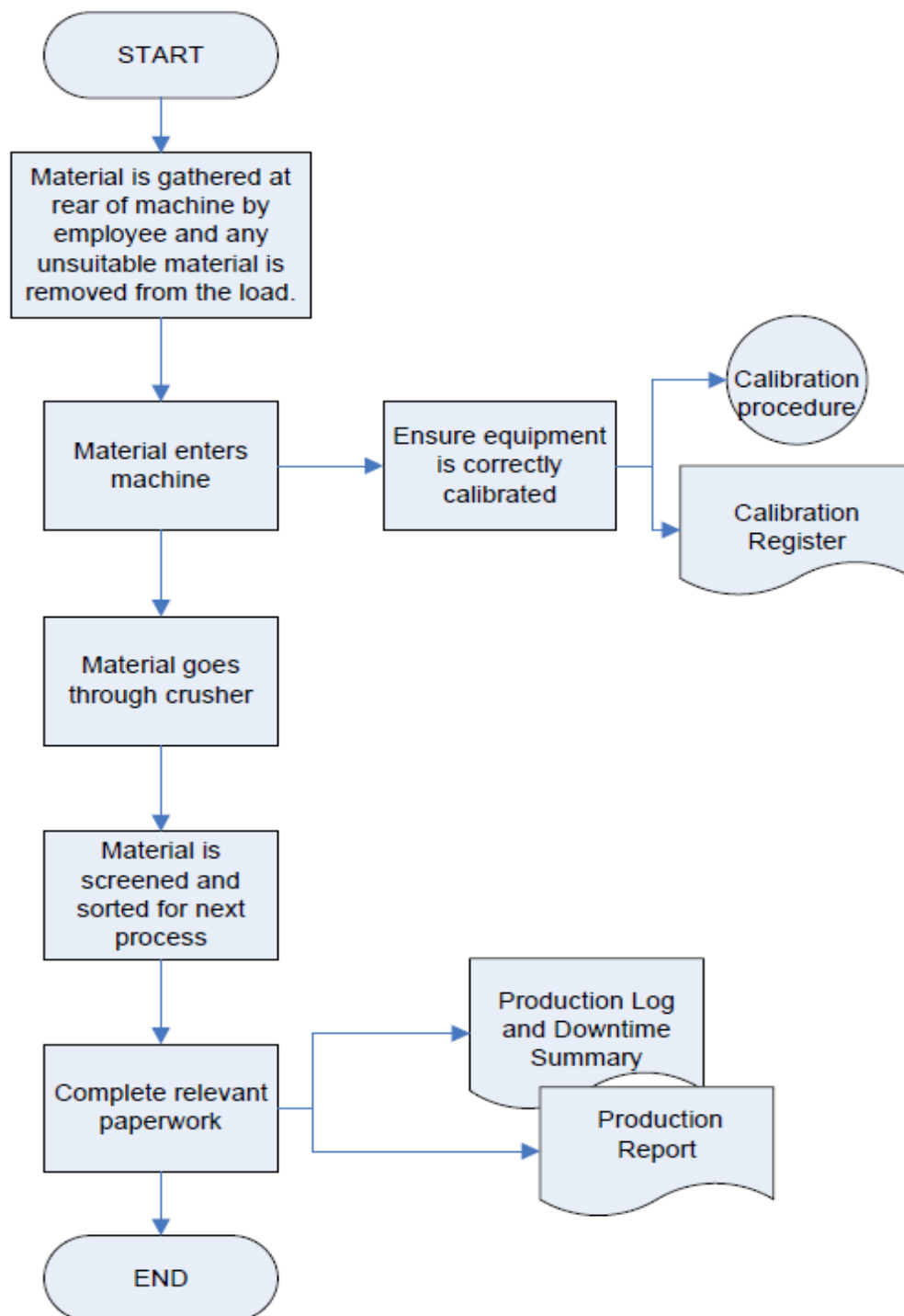
- Stockpiling of raw materials suitable for recycling
- Daily inspection of production
- Removal of contaminated materials from production process
- Inspection, stockpiling and loading of processed material
- Notifying management of suspected irregularities
- Informing management of plant maintenance requirements

Subcontractors

Subcontractors are not utilised on site for waste management activities or product manufacturing.

4. METHOD STATEMENT OF PRODUCTION

4.1 WASTE ACCEPTANCE CRITERIA



Refer to Environment Management System Waste Acceptance Procedure Section 3 SOP3.2

Only waste types specified in our Permit will be allowed to enter the recycling operation.

4.2 WASTE ACCEPTANCE

The only input materials used for the production of aggregate materials, along with their EWC codes, are specified in Table 2 below. These wastes conform with the Quality Protocol (Appendix C).

European Waste Catalogue Code	Description	Restrictions
Packaging (including separately collected municipal packaging waste)		
Construction and demolition waste – concrete, bricks, tiles and ceramics		
17 01 01	Concrete including solid dewatered concrete process waste	Must not include concrete slurry.
17 01 02	Bricks	N/A
17 01 03	Tiles and ceramics	N/A
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	N/A
Construction and demolition waste – wood, glass and plastic		
17 02 02	Glass	Must not include fibreglass or glass fibre.
Construction and demolition waste – soil (including excavated soil from contaminated sites), stones and dredging spoil		
17 05 04	Soil and stones other than those mentioned in 17 05 03	Must not contain any contaminated soil or stone from contaminated sites.
Construction and demolition waste – other construction and demolition wastes		
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	The waste is generated from utilities trenchings. The waste consists of sub base aggregates i.e. granular material. The waste contains only materials that would be described by entries 17 01 01, 17 03 02 and 17 05 04 in this appendix if the waste was not mixed.
Wastes from the mechanical treatment of waste not otherwise specified (for example sorting, crushing, compacting, pelletising)		
19 12 05	Glass	Does not include glass from cathode ray tubes
Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions		
20 01 02	Glass	Must not include fibreglass
20 02 02	Garden and park wastes (including cemetery waste) – soil and stones	Must not contain contaminated stones from garden and parks waste.

Selected construction and demolition waste (C & D waste): with low contents of other types of materials (such as; metals, plastic, organics, wood, rubber etc). The origin of the waste must be known.

No C & D waste from constructions polluted with organic dangerous substances, e.g. because of production processes in the construction, soil pollution, storage and usage of pesticides or other

dangerous substances, etc., unless it is made clear that the demolished construction was not significantly polluted.

No C & D waste from constructions, treated, covered or painted with materials containing dangerous substances in significant amounts.

A substantial amount of material is brought into the site from our own Demolition division and Waste Management Company and as such has already been pre-inspected at source.

On arrival at the weighbridge all incoming waste documentation is checked to ensure that the waste type is acceptable and then directed to the appropriate tipping area:

- Main stockpile (hardcore)
- Soils/clay

4.3 PROCEDURES FOR RE INSPECTING AND STOCKPILING/STORAGE OF WASTE

Incoming inert wastes will be tipped slightly away from the main stockpile to prevent any cross contamination, with pre checked, pre-processed wastes.

After tipping, each load is checked against the acceptance criteria and categorisation to ensure that undesirable/unpermitted materials are not hidden within load by a visual inspection.

Care will be taken to ensure that all incoming wastes meet the specification and restrictions detailed within the confirming waste list.

If the incoming load is deemed acceptable and it is then stockpiled into separate appropriate stockpile by the site operative using the loading shovel.

After a visual inspection, cleaning of a load may take place to remove any minimal levels of wood, plastic or metal. Cleaning/manual sorting is done by the recycling operative by handpicking foreign material which is then put into the allocated skips provided on site for their disposal.

Materials that require breaking or munching, either to reduce size for crushing or remove excessive rebar, are stockpiled separately. As are materials that require pre-screening due to containing excessive contaminants such as wood.

Plant operatives will inspect materials during tipping and subsequent stockpiling to ensure suitability.

.

5. SITE CONTROLS

5.1 MAINTENANCE

The crushers and screeners when in use are to be checked daily and the check is entered into a daily check sheet. All guards/noise baffling panels are to be in place. The machinery is regularly maintained and serviced.

5.2 DELIVERIES

All wagons entering & leaving site will be sheeted where there is a potential for dust to be generated from the materials in transit. This will be monitored through random spot- checks by Site Supervisors. For Company Drivers non-compliance will be a disciplinary matter.

There is a mandatory 5MPH Vehicle speed limit within to minimise disturbance of site surfaces. This will be monitored & enforced by Site Supervisors.

Roads shall be cleaned when necessary, and by the end of each working day if required unless it is impractical or unsafe to do so.

5.3 MONITORING

During periods of dry weather &/or when dusty site conditions prevail roads & stockpile areas of concern will be dampened down by means of a hose and water bowser. Other dust management methods will be considered as and when required.

All road maintenance, cleaning and bowsing activities will be noted in the site diary or daily site inspection sheet as appropriate.

5.4 MITIGATION

When loading of the crusher / screener hopper is undertaken, it is fed using an excavator bucket. The bucket is placed close to the hopper opening and the materials are slowly dropped into the hopper to prevent dust clouds forming.

The site machinery will not be used when there are high winds. Enclosed discharge conveyors & transfer points, wind boards & sheeting on mobile plant will be inspected & maintained as necessary.

Mobile plant water suppression will be used at the discretion of the Site Supervisor.

Where there is the possibility that dust & mud may migrate onto public roads through company vehicles leaving the site the following options shall be considered:

The use of a 'road-sweeper' on the site access road(s) & public road(s) where necessary,

Note: any water used during the cleaning of vehicle wheels must be collected & suitably disposed of i.e. it must not be discharged untreated directly into watercourses.

5.5 DAILY MONITORING

Regular visual assessments will be made throughout the day by Site Supervisors to identify any sources of particulate emission.

Where discharges of particulate are observed the Site Supervisor will conduct an investigation to determine the source of the emissions. Action will be taken to rectify any problem or failure in dust suppression measures.

Where wind-blown emissions of particulate from operations are observed leaving the site, relevant operations will be stopped & shall not be recommenced until an investigation & subsequent action have been taken to stop fugitive emissions.

The results of investigations into non-compliant emissions including the identification of the cause & action taken to remedy the problem will be recorded in the Site Diary or Daily Site Log as appropriate.

5.6 TRAINING

The site is overseen by the aggregates recycling manager who is responsible for the day-to-day operations at the site and to ensure that site personnel operate in compliance with the environmental permit and this protocol.

Training specific to this FPC is provided by the recycling manager to site staff in respect to:

- Acceptance criteria
- Non-complying input wastes procedures
- Sampling
- Testing
- Non complying output products
- Product inspection

All new site staff are taken through an induction process covering all areas of site operations, PPE, Company policies and all the relevant conditions of the environmental permit.

Refresher training is carried out on a yearly basis.

Training records are kept on site for inspection at all times along with copies of any Toolbox Talk records.

7.0 WASTE RECOVERY PROCESS AND EQUIPMENT

The method of production of aggregates from construction and demolition waste is as follows:

Inert waste materials are fed into the waste stream by a tracked excavator delivering material into the hopper of the crusher.

The raw material is crushed and then transmitted by conveyor, via the in-system over-band magnets to remove all ferrous metals.

Power screen is used where required to produce GSB Type 1 or smaller grade materials whichever is required to suit customer requirements.

All extraneous material, for example wood, paper, plastic and non-ferrous metal is removed by hand from picking areas throughout the area and stored in waste skips

All 'picked' waste will be removed for disposal by a licensed operator.

The above crushing/screening operation produces GSB Type 1 / 6F5. **Range of Products Produced**

The materials in table 3 will be produced to comply with the Specification for Highway Works (SHW) and relevant European Standards.

List of Materials Produced

Product	Common Terminology
Type 1 unbound sub-base (0/32 G_P)	GSB Type 1
Type 2 unbound sub-base (0/ G_P)	GSB Type
Class 6F5 Selected granular material (0/80 G_E)	6F5 Capping
Class 6F4 Selected granular material (0/32 G_E)	6F4 Capping

Other products may be produced depending on customer requirements but will be subject to trial production runs and testing where required, before sale.

8.0 TESTING

Plant operatives will visually inspect production throughout processing for potential problem areas that could affect product conformity including excessive or lack of fines, oversize, segregation, water content, contamination and content of extraneous material.

The Aggregate Recycling Manager will also inspect production periodically throughout the day.

Samples for analysis will be taken by laboratory technician or suitably trained personnel as per the general properties Testing Schedule and according to the requirements of *PR_511 Aggregate Testing Frequency*.

Testing will be carried out by (or a UKAS accredited laboratory).

Derwentside Environmental Testing Services Ltd
Unit 2, Park Road Industrial Estate
Consett Co Durham
DH8 5PY

Tel: +44 (0)1207 582333

Email: info@dets.co.uk

Schedule of Aggregate Testing

Property	Test Frequency	Test Method
Particle Size Distribution (Grading)	1 per week	BS EN 933-1
Composition	1 per run	BS EN 933-11
Frost Heave	1 per year	BS 812-124
Resistance to fragmentation (Los Angeles test)	2 per year	EN 1097-2
Particle density	1 per year	EN 1097-6
Water absorption	1 per year	EN 1097-6
Resistance to freezing and thawing (Magnesium sulphate soundness)	1 per year	EN 1367-1
Sulphate content (TRL 447)	1 per run	TRL Report 447
Plasticity	1 per run	BS 1377-2
Asbestos	1 per run	Analysis
NOTE 1 The frequencies given in the table above should be considered as a minimum requirement.		

8.1 NON-CONFORMITIES

Any failures or non-conforming products are completely rejected or reprocessed dependant of testing results.

Non-conforming products are recorded in the register of non-conformities for further investigation and if necessary, corrective action (Annex C).

Details include product type, quantity, nature of non-conformance, remedial action, results of causes, and corrective action taken.

9.0 FACTORY PRODUCT CONTROL

A system for Factory Production Control (FPC) is a requirement of the EU Construction Products Directive and must be set up in accordance with the annex which is included in all BS EN Standards for aggregates.

The FPC monitors production to ensure that characteristics of the aggregate are achieved and maintained, and that nonconforming product is managed.

The following table details the requirements that a FPC must cover and the relevant Listers Metals & Recycling Ltd documentation.

FPC Requirements

Requirement	Document Reference
Responsibilities and management	Management Manual, Section 3
Managing production and stockpiles	Method Statement of Production
Inspection and testing	Section 8
Record keeping	Management Manual, Section 10
Controlling nonconforming product	Management Manual, Section 8
Handling Inspection and storage	Environmental Working Practise
Transport and delivery	Environmental Working Practise
Training & Competence	Management Manual, Section 5

9.1 FINISHED PRODUCTS AND COLLECTION

All products are tested to BS EN standards. Product Test certificates and supporting documentation is kept in the site office.

When collecting a product the vehicle will enter the site, the driver will inform the operative of the product to be loaded. This is communicated via radio to the loading shovel operative.

The vehicle will proceed to the loading area. The loading shovel operative will then enter into one part of the certified pile to ensure an equal and consistent mix of the product and load the vehicle. The sides of the pile will then be pushed in to blend in with the existing stockpile.

The vehicle will then proceed to the site office and be issued with a delivery ticket. The ticket will display the following information:

- Site information
- A unique invoice/WB ticket number
- Date/Time of supply
- Customer Name and contact details
- Description of product, aggregate standard and specification
- Producer details (Site, address of production site)
- Delivery address
- Haulier
- Vehicle registration
- Order Number if relevant
- Approximate product weight
- Statement that the product was produced in line with this Quality Protocol

If requested the purchaser will be provided:

- Test results
- Outline details of the Factory Production Control Manual
- Information regarding product storage,

Records of all sales, testing and information supplied will be held for two years.

10. RECORD KEEPING

10.1 INFORMATION TO BE KEPT BY THE PRODUCER

The following records will be kept and available at any point in time upon request:

- Waste Transfer notes (retained for a minimum of 3 years)
- Records of all input material/wastes
- Plant and equipment maintenance/calibrations
- Product batch data that will include Batch Number and Date of Production
- Actions taken following a batch failure
- Copy of Environmental Permit/Exemption
- Copies of any rejected incoming wastes and action taken
- Corrective actions taken where constituents or mixture examined have not met specification
- Updates and revisions to this protocol

10.2 INFORMATION TO BE PROVIDED TO THE CUSTOMER

When requested by the purchaser, the producer shall provide:

- test results
- test procedures
- outline details of the factory production control manual

Section 6





A McCALL & SONS LTD

FIELD HOUSE QUARRY

Permit Variation

Field House Farm

Market Place

Houghton-le Spring

Tyne & Wear

DH5 8AJ

Olive Compliance Ltd

Street, Ponteland, Newcastle upon Tyne, NE20 9NH

Info@Olivecompliance.com

Basis of Report

This report has been prepared by Olive Compliance Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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1.0 Introduction

A McCall and Sons Ltd (MCCALLS) has instructed Olive Compliance Ltd (Olive) to prepare an application for an Environmental Permit variation application for the Field House Quarry situated at: Quarry Weighbridge Market Place, Houghton Le Spring DH5 8AJ under the Environmental Permitting (England and Wales) Regulations 2016.

The application is for a normal variation to Environmental Permit GP3994ZQ/A001.

The permit variation will allow the operator to store and treat waste to produce soil, soil substitutes and aggregate. Permitted wastes do not include hazardous wastes. The total quantity of waste that can be stored and subsequently treated at the site shall be no more than 99,000tonnes per annum.

The site wishes to accept soils and aggregates to either recover and sell as a product or as use as cover material on the inert landfill.

There are no increases in annual tonnages, no changes to the list of wastes received or changes to management and technically competent management status.

This ERA has been undertaken in accordance with the Environment Agency (EA) *Risk assessments for your environmental permit*¹ (2016) and is a simple assessment of the risks to the environment and human health from accidents, noise and fugitive emissions that may be associated with the proposed operations at the site.

The aim of the assessment is to identify any significant risks and demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage these risks.

The above guidance requires all receptors that are near the site and could reasonably be affected by the proposed activities to be identified and considered as part of the ERA. Therefore:

- a 2km radius has been adopted in reviewing potentially sensitive receptors of ecological importance; and
- a radius of 500m from the proposed permit boundary has been adopted for all other potentially sensitive receptors (for example, residential, cultural heritage, commercial, industrial, agricultural and surface water receptors).

¹ <https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit>

2.0 Site Setting and Receptors

2.1 Site Setting

The site (centred at NGR NZ35465066) is located at:

Field House Quarry
Houghton Le Spring,
County Durham
DH5 8LX

Waste operations at the site are currently being applied for under a Bespoke Permit based on SR10No12 which will permit the operator to store and treat waste to produce soil, soil substitutes and aggregate. Permitted wastes do not include hazardous wastes. The total quantity of waste that can be stored and subsequently treated at the site shall be no more than 99,000 tonnes per year.

The site is principally bounded, by agricultural areas. Drawings 5004.1.001 show the site location and surrounding features.

A summary of the immediate environmental site setting is provided in Table 2-1 below.

Table 2-1
Surrounding Land Uses

Boundary	Description
North	Agricultural land
Northeast	Agricultural High Hanning SSSI & farm
East	Agricultural land, Footpath
South	Agricultural Land, Footpath & Houghton Burn
West	Agricultural land

2.1.1 Water courses

The nearest surface water body is the Houghton Burn 250m to the east of the site.

2.1.2 Flood Risk Zone

Using the Environment Agency Long Term Flood Risk Information² service the site is identified as having a 'no' from surface water flooding, reservoirs, rivers and seas.

⁴ <https://flood-warning-information.service.gov.uk> accessed July 2022.

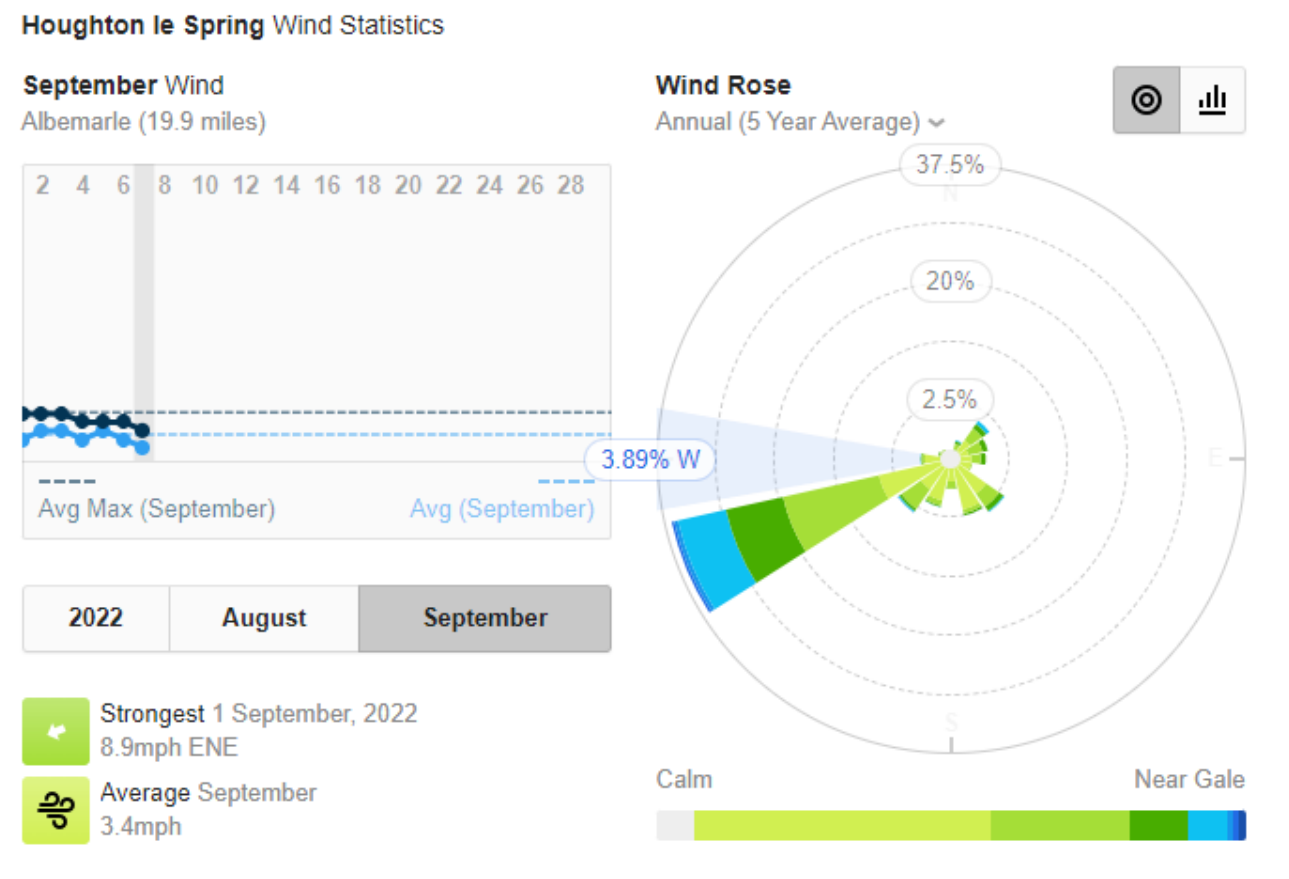


2.1.3 Prevailing Wind Direction.

The Willy Weather³ Wind Data Archive data for the closest weather station (Albemarle) indicates the distribution of wind power by direction over the previous 5 year average.

Upon review of this data the prevailing wind directions are predominately south westerly (SW) in respect of the site. See figure 2.

Figure 2



2.1.4 Transport Infrastructure

The site is accessed from the A690 and on to 'The Green'.

The A690 is within 1.5km to the west of the site boundary.

There are no railway links within 1km of the site boundary

2.1.5 Public Footpaths, Recreational areas and Areas for Public Use (Open Space)

There are local footpaths within the farmland surrounding the site.

³ [Houghton le Spring Weather Forecast, Tyne and Wear DH4 4 - WillyWeather](#)



2.1.6 Other receptors

The following receptors have been identified within 1km of the proposed permit boundary:

- Woodland Trust Sites; and
- National Forest.
- Local wildlife sites

There are no registered parks or gardens located within 1km of the site.

2.1.7 Geology, Hydrogeology & Hydrology

Geology

The bedrock geology comprises the Raisby Formation (also referred to as the Lower Magnesian Limestone) underlain by the Marl Slate in turn underlain by the Yellow Sands Formation, which was the principal material worked at the former quarry.

The Permian Yellow Sands Formation is underlain at depth by Carboniferous Coal Measure strata and the bedrock geology has a slight easterly dip. Superficial drift deposits are present around the quarry perimeter, comprising clayey sands and gravels, with recorded thickness of at up to 3.9m on the western boundary and significantly thinner to the north and east of the quarry.

The Raisby Formation comprises fine grained calcitic dolomite and limestone, approximately 20m thick in the northern quarry face, thinning rapidly to the south.

The Marl Slate comprises up to 2.6m thickness of grey, finely laminated silty dolomite and forms a low permeability barrier to vertical groundwater flow / recharge, as evidenced by a seepage line within the north-east quarry face.

The Permian Yellow Sands has a thickness of up to 55m at the site. The sands are generally weakly cemented.

Historic coal mine workings are recorded at depth beneath the site (in excess of 190m).

Hydrogeology

Review of Natural England's MAGIC website confirms that the local bedrock geology (Magnesian Limestone and Permian Yellow Sands) is classified as a Principal Aquifer (formerly referred to as a major aquifer). The online mapping also confirms that the local groundwater vulnerability, which describes the vulnerability of groundwater to a pollutant discharged at ground level, is classified as 'high' or 'medium-high'.

Online maps presented on Natural England's MAGIC website confirms that Field House Quarry Landfill remains within a Zone III (Total Catchment) Groundwater Source Protection Zone. It is not located within a Drinking Water Safeguard Zone or a Drinking Water Protected Area.

These designations remain unchanged from the 2004 HRA.

Hydrology/ Drainage

Houghton Burn, which flows in a westerly direction passing approximately 250m south of the site.

Houghton Burn rises approximately 1km to the east, at Warden Law and forms a tributary of the Moors Burn, to the west of Houghton le Spring.



Houghton Burn is not a potential receptor due to the inert nature of Field House Quarry Landfill and because the burn is at an elevation of approximately 100mAOD in the vicinity of the site, which is approximately 15m above groundwater levels at the site.

There are no recorded surface water abstractions within 1,000 m of the site.

There are 46 discharge consents within 2km of the site boundaries.

2.1.8 Ecology

European/International Sites

Searches on the Multi Agency Geographical Information for the Countryside (MAGIC)⁴ website confirm there is a Sites of Special Scientific Interest (SSSI),

- Hanning Hill SSSI

There are no special areas of conservation (SAC), special protection areas (SPA) or RAMSAR sites within 1km of the site boundary.

Other receptors(50m Screening⁵)

- Nature and heritage conservation sites
- Local Wildlife Sites (LWS):

2.1.9 Cultural Heritage

Searches on the MAGIC website³ confirm that there are none of the following within 500m of the application site:

- National Trust Properties; and Protected Habitats:
- Registered Battlefields.

It is considered that the identified receptors cannot reasonably be expected to be affected by the activities proposed at the site.

2.2 Receptors

Image 1 below shows receptors that are potentially sensitive and could reasonably be affected by the site.

The below table shows the receptors that could potentially be affected by a fire event, within 1km of the site boundary.

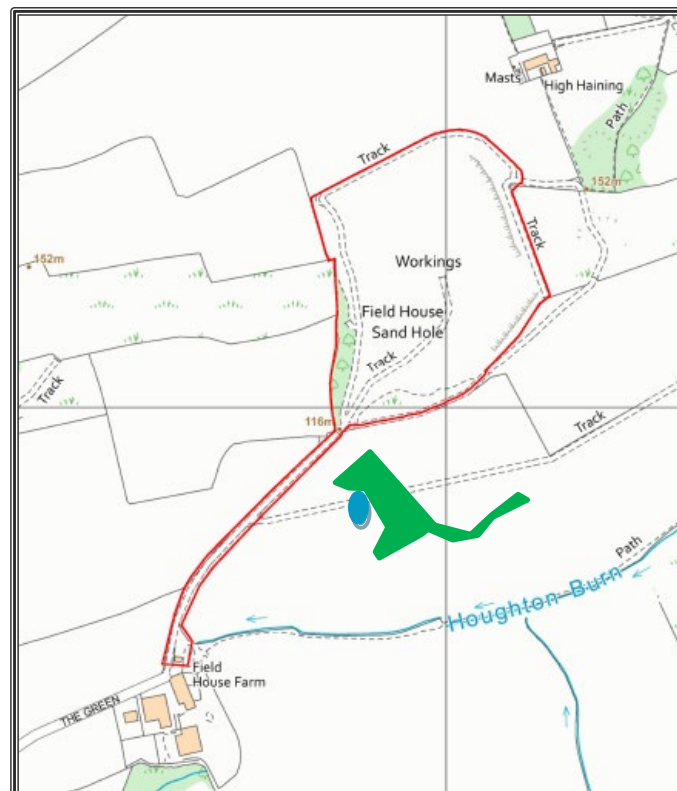
⁴ www.magic.gov.uk accessed July 2022.

⁵ Environment Agency Conservation Screening tool



Boundary	Receptor	Approximate distance to site boundary (m)
North	Agricultural	0 metres
	Footpath	10 metres
East	Agricultural	0 metres
	Footpath	10 metres
North East	High Hanning SSSI & Farm	400 metres
South	Footpath,	200 metres
	Houghton Burn	600 metres
West	Agricultural	0 metres
South West	Weighbridge and Field House Farm	1000 metres

Image 1 – Immediate Site Receptors



3.0 Environmental Risk Assessment

3.1 Overview and Approach

This section outlines the procedure that has been followed in the undertaking of the ERA for the site. The results are presented, in accordance with the EA Guidance, in the tables presented in Section 3.2.

3.1.1 Identification of Hazards

The first step of an ERA is to consider and identify the risks posed to the environment by the activities proposed for a site.

The EA Guidance states that an operator must:

"...identify whether any of the following risks could occur and what the environmental impact could be:

- *any discharge, for example sewage or trade effluent to surface or groundwater*
- *accidents*
- *odour (not for standalone water discharge and groundwater activities)*
- *noise and vibration (not for standalone water discharge and groundwater activities)*
- *uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that shouldn't be in the discharge*
- *visible emissions, eg smoke or visible plumes."*

3.1.2 Identification of Receptors

Section 2 of this document describes the site setting and the land uses in the vicinity of the proposed site. This information has been used in order to focus on the main receptors that could be potentially at risk from the activities of the site.

Using the information gathered from the stated sources, the receptors considered for assessment within the ERA are defined in Table 2-2.

In accordance with the EA Guidance, Drawing 002 presents a map showing the location of the site and the receptors considered within the ERA.

3.1.3 Identification of Potential Pathways

For each of the identified hazards for operation of the site, the ERA has considered that pathways through which each hazard may impact on a sensitive receptor. Where such pathways exist, the risks of potentially significant impacts have been assessed in accordance with Sections 3.1.4 and 3.1.5 (below) and the full details are included in the tables in Section 3.2.

Where no pathway exists between an identified hazard and an identified receptor, the associated risks are not considered further within the ERA and are, thus, not included in Section 3.2.

3.1.4 Assessment of Risks

The EA Guidance states that the nature of the ERA will be influenced by the type of activity (or activities) that are proposed for a site. For installations/waste operations, the ERA is required to consider, *"...one or more of the following, depending on the substances you discharge and where they're discharged to:*



- *assess the risks of your air emissions*
- *calculate the global warming impact of your air emissions*
- *assess risks to groundwater*
- *assess risk to groundwater from landfill leachate*
- *assess risks to surface water from hazardous pollutants*
- *assess risks to surface water from sanitary and other pollutants*

For installations and waste operations, an operator is also required to decide how to treat, recycle or dispose of waste. The ERA has therefore included consideration of the environmental impact of the ultimate fate of the materials that will be processed by the proposed activities of the site.

3.1.5 Controlling Risks

The EA Guidance states:

“You’ll need to show how you’re managing any risks appropriately by controlling and monitoring your emissions and through your management system.”

Where an ERA identifies risks that are potentially significant, the ERA is required to demonstrate how the risk of pollution or harm can be mitigated by measures to manage these risks. The approach undertaken to the implementation of management/mitigation measures, for this ERA, is (in order of preference):

- Avoidance / prevention;
- Minimisation / management;
- Mitigation; and
- Offset / compensation.

The following tables present the assessment in terms of hazards posed, receptors and pathways, along with management and residual risks for the following hazards:

- Odour;
- Noise and Vibration;
- Fugitive Emissions (including dust, mud, litter and pests); and
- Accidents.



Table 3-1 Odour Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Odours from the acceptance and storage of waste	<i>Site personnel and local human population</i>	Air	No putrescible or readily degradable wastes will be accepted at the site. No odorous wastes will be accepted at the site. Strict waste acceptance procedures will be adhered to, to ensure only permitted wastes are accepted on site. The site will be monitored for odours, if required, by site personnel throughout the working day. In the event that odours are detected, investigations will be undertaken to determine the cause and appropriate remedial action taken. In the event that odorous waste is delivered to site it will be segregated & removed at the earliest opportunity. The Site Manager will be responsible for implementing risk management measures.	Negligible	Odour nuisance and loss of amenity.	Not significant



Table 3-2 Noise Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Noise from vehicular movements (site access road and yard) Noise from operation of site plant.	<i>Site personnel and local human population</i> <i>Migrating birds</i>	Air.	The site is located within a mainly rural area. The machinery/plant will only be operated within the permitted site opening hours. Waste treatment operations will only be carried out during operational hours. All equipment will be maintained and operated in accordance with manufacturer's guidance and will be maintained in good working order. The site will be operated so as to minimise noise emissions from the site. Measures that will be taken at the site include: • locating plant away from noise-sensitive receptors where possible; • the avoidance of dropping materials from height; • switching plant off when not in use; • the imposition of a speed limit for vehicles delivering waste to the site. This will reduce noise associated with high engine speeds; • training of all personnel in the need to minimise site noise. All personnel are responsible for monitoring and reporting excessive noise when carrying out their everyday roles; • regular maintenance of site plant and machinery to minimise noise resulting from inefficient operation of pumps, generators and engines;	Mobile. Intermittent throughout the day. Medium.	Noise nuisance and loss of amenity.	Not significant



			• in the event that reversing alarms are found to give rise to complaints, alternative alarms or technology will be investigated; • regular maintenance of site surfaces to prevent the development of potholes. This will significantly reduce noise generated by vehicles, particularly empty vehicles exiting the site; • consideration will be given to the fitting of noise suppression kits on items of plant and equipment, if required; and • all plant will be maintained in accordance with manufacturer's recommendations to minimise noise emissions. Any noise complaint received will be logged in the site diary. The Site Manager will investigate the complaint and will take action to identify the source of the noise and implement remedial measures where appropriate depending on source identified. The measures employed at the site to minimise the emission of noise will be regularly reviewed by the Site Manager and additional measures will be employed where required. The procedure for managing complaints is included in Section of the EMS. The management of noise emissions is detailed further in Section SOP1.10 of the EMS. Site operations are limited to			
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Table 3-3 Fugitive Emissions Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
To Air:						
Dust from: Vehicle movements Waste storage and treatment Dusty wastes Waste deposition Waste surfaces	<i>Site personnel and local human population</i>	Air	DEMP (Dust & Emissions Management plan) in place. The requirements of the DEMF must be followed in order to manage emissions.	Medium	Dust nuisance Harm to human health	Low
To Water						
Runoff from waste storage areas & site surfaces Percolation of contaminated water	Surface water: Groundwater within bedrock deposits.	Overland percolation through the ground	The site will consist of a waste acceptance and treatment area. No risk to groundwater due to permitted waste types and strict waste acceptance procedures.	Low	Contamination of surface water and groundwater.	Not significant
Pests						
Birds, vermin and insects.	<i>Site personnel and local human population</i>	Via air (flies and birds) or over ground (vermin and birds).	Due to the nature of the wastes to be accepted at the site, it is not anticipated that pests will pose a risk at the facility. The facility will be inspected by both site management and operatives for infestations of pests, vermin and insects on a routine	Negligible	Nuisance, loss of amenity and harm to human health.	Not significant



			basis. A specialist pest control contractor will be deployed if required. The management of pests is further detailed in SOP 1.12 of the EMS.			
Mud/Litter						
Litter from acceptance and storage of waste	<i>Local human population and wildlife.</i>	Airborne litter	Due to the nature of the waste to be accepted on site, it is not anticipated that litter will pose a serious risk. However, the boundary of the site and its environs will be regularly visually inspected and any litter cleaned up. The site will benefit from a perimeter fence which will limit the potential for litter to escape off-site. It will be the responsibility of the site staff to monitor the site for any signs of escaping materials either from within the site or from vehicles delivering or removing materials to and from the site. Inspections will be carried out on a daily basis and a record maintained within the site diary. The management of litter is detailed further in SOP1.13 of the EMS.	Low	Nuisance and loss of amenity	Not significant
Mud on roads	<i>Local human population</i>	Transferral of mud on vehicle wheels	The following measures will be taken to prevent the deposition or tracking of mud or debris from the site onto public areas or highways: site surfaces will be maintained free of significant quantities of mud and debris; all operational areas will be subject to monitoring by staff throughout the working day; and all vehicles leaving operational areas will, before leaving the site, be checked to ensure that they are clear of loose waste and that	Low	Mud on road, road traffic accidents.	Not significant



			any products being exported from the site are secure. In the event that mud, debris or waste arising from the site is deposited onto public areas outside the site, the following remedial measures will be implemented: the affected public areas outside the site will be cleaned; and traffic will be isolated from sources of mud and debris within the site to prevent further tracking of mud and debris, and measures will be taken to clear any such sources as soon as practicable.			
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Table 3-4 Accidents Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Unauthorised waste	<i>Site personnel and local human population</i> <i>Local environment</i>	Via air (odours and dust) Overland (to sewer, surface water and groundwater)	Upon delivery waste will be subject to strict waste acceptance procedures to identify, reject and/or segregate potentially non-conforming waste. Only waste authorised by the permit will be accepted at the site. All wastes will be subject to inspection and checking against the declaration on the waste transfer documentation. In the event that unauthorised waste is delivered to the site, the waste will be reloaded onto the delivery vehicle for removal from site, or will be segregated and stored in a designated quarantine area prior to export from site. The waste acceptance procedures are included in SOP1.2 & 1.1 of the EMS. The Site Manager will be responsible for implementing risk management measures.	Low	Water contamination Odour and dust nuisance, loss of amenity	Not significant



Fire	<i>Site personnel and local human population</i> <i>Local environment</i>	Air, water runoff	A brief summary of the measures which will be employed is as follows: flammable wastes and incompatible materials will not be accepted at the site; the plant inspection schedule will include checks of electrical equipment within the site to ensure that any faults are identified and repaired; fire extinguishers will be provided at designated locations; smoking will not be permitted in operational areas of the site; working practices will ensure the assessment of fire hazards and training of employees in fire prevention, e.g. the use of fire extinguishers and emergency procedures; and no wastes will be burned on the site and any fire at the site will be treated as an emergency. In the event of a major fire, the following action will be taken: the Site Manager and Fire Brigade will be notified immediately and the Environment Agency as soon as practicable; the burning area will be isolated and attempts will be made to extinguish the fire utilising the onsite fire extinguishers, if safe to do so; and the site and buildings will be evacuated.	Low	Nuisance (smoke and fumes) and harm to human health. Water contamination (runoff)	Not significant
Spillage and Leakage	Local land quality, surface water and groundwater. <i>Site personnel, emergency services personnel and</i>	Runoff and percolation through ground.	To prevent loss of containment and minimise the risk and impact of releases the following measures will be implemented: Containment system: any facilities for the	Low	Contamination of groundwater and surface water. Harm to human	Not significant



	<i>local human population</i>	Direct exposure and transport via air	storage of oils, fuels or chemicals will be sited above ground on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound will be at least the equivalent to the capacity of the tank plus 10%. All filling points, vents and gauges will be located within the bund. Storage vessels: storage tanks will be constructed to the appropriate British Standard; Inspection: tanks will be inspected visually on a daily basis by site staff to ensure the continued integrity of the tanks, and identify the requirement for any remedial action; Spill kits: materials suitable for absorbing and containing minor spillages will be maintained on site; and Monitoring techniques: the site staff will undertake daily monitoring for evidence of spillage and leakage. In the event of any potentially polluting leak or spillage occurring on site, the following action will be taken: Minor spillages will be cleaned up immediately, using sand or proprietary absorbent. The resultant materials will be placed into containers and will then be removed from site and disposed of at a suitably permitted facility. The incident will be logged in the site diary. Any dry wastes spilled on site will be collected and transported to the appropriate area of the site. In the event of a major spillage, which is causing or is likely to cause polluting		health.	
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			emissions to the environment, immediate action will be taken to contain the spillage and prevent liquid from entering surface water or drains. The spillage will be cleared immediately and placed in containers for offsite disposal, and the Environment Agency will be informed. The spillage procedure, included in Section SOP 1.17 of the EMS, provides further information with respect to spillages on site.			
Security and Vandalism	Personnel on site, emergency service workers.		The following security measures are in place: Site perimeter: the site benefits from a site agricultural fencing Security gates: the site entrance gate will be locked at all times when the facility is unattended and when the site is not in use; The site will be monitored by an external security company 24 hours via regular out of hours patrols Inspection: gates and fencing extending around the site will be inspected regularly by the operations staff to identify deterioration and damage, and the need for any repairs; Maintenance and repair: fencing and gates will be maintained and repaired to ensure their continued integrity. In the event that damage is sustained repairs will be made by the end of the working day. If this is not possible, suitable measures will be taken to prevent any unauthorised access to the site and permanent repairs will be affected as soon as practicable;	Low	Nuisance and harm to human health. Contamination of land and surface water.	Not significant



			Authorised access system: all visitors to the site will be required to register in the visitor's book and sign out again on exit to minimise the risk of unauthorised visitors being present on site; and Monitoring techniques: operational procedures, including regular inspections, will ensure continual monitoring of security provision at the site. In the event of a breach of security at the site, the cause will be investigated and appropriate mitigation measures implemented. Records to be maintained include inspections and maintenance of security fencing and gates, breaches of security, investigations and actions taken.			
Flooding	<i>Site personnel and local human population</i> <i>Local environment</i>	Overland	There are no surface water features within the site boundary. According to the UK government Flood Map for Planning, the site lies within flood zone 1. Land and property in flood zone 1 have a low probability of flooding. Evacuation procedures will be implemented in the event of flooding. The Site Manager will be responsible for implementing risk management measures.	Low	Inundation of site with flood water	Not significant



Section 7





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Botanical Survey

High Haining Hill Site of Special Scientific Interest

August 2022

Olive Compliance

Client	Olive Compliance
Project Name	High Haining Hill Site of Special Scientific Interest
Project Number	22148
Report Type	Botanical Survey
Version	V1 (DRAFT)

	Name	Position	Date
Report Originator	Mark Osborne	Director	17 th August 2022
Reviewed	Mandy Rackham	Senior Ecologist	17 th August 2022

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1. Introduction

- 1.1 OS Ecology Ltd were commissioned by Olive Compliance in June 2022 to undertake a botanical survey of the High Haining Hill Site of Special Scientific Interest (SSSI) in an attempt to determine whether the adjacent quarry is having a detrimental impact on the site.

Site Location

- 1.2 The site is located to the north east of Houghton-le-Spring and to the south west of the city of Sunderland at an approximate central grid reference of NZ 35722 50719. The site location is illustrated within figure 1 in the appendices.

Site Description¹

- 1.3 The site was notified in 1983 and is approximately 2.9ha in size and comprises an area of Magnesian grassland.
- 1.4 The south-facing slope of High Haining Hill is of interest for its Magnesian Limestone² grassland which has in part been colonised by gorse scrub. Small areas of short-grazed turf support important vegetative communities.
- 1.5 High Haining Hill SSSI was considered to be in unfavourable recovering condition when last assessed in 2011³⁴.
- 1.6 The site is noted to also be of value to several butterfly species.
- 1.7 The full citation can be found within the Appendices.

Objectives of the Study

- 1.8 The objectives of this report are:
- To determine whether the adjacent quarry is having a detrimental impact on the site.

¹ <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1001045.pdf>

² Magnesian Limestone is itself restricted to a narrow belt between Nottingham and Durham. The associated semi-natural grasslands are concentrated in south-east Tyneside and County Durham, although even here quarrying and agricultural intensification has reduced the original area with the result that good examples of Magnesian Limestone grassland are somewhat scattered and tend, as at High Haining Hill, to be small in area.

³ Often known simply as 'recovering'. Units/features are not yet fully conserved but all the necessary management mechanisms are in place. At least one of the designated feature(s) mandatory attributes are not meeting their targets (as set out in the site specific FCT). Provided that the recovery work is sustained, the unit/feature will reach favourable condition in time.

⁴ <https://designatedsites.naturalengland.org.uk/SiteUnitList.aspx?SiteCode=s1001045&SiteName=&countyCode=&responsiblePerson=&unitId=&SeaArea=&IFCAAra=>

2. Methodology

Scope of Study

- 2.1 The site was surveyed with the aim to determine whether the adjacent quarry activities were impacting the designated site.

Desk Study

- 2.2 Desk study was undertaken to assess the nature of the surrounding habitats and included:
- Assessment of aerial imagery and Ordnance Survey mapping.
 - A search of the MAGIC website⁵ for designated sites and Priority Habitats.

Field Survey

Botanical Assessment

- 2.3 The site was subject to detailed survey, during which habitats were assessed in line with the UK Habitat Classification User Manual⁶.
- 2.4 Prior to the survey, the aerial images were assessed to identify likely locations where habitats change. Each area was then subject to survey, during which surveyors assessed each habitat.
- 2.5 Survey was undertaken by Mark Osborne CEcol MCIEEM and Mandy Rackham MCIEEM both experienced ecologists.
- 2.6 The following equipment was utilised during survey:
- Zeiss 8x30 binoculars.
 - Digital camera.
 - 1mx1m quadrat
 - Garmin handheld GPS
- 2.7 The survey was undertaken on the 7th July 2022 in the following weather conditions:

Table 1: Survey Conditions				
Date	Temperature	Cloud Cover	Precipitation	Wind Conditions
7 th July 2022	18°C	70%	None	S1

⁵ Multi Agency Geographic Information for the Countryside (www.magic.gov.uk)

⁶ Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1 at <http://www.ukhab.org/>

Limitations to Survey

2.8 There were considered to be no major constraints to survey.

Assessment Methodology

2.9 Guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) is utilised to provide habitat valuations.

2.10 The level of value of specific ecological receptors is assigned using a geographic frame of reference. For, example international value being most important (SACs, SPAs and pSPAs), then national (SSSIs), regional, county (LWS), district (LNR), local and lastly, within the immediate zone of influence of the site only (low).

2.11 Examples of ecological receptors at various levels of value are provided within Appendix 3.

3. Results

Desk Study

General Land Use

- 3.1 A review of aerial imagery and Ordnance Survey mapping highlighted that the general land use in the surrounding area is dominated agricultural fields with urban development to the east and west.
- 3.2 An active quarry is present on the western boundary of the SSSI.

Field Survey

- 3.3 The following table highlights the plant species recorded within the SSSI boundary.

Table 2: Survey Results			
Species	Latin Name	SSSI Citation	Comment
False Oat Grass	<i>Arrhenatherum elatius</i>		Coarser areas, site margins and scrub
Perennial ryegrass	<i>Lolium perenne</i>		Coarser areas, site margins and scrub
Ribwort Plantain	<i>Plantago lanceolata</i>		Slope areas
Eyebright sp.	<i>Euphrasia sp.</i>		Slope areas
Red Clover	<i>Trifolium pratense</i>		Throughout site
Cocksfoot	<i>Dactylis glomerata</i>		Coarser areas, site margins and scrub
Field Scabious	<i>Knautia arvensis</i>		Slope areas
Common Hogweed	<i>Heracleum sphondylium</i>		Coarser areas, site margins and scrub
Common Mouse Ear	<i>Cerastium fontanum</i>		Slope areas
Quaking Grass	<i>Briza media</i>	✓	Slope areas
Creeping Thistle	<i>Cirsium arvense</i>		Slope areas
Perforate St John's Wort	<i>Hypericum perforatum</i>		Slope areas
Harebell	<i>Campanula rotundifolia</i>	✓	Slope areas
Blue Moor Grass	<i>Sesleria caerulea</i>	✓	Slope areas
Cowslip	<i>Primula veris</i>	✓	Slope areas
Fairy Flax	<i>Linum catharticum</i>	✓	Slope areas
Common Thyme	<i>Thymus serpyllum</i>	✓	Slope areas
Salad Burnet	<i>Sanguisorba minor</i>	✓	Slope areas
Wild Strawberry	<i>Fragaria vesca</i>		Slope areas
Mouse Eared Hawkweed	<i>Pilosella officinarum</i>		Slope areas
Glaucous Sedge	<i>Carex flacca</i>	✓	Slope areas
Silver Ragwort	<i>Jacobaea maritima</i>		Coarser areas, site margins and scrub
Devil's bit Scabious	<i>Succisa pratensis</i>	✓	Slope areas
Common calamint	<i>Clinopodium menthifolium</i>		Slope areas
Yarrow	<i>Achillea millefolium</i>		Throughout site
Tufted Vetch	<i>Vicia cracca</i>		Throughout site
Bird's foot Trefoil	<i>Lotus corniculatus</i>		Slope areas
Yellow Oat grass	<i>Trisetum flavescens</i>	✓	Slope areas
Lady's Bedstraw	<i>Galium verum</i>	✓	Slope areas
Meadow Buttercup	<i>Ranunculus acris</i>		
Common Restharrow	<i>Ononis repens</i>		Slope areas
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>		Slope areas

Crested Dog's Tail	<i>Cynosurus cristatus</i>		Slope areas
Selfheal	<i>Prunella vulgaris</i>		Slope areas
Black Medic	<i>Medicago lupulina</i>	✓	Slope areas
Soft Brome	<i>Bromus hordeaceus</i>		Coarser areas, site margins and scrub
Burnet Saxifrage	<i>Pimpinella saxifraga</i>	✓	Slope areas
Creeping Cinquefoil	<i>Potentilla reptans</i>		Slope areas
Wild Carrot	<i>Daucus carota</i>	✓	Slope areas
Yorkshire Fog	<i>Holcus lanatus</i>		Slope areas
Spear Thistle	<i>Cirsium vulgare</i>		Coarser areas, site margins and scrub
Daisy	<i>Bellis perennis</i>		Coarser areas, site margins and scrub
Zigzag Clover	<i>Trifolium medium</i>		Coarser areas, site margins and scrub
Wild mignonette	<i>Reseda lutea</i>		Coarser areas, site margins and scrub
Common Rockrose	<i>Helianthemum nummularium</i>	✓	Rare – recorded at base of slope
Common Couch	<i>Elymus repens</i>		Coarser areas, site margins and scrub
Red Fescue	<i>Festuca rubra</i>		Coarser areas, site margins and scrub
Slender St John's Wort	<i>Hypericum pulchrum</i>		Slope areas
Common Centaury	<i>Centaurea erythraea</i>		Slope areas
Ragwort	<i>Senecio jacobaea</i>		Slope areas
Rosebay Willowherb	<i>Chamaenerion angustifolium</i>		Around scrub and site margins
Goats beard	<i>Tragopogon pratensis</i>		Slope areas
Rough Hawkbit	<i>Leontodon hispidus</i>	✓	Slope areas
Common Catsear	<i>Hypochaeris radicata</i>		Slope areas
Common Spotted Orchid	<i>Dactylorhiza fuchsii</i>		Near northern site entrance
Common knapweed	<i>Centaurea nigra</i>		Coarser areas at base of slope
Greater knapweed	<i>Centaurea scabiosa</i>		Coarser areas at base of slope
Timothy	<i>Phleum pratense</i>		Coarser areas at base of slope
Coltsfoot	<i>Tussilago farfara</i>		Coarser areas at base of slope
Gorse	<i>Ulex europaeus</i>		-
Hawthorn	<i>Crataegus monogyna</i>		-

Species on SSSI Citation not recorded during survey

- Crested hair-grass *Koeleria macrantha*,
- Sheep's fescue *Festuca ovina*
- Carlina thistle *Carlina vulgaris*,
- Autumn hawkbit *Leontodon autumnalis*,
- Nodding thistle *Carduus nutans*,

Threats to SSSI

- Scrub development
- Coarse grass development.

Evidence of management:

- Evidence of horse grazing
- Scrub management





4. Site Assessment

Assessment of Survey Findings

- 4.1 The SSSI is relatively small and designated due to the presence of Magnesian grassland.
- 4.2 Management of the grassland is evident, with evidence of both grazing and scrub cutting recorded. A condition assessment of the grassland based on the UK Hab methodology⁷ and criteria is detailed in the table below.

Table 3: Condition Sheet: Grassland Habitat Type (medium, high & <u>very high distinctiveness</u>)			
Grassland - Lowland calcareous grassland			
Condition Assessment Criteria		Condition Achieved (Y/N)	Notes/Justification
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward. NB - This criterion is essential for achieving moderate condition for non-acid grassland types only.	Yes	Confirmed
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.	Yes	Yes – range of sward heights present
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Yes	Ephemeral vegetation present
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	No	Scrub encroachment recorded
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of species indicative of sub-optimal condition ¹ and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Yes	None present
Additional Group (Non-acid types only)			
6	There are greater than 9 species per metre squared. (NB - This criterion is essential for achieving good condition (non-acid grassland types only)).	Yes	
Number of criteria passed			5
Condition Assessment Result		Condition Assessment Score	Score Achieved x/✓
Non-acid grassland Types			
Passes 5 of 6 criteria, including essential criterion 1 and 6.		Good (3)	Yes
Suggested enhancement interventions to improve condition score			
Further scrub removal and targeted grazing			

- 4.3 It can be seen from the table that the above grassland is considered to be in “good” condition, with active management being undertaken.

⁷ Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1 at <http://www.ukhab.org/>

- 4.4 Potential improvements could be instated, with targeted grazing, in areas where a coarser less diverse sward has developed and further scrub removal to enable more diverse grassland to develop.
- 4.5 The adjacent quarry does not appear to be impacting the development site and there is considered to be the potential to create further important grassland habitats within the quarry boundary.

Appendix 1 – Policy and Legislation

Planning Policy

National Planning Policy Framework (NPPF)⁸

The revised National Planning Policy Framework sets out the government's planning policies for England and how these are expected to be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. Planning law requires that applications for planning permission be determined in accordance with the development plan. The key paragraphs from the relating to the natural environment are detailed below.

Ecologically Relevant Paragraphs of the NPPF	
Paragraph	Statement
8	Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure; b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and c) an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy
174	Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate

⁸ National Planning Policy Framework July 2021

(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf)

Ecologically Relevant Paragraphs of the NPPF	
Paragraph	Statement
175	Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries
179	To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.
180	When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons ⁶³ and a suitable compensation strategy exists; and d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.
181	The following should be given the same protection as habitats sites: a) potential Special Protection Areas and possible Special Areas of Conservation; b) listed or proposed Ramsar sites ⁶⁴ ; and c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites
182	The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

Local Planning Policy

The following table details the ecologically relevant policies of the local plan relevant to this site.

Ecologically Relevant Policies of the Sunderland City Council Core Strategy and Development Plan 2015-2033⁹	
Policy No.	Policy
NE1	Green and Blue Infrastructure 1. To maintain and improve the Green Infrastructure Network through enhancing, creating and managing multifunctional greenspaces and bluespaces that are well connected to each other and the wider countryside, development should: i. incorporate existing and/or new green infrastructure features within their design and to improve accessibility to the surrounding area; ii. address corridor gaps and areas of corridor weakness where feasible; iii. support the management of existing wildlife corridors, including reconnecting vulnerable and priority habitats (see policy NE2); iv. apply climate change mitigation and adaptation measures, including flood risk and watercourse management; v. link walking and cycling routes to and through the corridors, where appropriate; vi. include and/or enhance formal and natural greenspace and bluespace provision; vii. protect and enhance landscape character; viii. have regard to the requirements of the Green Infrastructure Delivery Plan and make contributions proportionate to their scale towards the establishment, enhancement and on-going management; and ix. protect, enhance and restore watercourses, ponds, lakes and water dependent habitats. 2. Development that would sever or significantly reduce green infrastructure will not normally be permitted unless the need for and benefits of the development demonstrably outweigh any adverse impacts and suitable mitigation and/or compensation is provided
NE2	Biodiversity and Geodiversity • Where appropriate, development must demonstrate how it will: i. provide net gains in biodiversity; and ii. avoid (through locating on an alternative site with less harmful impacts) or minimise adverse impacts on biodiversity and geodiversity in accordance with the mitigation hierarchy. • Development that would have an impact on the integrity of European designated sites that cannot be avoided or adequately mitigated will not be permitted other than in exceptional circumstances. These circumstances will only apply where there are: i. no suitable alternatives; ii. imperative reasons of overriding public interest; iii. necessary compensatory provision can be secured to ensure that the overall coherence of the Natura 2000 network of European sites is protected; and iv. development will only be permitted where the council is satisfied that any necessary mitigation is included such that, in combination with other development, there will be no significant effects on the integrity of European Nature Conservation Sites. • Development that would adversely affect a Site of Special Scientific Interest, either directly or indirectly, will be required to demonstrate that the reasons for the development, including the lack of an alternative solution, clearly outweigh the nature conservation value of the site and the national policy to safeguard the national network of such sites. • Development that would adversely affect a Local Wildlife Site or Local Geological Site, either directly or indirectly, will demonstrate that: i. there are no reasonable alternatives; and ii. the case for development clearly outweighs the need to safeguard the intrinsic value of the site.

⁹ Sunderland City Council, Core Strategy and Development Plan 2015-2033, January 2020

Ecologically Relevant Policies of the Sunderland City Council Core Strategy and Development Plan 2015-2033 ⁹	
Policy No.	Policy
	- Development that would adversely affect the ecological, recreational and/or educational value of a Local Nature Reserve that will demonstrate: i. that there are no reasonable alternatives; and ii. the case for development clearly outweighs the need to safeguard the ecological, recreational and/or educational value of the site. - Development that would have a significant adverse impact on the value and integrity of a wildlife corridor will only be permitted where suitable replacement land or other mitigation is provided to retain the value and integrity of the corridor.
NE3	Woodlands/Hedgerows and Trees To conserve significant trees, woodlands and hedgerows, development should: - follow the principles below to guide the design of development where effects to ancient woodland, veteran/aged trees and their immediate surroundings have been identified: i. avoid harm; ii. provide unequivocal evidence of need and benefits of proposed development; iii. provide biodiversity net gain; iv. establish likelihood and type of any impacts; v. implement appropriate and adequate mitigation and compensation; vi. provide adequate buffers; and vii. provide adequate evidence to support proposals; - retain, protect and improve woodland, trees subject to Tree Preservation Orders (TPOs), trees within conservation areas, and 'important' hedgerows as defined by the Hedgerows Regulations 1997; - give consideration to trees and hedgerows both on individual merit as well as their contribution to amenity and interaction as part of a group within the broader landscape setting; and - ensure that where trees, woodlands and hedgerows are impacted negatively by proposed development, justification, mitigation, compensation and maintenance measures are provided in a detailed management plan.

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation¹⁰ (England only)

This Circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England.

Part IV - Conservation of Species protected by Law details that the presence of a protected species is a material consideration when considering a development proposal that may result in harm to the species or its habitat and that planning authorities must have regard to species protected under the Habitat Regulations.

¹⁰ODPM Circular 06/2005 Office of the Deputy Prime Minister Eland House, Bressenden Place, London SW1E 5DU
Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System

It goes on to say that: *it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted.*

Natural Environment and Rural Communities (NERC) Act 2006^{11 12}

Section 40 – To conserve biodiversity

This section puts a duty on public authorities to conserve biodiversity when undertaking its duties and functions.

Section 41 – Biodiversity list and Action

Requires the Secretary of State to *publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity. They must also take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section or promote the taking by others of such steps.*

The 2007 lists were superseded by the UK Post-2010 Biodiversity Framework.

UK Priority Habitats (excl. marine habitats)¹³	
UK BAP Broad Habitat	UK BAP Priority Habitat
Rivers and Streams	• Rivers
Standing Open Waters and Canals	• Oligotrophic and Dystrophic Lakes • Eutrophic Standing Waters • Ponds • Aquifer Fed Naturally Fluctuating Water Bodies • Mesotrophic Lakes
Arable and Horticultural	• Arable Field Margins
Boundary and Linear Features	• Hedgerows
Broadleaved, Mixed and Yew Woodland	• Traditional Orchards • Upland Mixed Ashwoods • Wood-Pasture and Parkland • Wet Woodland • Upland Oakwood • Lowland Mixed Deciduous Woodland • Lowland Beech and Yew Woodland • Upland Birchwoods
Coniferous Woodland	• Native Pine Woodlands
Acid Grassland	• Lowland Dry Acid Grassland
Calcareous Grassland	• Lowland Calcareous Grassland • Upland Calcareous Grassland

¹¹ <https://www.legislation.gov.uk/ukpga/2006/16/section/40>

¹² <https://www.legislation.gov.uk/ukpga/2006/16/section/41>

¹³ <http://jncc.defra.gov.uk/page-5706>

UK Priority Habitats (excl. marine habitats)¹³	
UK BAP Broad Habitat	UK BAP Priority Habitat
Neutral Grassland	• Lowland Meadows • Upland Hay Meadows
Improved Grassland	• Coastal and Floodplain Grazing Marsh
Dwarf Shrub Heath	• Lowland Heathland • Upland Heathland
Fen, Marsh and Swamp	• Upland Flushes, Fens and Swamps • Purple Moor Grass and Rush Pastures • Lowland Fens • Reedbeds
Bogs	• Lowland Raised Bog • Blanket Bog
Montane Habitats	• Mountain Heaths and Willow Scrub
Inland Rock	• Inland Rock Outcrop and Scree Habitats • Calaminarian Grasslands • Open Mosaic Habitats on Previously Developed Land • Limestone Pavements
Supralittoral Rock	• Maritime Cliff and Slopes
Supralittoral Sediment	• Coastal Vegetated Shingle • Machair • Coastal Sand Dunes

Appendix 2 - Receptor Valuation

The importance of ecological features is considered within a defined geographic context, examples of which are provided within the table below. The valuation of features is a complex process and, in many cases, requires the application of expert judgement. Valuation considers a range of factors including statutory designations, national biodiversity lists, biodiversity action plan lists and lists of declining, rare or legally protected species. Other factors to be considered include the 'naturalness' of habitats, the functional importance of features and whether habitats are irreplaceable.

Examples of Importance of Ecological Features (Geographic Context)¹⁴			
Importance	Designated Site	Habitat	Species
International and European	Special Protection Area/Proposed Special Protection Area	A significant area of a Priority Habitat listed on Annex 1 of the Habitats Directive or a smaller area of such habitat that is thought to be functionally linked to a significant area of such habitat	An area that is functionally important to a species listed on Annexes II, IV or V of the Habitats Directive or Annex I of the Birds Directive which is present in internationally significant numbers (>1% of the biogeographic population)
	Special Area of Conservation/Proposed Special Area of Conservation		
	Ramsar Site		
National	Site of Special Scientific Interest	A significant area of a Priority Habitat listed as a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 or a smaller area of such habitat that is thought to be functionally linked to a significant area of such habitat	An area that is functionally important to a species listed as a species of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006, which is present in nationally significant numbers (>1% of the national population)
Regional	-	An area of a Priority Habitat listed as a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 which is not significant enough in extent to be considered of national importance but is considered to be of greater than metropolitan or county value.	An area that is functionally important to a species which is present in regionally significant numbers (>1% of the regional population)
Metropolitan area or County	Local Wildlife Site designated at a metropolitan area or county level	A significant area of a Priority Habitat listed within the relevant local Biodiversity Action Plan or a smaller area	An area that is functionally important to a species listed as a Priority Species within the relevant local Biodiversity

¹⁴ Based on information provided within Guidelines for Ecological Impact Assessment in the UK and Ireland (2018) CIEEM

Examples of Importance of Ecological Features (Geographic Context)¹⁴			
Importance	Designated Site	Habitat	Species
Local (District/ Borough of Parish)	Local Wildlife Site designated at a district or borough level	of such habitat that is thought to be functionally linked to a significant area of such habitat	Action Plan, which is present in significant numbers within the geographic context.
Low	-	Habitats that are unexceptional in a local context and do not meet the above criteria.	Species populations that are unexceptional in a local context and do not meet the above criteria.

Appendix 3: High Haining Hill SSSI Citation

File ref:

County: Tyne and Wear **Site Name:** **High Haining Hill**

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act, 1981.

Local Planning Authority: Sunderland Metropolitan Borough Council

National Grid Reference: NZ 357507 **Area:** 2.9 (ha) 7.2 (ac)

Ordnance Survey Sheet 1:50 000 88 **1:10 000** NZ 35 SE

First Notified: 1968* **Date of Revision:** 1983

Other Information:

1. The site is the easternmost extremity of the former 'Houghton Scarp' SSSI.
 2. Magnesian Limestone is itself restricted to a narrow belt between Nottingham and Durham. The associated semi-natural grasslands are concentrated in south-east Tyneside and County Durham, although even here quarrying and agricultural intensification has reduced the original area with the result that good examples of Magnesian Limestone grassland are somewhat scattered and tend, as at High Haining Hill, to be small in area.
- * Under Section 23 of the National Parks and Access to the Countryside Act, 1949.

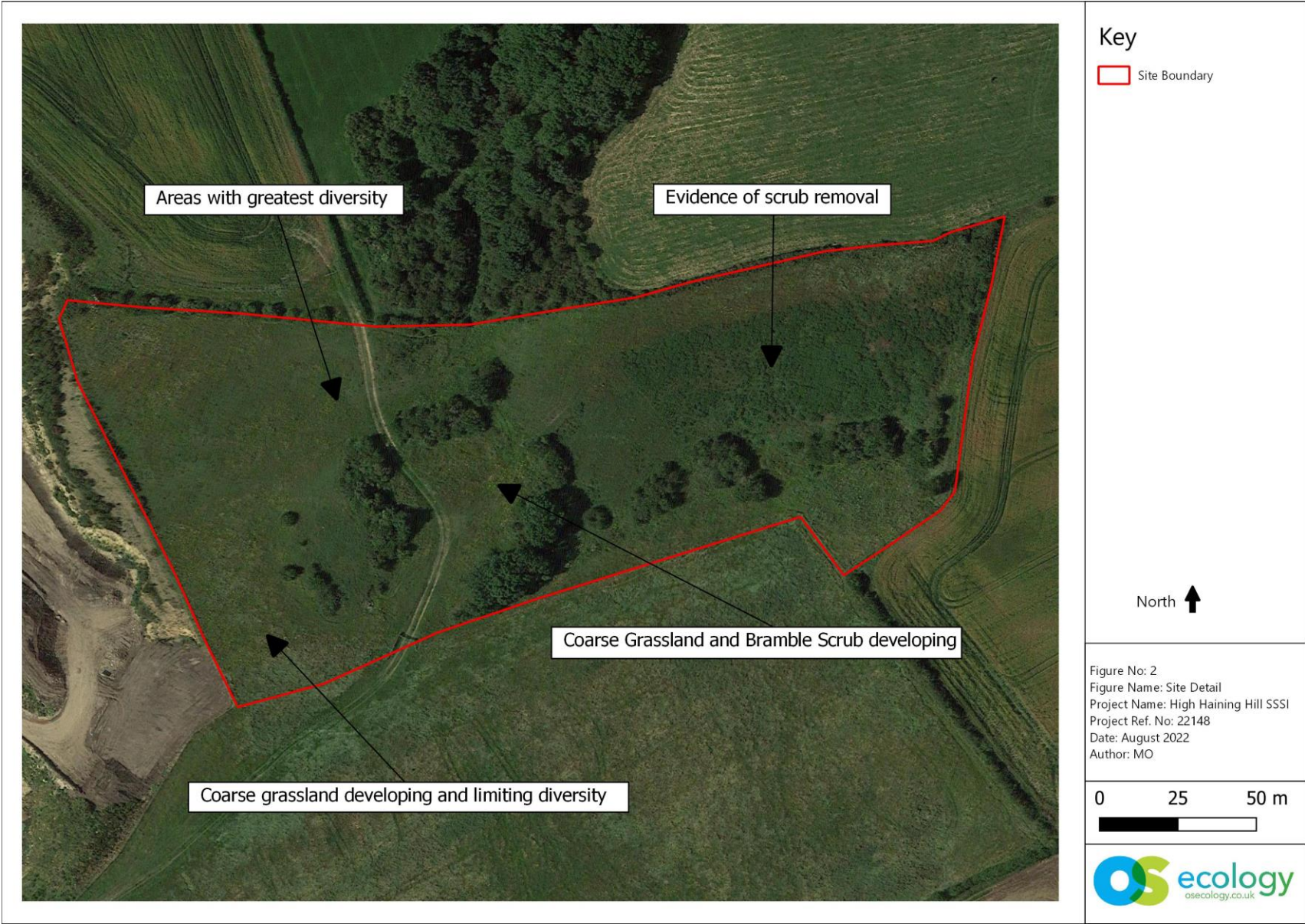
Description:

The south-facing slope of High Haining Hill is of interest for its Magnesian Limestone grassland which has in part been colonised by gorse scrub. Small areas of short-grazed turf support communities of crested hair-grass *Koeleria macrantha*, sheep's fescue *Festuca ovina* and common quaking grass *Briza media* in which blue moor-grass *Sesleria albicans* and glaucous sedge *Carex flacca* also occur. Many herbs are present including harebell *Campanula rotundifolia*, carline thistle *Carlina vulgaris*, lady's bedstraw *Galium verum*, hawkbit *Leontodon hispidus* and *L. autumnalis*, bird's-foot trefoil *Lotus corniculatus*, devil's-bit scabious *Succisa pratensis*, black medick *Medicago lupulina*, salad burnet *Sanguisorba minor*, cowslip *Primula veris* and burnet saxifrage *Pimpinella saxifraga*. Taller plants such as knapweed *Centaurea nigra*, greater knapweed *C. scabiosa* and nodding thistle *Carduus nutans*, are also present, the last also associated with gorse scrub. Elsewhere shallower soils, in particular those developed on a small knoll, support locally abundant populations of fairy flax *Linum catharticum*, wild thyme *Thymus praecox* and common rock-rose *Helianthemum nummularium*, the latter being the food plant of the Durham Argus butterfly *Aricia artaxerxes* spp. *salmacis*, a small colony of which occurs here together with other species such as common blue, wall brown, small copper, small heath and small tortoise-shell.

A large patch of gorse scrub on the eastern side of the hill has been burnt during recent years and supports a remnant of Magnesian Limestone grassland, which includes a flourishing population of wild carrot *Daucus carota*. Scattered hawthorns and low gorse scrub to the west of the main area of grassland provide nesting cover for linnets and yellowhammers.

Appendix 4 – Figures





Section 8





Nicola Sugg
Consultant Hydrogeologist
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**FIELD HOUSE QUARRY INERT LANDFILL
HOUGHTON LE SPRING, DURHAM**

HYDROGEOLOGICAL RISK ASSESSMENT REVIEW

November 2022

Commissioned by: Olive Compliance Ltd.

Issue: V1

Project Reference: NS_0116_05

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DRAWINGS

Drawing 1 Site Monitoring Plan

APPENDICES

Appendix 1 Groundwater Quality Data: Ammoniacal-Nitrogen & Chloride Graphs
Appendix 2 Groundwater Quality Data: March 2021 Annual Results
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1.0 INTRODUCTION

1.1 Project Introduction and Aims

Olive Compliance Ltd. has commissioned NSugg Ltd. to undertake a Hydrogeological Risk Assessment Review (HRA Review) for Field House Quarry Landfill, Houghton le Spring, Tyne and Wear.

Field House Quarry Landfill is an inert landfill facility regulated by Environmental Permit UP3839BE, variation number HP3232LH, issued on 5th March 2007 and held by A McCall & Sons (Houghton-le-Spring) Ltd.

This HRA Review has been prepared to support a permit variation application to amend the site's approved restoration contours.

A Hydrogeological Risk Assessment was completed for the site in October 2004¹ to support the site's permit application (hereafter referred to as the 2004 HRA). The hydrogeological conceptual site model was developed and presented in the Environmental Setting and Installation Design (ESID) Report² submitted as part of the 2004 permit application (hereafter referred to as the 2004 ESID).

No HRA Review has been undertaken since the original permit application, therefore the 2004 HRA represents the most recent HRA for the site. A summary of the findings and conclusions from the 2004 HRA is presented in Section 1.2 below.

The aim of this HRA Review is to assess whether the assumptions of the 2004 HRA remain valid, based on updated conceptual site model information and the revised development proposals subject to this permit variation application.

This HRA Review has been undertaken in accordance with current Environment Agency guidance³, and the report has the following structure:

- Section 2 presents an update and review of the hydrogeological conceptual site model;
- Section 3 presents the hydrogeological risk assessment;
- Section 4 reviews the site monitoring schedules and compliance limits and
- Section 5 includes a summary and report conclusions.

1.2 Summary of the 2004 HRA

The 2004 HRA can be summarised as follows:

- The 2004 HRA was prepared to support the site's PPC Permit application, prior to Field House Quarry Landfill becoming operational. Therefore, the report presents baseline site monitoring data only, prior to any landfilling occurring.

¹ Wardell Armstrong, October 2004, Field House Quarry Landfill, Application for PPC Permit, Hydrogeological Risk Assessment, Ref. NT03182 B1.4.1.

² Wardell Armstrong, September 2004, Field House Quarry Landfill, Application for PPC Permit, Environmental Setting and Installation Design Report, Ref. NT03182 B1.3.

³ Environment Agency, January 2020, last updated February 2022, Landfill operators: environmental permits – Review your hydrogeological risk assessment.

- Field House Quarry represents a former Magnesian Limestone and Permian Yellow Sands quarry of area approximately 5 hectares. The quarry had a basal elevation of approximately 100mAOD and quarry faces of up to 60m in height.
- The 2004 HRA confirms the proposal to restore Field House Quarry as an inert landfill facility, developed as two phases, receiving 0.75 million m³ of inert waste and 5000m³ of soil making materials over a period of 15 years.
- The primary pathway and receptor for potential leachate migration was identified as vertical flow through the proposed attenuation layer to the underlying Permian Yellow Sands aquifer. The Permian Yellow Sands was identified as a major aquifer, with Field House Quarry located within a Zone III (total catchment zone) of a local public water supply abstraction.
- Groundwater within the Permian Yellow Sands aquifer was recorded at between 88mAOD in the north-west and 86mAOD in the south-east, approximately 12m below the base of the quarry floor and with an inferred groundwater flow direction towards the south-east.
- Baseline groundwater quality monitoring confirmed the presence of iron, magnesium and nitrate at concentrations occasionally in excess of the UK Drinking Water Standards, attributed to local agricultural land use.
- Houghton Burn was identified as the closest surface water course to the site and flows in a westerly direction approximately 250m south of the site. The burn was not identified as a potential receptor to leachate migration due to the inert nature of the proposed wastes, its distance from the site and the burn's elevation approximately 15m above local groundwater levels preventing groundwater recharge. Surface water sampling identified magnesium and iron at concentrations in excess of UK Drinking Water Standards.
- Due to the inert nature of the landfill site, the HRA presents simple risk screening only and confirms that the site's waste acceptance procedures and the installation of an attenuation layer across the base and side walls of the quarry, with continued environmental monitoring, would be sufficient to protect the local groundwater quality and resource.

2.0 HYDROGEOLOGICAL CONCEPTUAL SITE MODEL REVIEW

2.1 Introduction

This section of the report reviews the hydrogeological conceptual site model that was developed within the 2004 ESID and 2004 HRA reports. The sources, pathways and receptors have been reviewed and updated with reference to recent site monitoring data, information on site operations and site management and updated third party information.

2.2 Sources

Field House Quarry Landfill is an inert waste landfill site, which is permitted to receive up to 99,000 tonnes of inert waste per year.

By definition, inert waste does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter that it comes into contact with, in a way likely to cause environmental pollution or harm to human health.

The total leachability and pollutant content of inert waste and the ecotoxicity of the leachate must:

- be insignificant
- not endanger the quality of surface water or groundwater

Notwithstanding the above, Table S4.3 of the Environmental Permit for Field House Quarry Landfill includes a requirement for in-waste leachate monitoring; there are no permit compliance limits associated with leachate level or leachate quality.

It is considered appropriate to review the following elements of the source term as part of the HRA Review:

- Site operation, construction and management;
- Leachate levels; and
- Leachate quality.

2.2.1 Site Operation, Construction and Management

The site construction is detailed within the Emissions Control and Abatement report prepared for the 2004 permit application⁴. The report details the following engineering proposals:

- The quarry profile shall be subject to a cut and fill exercise to achieve a suitable formation for engineering works. Within the south of the site, overburden comprising clay, sand and gravel, has been placed against the quarry face; this will be re-profiled and form the subgrade to the side wall liner.
- The site shall be developed as two cells (Cell 1 in the north and Cell 2 in the south), with filling of both cells undertaken together. An artificial geological barrier constructed from clay rich material (excavated from nearby construction sites) to achieve a maximum permeability of 1×10^{-7} m/s, shall be placed across the quarry floor and side walls. The

⁴ Wardell Armstrong LLP, September 2004, Field House Quarry, Application for PPC Permit, Emissions Control and Abatement. Document Reference: NT03182 B2.2.

liner shall have a minimum thickness of 1.0m. The lining system shall be installed under an independent Construction Quality Assurance (CQA) system.

- Following completion of landfilling, the site shall be restored with soils and landscaped to promote surface water runoff; no engineered capping layer to the waste is proposed.
- A HDPE monitoring well shall be installed within each cell, placed directly onto the basal liner, for long-term leachate monitoring.

It is understood that the site has been developed in accordance with the above proposals and is currently an active inert landfill facility.

This HRA Review supports a permit variation application to increase the site's currently approved restoration contours by approximately 10m in the north of the site, to achieve a smooth restored profile, comparable to natural external ground contours.

2.2.2 Leachate Levels and Quality

Table S4.3 of the site permit requires in-waste leachate monitoring at locations MW1 and MW2. However, the operator has confirmed that the leachate monitoring points are consistently reported as dry, with no accumulation of leachate within the site. Therefore, no leachate quality data are available.

The 2004 HRA includes a basic water balance for the site, which predicts that a basal artificial geological barrier of permeability greater than 1×10^{-8} m/s should maintain a zero head of leachate within the site. The design permeability of the artificial geological barrier is 1×10^{-7} m/s and therefore no accumulation of leachate would be anticipated.

Limited test results from Waste Acceptance Criteria (WAC) testing of incoming wastes have been provided, with all results confirming compliance with the limit values for inert waste.

The 2004 HRA selected ammoniacal-nitrogen, chloride and nickel as priority contaminants for the site, due to their common association with non-inert landfill wastes. The site permit includes groundwater compliance limits for ammoniacal-nitrogen and chloride.

In the absence of site-specific leachate quality data, ammoniacal-nitrogen and chloride are considered to remain appropriate priority contaminants for the site. These parameters are typically elevated within non-hazardous landfill leachate and would therefore be associated with potential rogue loads of non-inert waste.

2.3 Pathways

It is appropriate to review the following elements of the hydrogeological pathways as part of the HRA Review:

- Geology and aquifer characteristics;
- Groundwater levels and flow;
- Groundwater quality; and
- Surface water quality

2.3.1 Geology and Aquifer Characteristics

The geological setting of Field House Quarry Landfill is detailed within Section 4 of the 2004 HRA and can be summarised as follows:

- The bedrock geology comprises the Raisby Formation (also referred to as the Lower Magnesian Limestone) underlain by the Marl Slate in turn underlain by the Yellow Sands

Formation, which was the principal material worked at the former quarry. The Permian Yellow Sands Formation is underlain at depth by Carboniferous Coal Measure strata and the bedrock geology has a slight easterly dip. Superficial drift deposits are present around the quarry perimeter, comprising clayey sands and gravels, with recorded thickness of at up to 3.9m on the western boundary and significantly thinner to the north and east of the quarry.

- The Raisby Formation comprises fine grained calcitic dolomite and limestone, approximately 20m thick in the northern quarry face, thinning rapidly to the south.
- The Marl Slate comprises up to 2.6m thickness of grey, finely laminated silty dolomite and forms a low permeability barrier to vertical groundwater flow / recharge, as evidenced by a seepage line within the north-east quarry face.
- The Permian Yellow Sands has a thickness of up to 55m at the site. The sands are generally weakly cemented.
- Historic coal mine workings are recorded at depth beneath the site (in excess of 190m).

A geological cross-section through the site from north-west to south-east (B to B') is reproduced as Figure 1 below and presents the geological strata at the site as confirmed through borehole records and the exposed quarry faces.

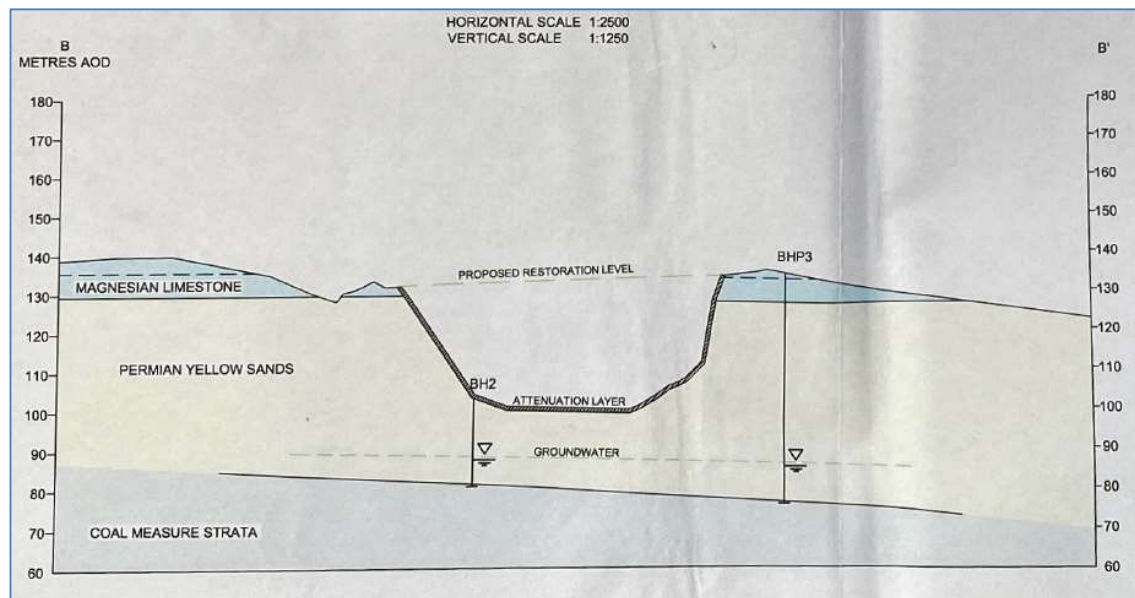


Figure 1. Geological Cross-Section (Extracted from 2004 PPC Permit Application, Wardell Armstrong, Drawing No. NT03182/007)

Review of Natural England's MAGIC website confirms that the local bedrock geology (Magnesian Limestone and Permian Yellow Sands) is classified as a Principal Aquifer (formerly referred to as a major aquifer). The online mapping also confirms that the local groundwater vulnerability, which describes the vulnerability of groundwater to a pollutant discharged at ground level, is classified as 'high' or 'medium-high'.

Online maps presented on Natural England's MAGIC website confirms that Field House Quarry Landfill remains within a Zone III (Total Catchment) Groundwater Source Protection

Zone. It is not located within a Drinking Water Safeguard Zone or a Drinking Water Protected Area.

These designations remain unchanged from the 2004 HRA.

2.3.2 Groundwater Levels and Flow

A number of permanent groundwater monitoring boreholes were installed around the perimeter of Field House Quarry Landfill in June 2003, to support the permit application. Data were also available for the 2004 HRA from a number of historic boreholes installed within the base of the quarry, which have now been lost as a result of site development.

The 2004 HRA presents groundwater levels and inferred groundwater contours for the Permian Yellow Sands, indicating a groundwater flow direction beneath the site towards the south-east, at a hydraulic gradient of approximately 0.01. The groundwater flow direction approximately follows the direction of geological dip, with fracture flow likely to dominate within the aquifer. An unsaturated zone thickness of approximately 12m is confirmed beneath the base of the quarry (refer to Figure 1 above).

The site permit does not include a requirement for routine groundwater level monitoring. However, limited groundwater level data are available from perimeter boreholes (P1 to P7) for the period 2016 to 2021 and are reported as depth to groundwater. The borehole locations are indicated on Drawing 1 and available groundwater depth data are summarised below in Table 1.

Table 1: Groundwater Depth Monitoring Data 2016-2021

Monitoring Borehole	Number of Readings	Depth to Groundwater (m)		
		Min	Average	Max
P1	1	67.5	67.5	67.5
P3	8	44.5	45.32	46.71
P5	7	65.4	67.1	69.0
P6	7	48.8	50.8	53.5
P7	7	32.8	33.9	36.7

Notes: 1. Data for P2 and P4 (single readings) appear unreliable and have been omitted.

Attempts were made to convert the groundwater depth monitoring data to approximate groundwater levels (mAOD) using inferred ground level datum elevations from the May 2021 site survey (refer to Drawing 1). However, due to uncertainties regarding precise borehole locations and dip datums, no reliable groundwater level data could be inferred. Therefore, this HRA Review relies on the data presented within the 2004 HRA, as reproduced below within Figure 2.



Figure 2. Inferred Groundwater Contours (Extracted from 2004 PPC Permit Application)

It is recommended that a survey of the borehole locations and monitoring point datum elevations (mAOD) be undertaken promptly to enable future groundwater level monitoring, in accordance with the recommendations within Section 4 of this report.

2.3.3 Groundwater Quality

Groundwater quality within the Permian Yellow Sands is monitored on a quarterly basis for ammoniacal-nitrogen and chloride at boreholes P3, P5, P6 and P7, in accordance with the site permit. An extended groundwater monitoring suite is undertaken approximately annually.

Review of the groundwater level data and inferred groundwater contours within the 2004 HRA confirms that borehole P5 represents the up-gradient, background groundwater quality monitoring point and boreholes P3, P6 and P7 are located down-gradient of the site.

The site permit includes groundwater quality trigger levels for ammoniacal-nitrogen and chloride at boreholes P3, P5, P6 and P7 as follows:

Ammoniacal-nitrogen: 0.5mg/l

Chloride: 250mg/l

A summary of recent available data (2010-2020) is presented within Table 3 below and time-series plots of ammoniacal-nitrogen and chloride concentrations in groundwater are included as Appendix 1. The graphs within Appendix 1 include limited data from the 2004 HRA, confirming pre-landfill, baseline groundwater quality.

Table 3: Groundwater Quality Data Summary (2010-2020)

Borehole	No. of Samples	Ammoniacal-Nitrogen (mg/l)			Chloride (mg/l)		
		Min	Average	Max	Min	Average	Max
P3	19	<0.2	0.29	1.03	13.5	58.7	113
P5	19	<0.2	0.21	0.317	20.6	29.7	34.1
P6	19	<0.2	0.22	0.5	20.7	48.7	106
P7	17	<0.2	0.33	1.04	13.3	53.6	107

Table notes: 1. Data are summarised from the following monitoring period: April 2010 to January 2020 inclusive.

2. Average ammoniacal-nitrogen concentrations have been calculated assuming values below the laboratory reporting limit (LRL) are equal to the LRL.

Ammoniacal-Nitrogen

Review of the ammoniacal-nitrogen groundwater quality data confirms that concentrations at up-gradient borehole P5 have remained low and consistent throughout the monitoring record. Ammoniacal-nitrogen concentrations at P5 remained below the laboratory reporting limit (LRL) of 0.2mg/l for all monitoring events except November 2012 when a value of 0.317mg/l was recorded; this concentration remains below the UK Drinking Water Standard (0.39mg/l) and permit trigger level (0.5mg/l).

Ammoniacal-nitrogen concentrations in the down-gradient groundwater monitoring boreholes also remained below the LRL of 0.2mg/l on most monitoring events. However, ammoniacal-nitrogen has been recorded in groundwater at concentrations equal to, or exceeding, the permit trigger level at all three down-gradient boreholes on isolated occasions. The highest ammoniacal-nitrogen concentrations have been recorded at P7 (maximum: 1.04mg/l) and P3 (maximum: 1.03mg/l); the permit trigger level has been exceeded on three occasions at each of these boreholes during the available monitoring record.

Average ammoniacal-nitrogen concentrations in groundwater presented in Table 3 have been calculated by assuming concentrations below the LRL are equal to the LRL. It is clear that the average ammoniacal-nitrogen concentration up-gradient of the site (0.21mg/l) is only marginally lower than the average down-gradient concentrations, which range from 0.22mg/l to 0.33mg/l. All average ammoniacal-nitrogen concentrations in groundwater monitoring boreholes remain below the UK Drinking Water Standard of 0.39mg/l.

The isolated peak ammoniacal-nitrogen concentrations in groundwater appear to be outliers; concentrations fluctuate rapidly and do not correspond with the chloride trend (discussed below).

Chloride

Chloride concentrations in background groundwater at up-gradient borehole P5 have remained relatively low and consistent throughout the monitoring record, remaining below 35mg/l, significantly below the UK Drinking Water Standard and permit trigger level of 250mg/l.

Chloride concentrations in groundwater within the down-gradient boreholes follow a gradual rising trend through the monitoring record from 2010 to 2020, with the most significant rise in concentrations observed since 2015. Maximum chloride concentrations recorded within the

down-gradient boreholes range from 106mg/l to 113mg/l and are significantly elevated relative to the up-gradient concentrations, but remain below the 250mg/l permit trigger level.

Other Parameters

An extended groundwater monitoring suite is undertaken approximately annually, with the most recent laboratory data available from March 2021. Laboratory results are included within Appendix 2 and parameters detected at concentrations above the laboratory reporting limit (LRL) are summarised in Table 4.

Table 4: Groundwater Quality Data – March 2021, Extended Suite

Parameter	Units	MRV / UK DWS	Concentration in Groundwater			
			P3	P5	P6	P7
Selenium	µg/l	10	1.03	<1	1.37	9.22
2,3,5,6-tetrachlorophenol	µg/l	-	<0.5	<0.5	3.18	<0.5
2,3,4,6-tetrachlorophenol	µg/l	-	<0.5	<0.5	2.82	<0.5
Pentachlorophenol	µg/l	0.1	<2	<2	8.69	<2
Polycyclic Aromatic Hydrocarbons (Total of 16 PAHs)	µg/l	0.1	0.6	0.969	1.16	<0.082

Table notes: 1. Data are summarised for parameters detected in groundwater (concentration >LRL)

2. UK DWS for PAHs is for a total of 4 named PAHs.

3. MRV (minimum reporting value in groundwater) has been reported for hazardous substance pentachlorophenol.

Review of the laboratory results for the extended suite confirms that the majority of parameters remained below the LRL in groundwater up-gradient and down-gradient of the site. Selenium was detected in groundwater down-gradient of the landfill site at concentrations approaching the UK DWS but was not detected in groundwater up-gradient of the site.

A range of PAHs were detected in groundwater monitoring boreholes, with the total concentration of PAHs comparable up-gradient and down-gradient of the site and in excess of the UK DWS.

Pentachlorophenol, a hazardous substance, and tetrachlorophenol (assumed a hazardous substance) were only detected in groundwater at down-gradient borehole P6. However, these could be isolated outliers. A similar extended groundwater monitoring suite was undertaken in February 2019, when pentachlorophenol and tetrachlorophenol remained below the LRL in all boreholes.

In summary, the recent extended groundwater monitoring suite indicates background groundwater quality impacts at up-gradient borehole P5 from an off-site source, but also indicates variable down-gradient impact, with concentrations of a number of parameters at boreholes P6 and P7 (selenium only) exceeding up-gradient concentrations.

2.3.4 Surface Water Quality

The 2004 HRA confirms there is only one watercourse in the vicinity of the site: Houghton Burn, which flows in a westerly direction passing approximately 250m south of the site.

Houghton Burn rises approximately 1km to the east, at Warden Law and forms a tributary of the Moors Burn, to the west of Houghton le Spring.

The 2004 HRA confirms that Houghton Burn is not a potential receptor due to the inert nature of Field House Quarry Landfill and because the burn is at an elevation of approximately 100mAOD in the vicinity of the site, which is approximately 15m above groundwater levels at the site.

There is no permit requirement for surface water monitoring.

2.4 Receptors

2.4.1 Licensed and Private Abstractions

Updated information on private water supplies and licensed water abstractions has been obtained from Sunderland City Council⁵ and the Environment Agency⁶ respectively.

Sunderland City Council has confirmed there are no private water supplies within a 3km radius of Field House Quarry Landfill site boundary.

The Environment Agency has confirmed there are two licensed water abstractions (from groundwater and surface water) within a 3km radius of Field House Quarry Landfill. The details are presented in Table 5.

Table 5: Licensed Water Abstractions within 3km of Field House Quarry Landfill

Licence No. & Holder	Source of Water	Location	Distance and direction from site	Use and Limit (m3/day)
NE/024/0005/004 Biffa Waste Services	Groundwater (Basal Permian Sands)	NZ 34345 50908	1km north-west (up-gradient)	Pump & Treat, Pollution Remediation, 250m ³ /day
1/24/05/001 Northumbrian Water	Groundwater (Magnesian Limestone)	NZ 3540 5150	0.75km north (up-gradient)	Public Water Supply 5273.5m ³ /day

No licensed or private water supplies have been identified within 3km down-gradient of Field House Quarry Landfill.

2.4.2 Receptors and Compliance Points for Hazardous Substances and Non-hazardous Pollutants

Groundwater within the Permian Yellow Sands aquifer beneath the site is the only potential receptor identified within the 2004 HRA and this remains applicable. The primary pathway for potential leachate migration is identified as vertically downwards through the artificial geological barrier and underlying unsaturated pathway, which has a thickness of approximately 12m.

Therefore, the compliance point for both hazardous substances and non-hazardous pollutants is groundwater at the down-gradient site boundary within the Permian Yellow

⁵ Email dated 13th April 2022, Steve Hanratty, Business Manager, Economic Regeneration, Sunderland City Council.

⁶ Email dated 5th April 2022, Laura Stevenson, Customer and Engagement Officer, Environment Agency, North East Area.

Sands aquifer. If compliance is achieved at the down-gradient site boundary it is inferred that compliance would also be achieved at any down-gradient abstractions.

2.4.3 Environmental Assessment Levels (EALs)

An Environmental Assessment Level (EAL) is a value set at the compliance point and is the maximum concentration allowable at that point in order to protect the receptors. EALs are based on water quality standards with due consideration of baseline groundwater quality.

The priority contaminants included within the site permit are ammoniacal-nitrogen and chloride and these are considered to remain applicable for the site. The EALs derived in the 2004 HRA for these parameters within groundwater in the Permian Yellow Sands aquifer are reviewed in Table 6.

Table 6: Environmental Assessment Level Review

Substance	2004 HRA EAL (mg/l)	Derivation	EAL Review
Ammoniacal-Nitrogen	0.50	UK Drinking Water Standard	Remains applicable
Chloride	250		

The EALs derived within the 2004 HRA remain applicable as they represent the UK DWS values, which have not been exceeded in background, up-gradient groundwater.

2.5 Summary of the Hydrogeological Conceptual Site Model

The review of the potential sources, pathways and receptors for Field House Quarry Landfill, presented above, has confirmed that the hydrogeological conceptual site model presented in the 2004 HRA remains valid. The conceptual site model, as reviewed above, can be summarised as follows:

Source: Field House Quarry Landfill is restoring a former Magnesian Limestone and Permian Yellow Sands quarry and is permitted to receive up to 99,000 tonnes/year of inert waste. Due to the inert nature of the wastes, the pollutant content of the leachate should be insignificant and not endanger the quality of local water receptors. There is no accumulation of leachate within the site and therefore no site-specific leachate quality data are available. Limited WAC data confirm the inert nature of the wastes. This HRA Review supports a permit variation application to increase the site's currently approved restoration contours by approximately 10m in the north of the site, to achieve a smooth restored profile, comparable to natural external ground contours.

Pathway: Vertical flow through the artificial geological barrier and underlying unsaturated Permian Yellow Sands. The artificial geological barrier, installed across the base and sidewalls of the quarry, comprises 1.0m thickness of clay rich material achieving a maximum permeability of 1×10^{-7} m/s. The underlying unsaturated pathway within the Permian Yellows Sands is approximately 12m. These pathways offer the potential for retardation and degradation of any potential pollutants within the leachate.

Receptor: Groundwater within the Permian Yellow Sands (principal aquifer) at the down-gradient, south-eastern site boundary.

The original hydrogeological conceptual site model presented in the 2004 HRA, as summarised above, is considered to remain valid.

3.0 HYDROGEOLOGICAL RISK ASSESSMENT

3.1 Risk Assessment Approach

The 2004 HRA included a simple risk screening assessment and concluded that the inert waste would, by definition, increase the level of hazardous substances and non-hazardous pollutants released into the groundwater at the site at such low concentrations that the potential use of the aquifer for drinking water would not be affected.

The Environment Agency's groundwater risk assessment guidance⁷ confirms that for an inert landfill site located above the water table within a principal aquifer, with no local surface water receptors, a risk screening approach or a generic quantitative risk assessment is appropriate.

Therefore, it is proposed that a risk screening assessment be completed initially, as undertaken in the 2004 HRA.

3.2 Risk Screening Assessment

This risk screening exercise aims to assess whether the discharge from Field House Quarry Landfill site is acceptable and therefore will not require further assessment.

The Environment Agency's guidance states that no further assessment is likely to be required if: *the discharge has concentrations of non-hazardous pollutants that are within the relevant environmental standards, or in concentrations that are the same as the natural background levels in the groundwater.*

Due to the nature of the site, no leachate accumulates, and no site-specific leachate quality data are available. However, available WAC data indicate compliance with inert waste limits and the site adopts appropriate waste acceptance procedures to ensure only appropriate, inert wastes are accepted at the site, in accordance with the site permit.

The permit variation application seeks to increase the restoration profile and will result in increased waste thickness, of up to approximately 10m in the north of the site, to achieve a smooth restored profile. Due to the inert nature of the wastes, any increased volume and thickness of waste will not increase the risks posed to the underlying groundwater receptor.

Groundwater monitoring data for the priority contaminants chloride and ammoniacal-nitrogen confirm that concentrations down-gradient of the site are slightly elevated, relative to background up-gradient concentrations. However, chloride remains significantly below the permit compliance limit and only isolated, occasional exceedances of the permit compliance limit have been reported for ammoniacal-nitrogen. The peak ammoniacal-nitrogen data appear to be isolated outliers, with no long-term trend.

The extended groundwater monitoring suite of March 2021 also indicates isolated down-gradient impact for a number of parameters, although PAHs were detected in groundwater at similar concentrations up-gradient and down-gradient of the site.

The available monitoring data indicate that leachate discharged from Field House Quarry Landfill has low concentrations of non-hazardous pollutants (chloride, ammoniacal-nitrogen

⁷ Environment Agency, February 2016 (last updated: October 2020), Guidance – Landfill developments: groundwater risk assessment for leachate.

and selenium), with resultant, down-gradient groundwater quality remaining below the relevant EAL, ignoring isolated outliers.

Although chloride concentrations in groundwater on the down-gradient site boundary remain significantly below the EAL, they are following a rising trend. Therefore, the potential impact of the observed chloride concentrations in groundwater beneath the site, to a receptor located 50m down-gradient of the site, has been assessed using the Environment Agency's Remedial Targets Worksheet⁸. Chloride has also been selected for inclusion in the risk assessment because it is a conservative parameter, that is not subject to degradation or retardation within the aquifer pathway.

A 50m receptor distance is typically requested by the Environment Agency during land contamination risk assessments and is considered appropriate for the site given the absence of local water abstractions.

The quantitative risk assessment is presented below in Section 3.3. The groundwater monitoring data and aquifer sensitivity highlight the requirement for stringent technical precautions at the site, including appropriate waste acceptance procedures, which are discussed in Section 3.4.

3.3 Level 3 Groundwater Remedial Targets Worksheet

A Level 3 Groundwater Remedial Targets Worksheet has been used to assess the resultant concentration of chloride in groundwater at a receptor located 50m down-gradient of the site. The worksheet is included as Appendix 3 and the following parameters are assumed:

- Source concentration in groundwater: 113mg/l (maximum recorded in down-gradient boreholes)
- Width of groundwater plume: 250m (width of the site perpendicular to direction of groundwater flow)
- Plume thickness at source: 2m (assumed after aquifer characteristics, limited saturated zone thickness and discrete fracture flow)
- Saturated aquifer thickness: 10m (refer to Section 2.3.1 above)
- Aquifer porosity: 0.24 (mean value for Permian-Triassic sandstones in the region, after: BGS, Physical Properties of Major Aquifers in England and Wales).
- Aquifer hydraulic conductivity: 3.7m/d (mean value for Permian-Triassic sandstones in the region, after: BGS, Physical Properties of Major Aquifers in England and Wales).

Based on the above assumptions, the Remedial Targets Worksheet predicts a resultant chloride concentration in groundwater at the 50m receptor of 71.1mg/l. This is based on a source concentration at the down-gradient site boundary of 113mg/l, which is equivalent to the maximum recorded concentration in the down-gradient boreholes.

The worksheet model was re-run with the source concentration of chloride in groundwater at the down-gradient site boundary reduced to 88.5mg/l, which represents the average concentration recorded in the down-gradient site boreholes between 2018 and 2020. In this scenario, the resultant chloride concentration at the 50m receptor is calculated as 55.7mg/l.

The model results are summarised below in Table 7 and confirm that chloride concentrations in groundwater at the down-gradient site boundary are reduced by approximately 37% at the

⁸ Environment Agency, Hydrogeological risk assessment for land contamination, Remedial Targets Worksheet, Release 3.2: January 2013.

50m receptor. Whilst the resultant concentrations at the 50m receptor remain slightly elevated, relative to background levels, they remain significantly below the EAL. The EAL is defined as the maximum concentration allowable at that point in order to protect receptors and the data confirm that chloride concentrations in groundwater at the down-gradient site boundary (and hence at the 50m receptor) are significantly below the EAL.

Table 7: Level 3 Groundwater Remedial Target Worksheet Results

Source Concentration of Chloride in Groundwater at Down-Gradient Site Boundary (mg/l)	Resultant Chloride Concentration in Groundwater at 50m Receptor (mg/l)	Maximum Background Chloride Concentration in Groundwater (Borehole P5) (mg/l)	EAL (mg/l)
113 (maximum recorded)	71.1	34.1	250
88.5 (average, 2018-2020)	55.7		

The risk screening and simple risk assessment presented above, confirm that the discharge of non-hazardous pollutants is currently limited, so as to avoid pollution. However, the rising trend in chloride concentrations in groundwater at the down-gradient site boundary and the isolated evidence of hazardous substance pentachlorophenol in groundwater down-gradient of the site highlights the requirement for appropriate technical precautions at the site.

3.4 Review of Technical Precautions

This section of the report reviews the site's existing technical precautions as set out in the 2004 HRA and site permit, to determine whether they remain sufficient so as to ensure compliance with the Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations.

3.4.1 Artificial Geological Barrier

No further development of Field House Quarry Landfill is proposed. The existing site benefits from the presence of an artificial geological barrier.

3.4.2 Waste Acceptance Procedures

This HRA Review demonstrates limited groundwater quality impact from Field House Quarry Landfill and therefore the site's waste acceptance procedures should be reviewed to ensure only inert wastes, in accordance with the site permit, are accepted at the site. The enforcement of stringent, appropriate waste acceptance procedures is key to the future performance of the site.

Any potentially non-compliant wastes should be segregated, stored in secure enclosed receptacles and disposed of off-site at an appropriate facility.

3.4.3 Restoration

The 2004 HRA assumed that the landfill would be restored with a soil restoration layer only, with infiltration equivalent to effective rainfall. The proposed revised restoration contours allow the site to be restored with a smooth profile, comparable to natural external ground contours. Due to the unconsolidated nature of the wastes and proposed soil restoration layer, surface water runoff rates from the restored landfill site should be comparable to pre-development rates, with no requirement for long-term surface water management.

Any requirement to reduce leachate generation rates, through the introduction of a low permeability restoration layer / capping system, should be reviewed in the six-yearly HRA Review due for completion in 2028, following the additional proposed groundwater quality monitoring detailed below.

4.0 REVIEW OF SITE MONITORING SCHEDULES AND COMPLIANCE LIMITS

The site's permit includes monitoring schedules for leachate and groundwater at Field House Quarry Landfill, together with compliance limits for groundwater quality within the perimeter monitoring boreholes.

This section of the report presents a review of the current site monitoring schedules and compliance limits based on the findings of the HRA Review.

4.1 Leachate Monitoring Requirements

The current leachate monitoring requirements are specified in Table S4.3 of the site permit. As detailed above, no leachate accumulates within the site, due to the permeability of the artificial geological barrier and underlying unsaturated zone pathway. Therefore, whilst monitoring of leachate should continue to be attempted in accordance with Table S4.3 of the site permit, this is unlikely to be successful.

4.2 Groundwater Monitoring Requirements

The current groundwater monitoring requirements and compliance limits are specified in Table S4.1 of the site permit. Review of recent site monitoring data and the risks posed by the site confirm that the current groundwater compliance limits remain appropriate.

Whilst the site permit specifies a quarterly groundwater monitoring requirement for chloride and ammoniacal-nitrogen only, a wider annual monitoring schedule has been undertaken. Due to the sensitivity of the groundwater receptor, it is recommended that an extended quarterly and annual monitoring suite is adopted, as presented in Table 8. The quarterly monitoring suite has been extended to include general water quality indicator parameters and a wider range of parameters commonly associated with rogue loads of non-inert waste. The quarterly suite also includes pentachlorophenol which has been identified in groundwater down-gradient of the site. The proposed annual monitoring suite includes a wider range of parameters including hazardous substances and PAHs, as previously included within the annual suite.

The boreholes should be surveyed to confirm datum elevations (mAOD) for water level monitoring.

Table 8: Proposed Groundwater Monitoring Schedule

Monitoring Location	Frequency	Parameters
Perimeter Boreholes P3, P5, P6 & P7	Quarterly	Groundwater level (mAOD), pH, Chloride, Ammoniacal-Nitrogen, Electrical Conductivity, Sulphate, Selenium, Nickel, Pentachlorophenol
	Annually	As above, plus: Calcium, Magnesium, Sodium, Potassium, Total Alkalinity, Iron, Manganese, Arsenic, Cadmium, Chromium, Mercury, Lead, Zinc, Polycyclic Aromatic Hydrocarbons (PAHs) Base of borehole (mAOD)

Table notes: 1. Metals should be analysed for dissolved content, except iron and manganese which should be analysed for dissolved and total content.

5.0 SUMMARY AND CONCLUSIONS

This report presents a review of the 2004 HRA Field House Quarry Landfill, to support a permit variation application for revised site restoration contours. This HRA Review has been informed by updated site monitoring data, information on site operations and site management and updated third party information.

Field House Quarry Landfill is permitted to accept inert waste only, therefore, by definition, the pollutant content of the site leachate should be insignificant and should not endanger the quality of surface water or groundwater.

The landfill is restoring a former Magnesian Limestone and Permian Yellow Sands quarry and benefits from an artificial geological barrier across the base and sidewalls. There is no accumulation of leachate within the site and therefore no leachate quality monitoring data are available.

The review of the sources, pathways and receptors confirms that the conceptual site model presented in the 2004 HRA remains valid. The proposed increased thickness of inert wastes to achieve the revised restoration contours will not alter the current conceptual site model or risks posed by the site.

The potential receptor to leachate migration is groundwater within the underlying Permian Yellow Sands, classified as a principal aquifer.

No reliable site-specific groundwater level monitoring data are available for review, therefore the findings of the 2004 HRA are relied on, with an inferred groundwater flow direction towards the south-east.

Site-specific groundwater quality monitoring data indicate generally good quality background groundwater within the up-gradient borehole. Down-gradient groundwater quality appears to display limited impact from the site, notably in the form of gradually rising chloride concentrations within all down-gradient boreholes. However, concentrations of chloride and ammoniacal-nitrogen have remained below the EAL and permit compliance limit, excluding isolated outliers.

Whilst chloride concentrations in groundwater on the down-gradient site boundary remain significantly below the EAL, they are following a rising trend and this HRA Review includes an assessment of the potential impacts of the observed concentrations on a receptor located 50m down-gradient of the site. Chloride concentrations are reduced by approximately 37% at the 50m receptor, and whilst they remain elevated relative to background, up-gradient concentrations, they are not causing pollution of the groundwater receptor. The 37% reduction in chloride concentrations demonstrated between the site boundary and the 50m receptor provides further reassurance regarding aquifer protection. Other potential contaminants subject to retardation and degradation would experience a more significant reduction in concentration at the 50m receptor.

Based on the available data and ignoring outliers, this HRA review has demonstrated that the technical precautions at the site are sufficient to prevent the discernible discharge of hazardous substances and to limit the discharge of non-hazardous pollutants to groundwater so as to avoid pollution.

However, it is recommended that the site's waste acceptance procedures be reviewed and updated as required, to ensure only inert wastes, in accordance with the site permit, are accepted at the site. Any requirement to reduce leachate generation rates, through the introduction of a low permeability restoration layer / capping system, should be reviewed in

the six-yearly HRA Review due for completion in 2028, following the additional proposed groundwater quality monitoring.

Whilst the current priority contaminants and permit compliance limits are considered to remain applicable for the site, revised groundwater monitoring schedules are recommended, in order to provide a greater understanding of the site performance to inform the 2028 HRA Review.

6.0 CLOSURE

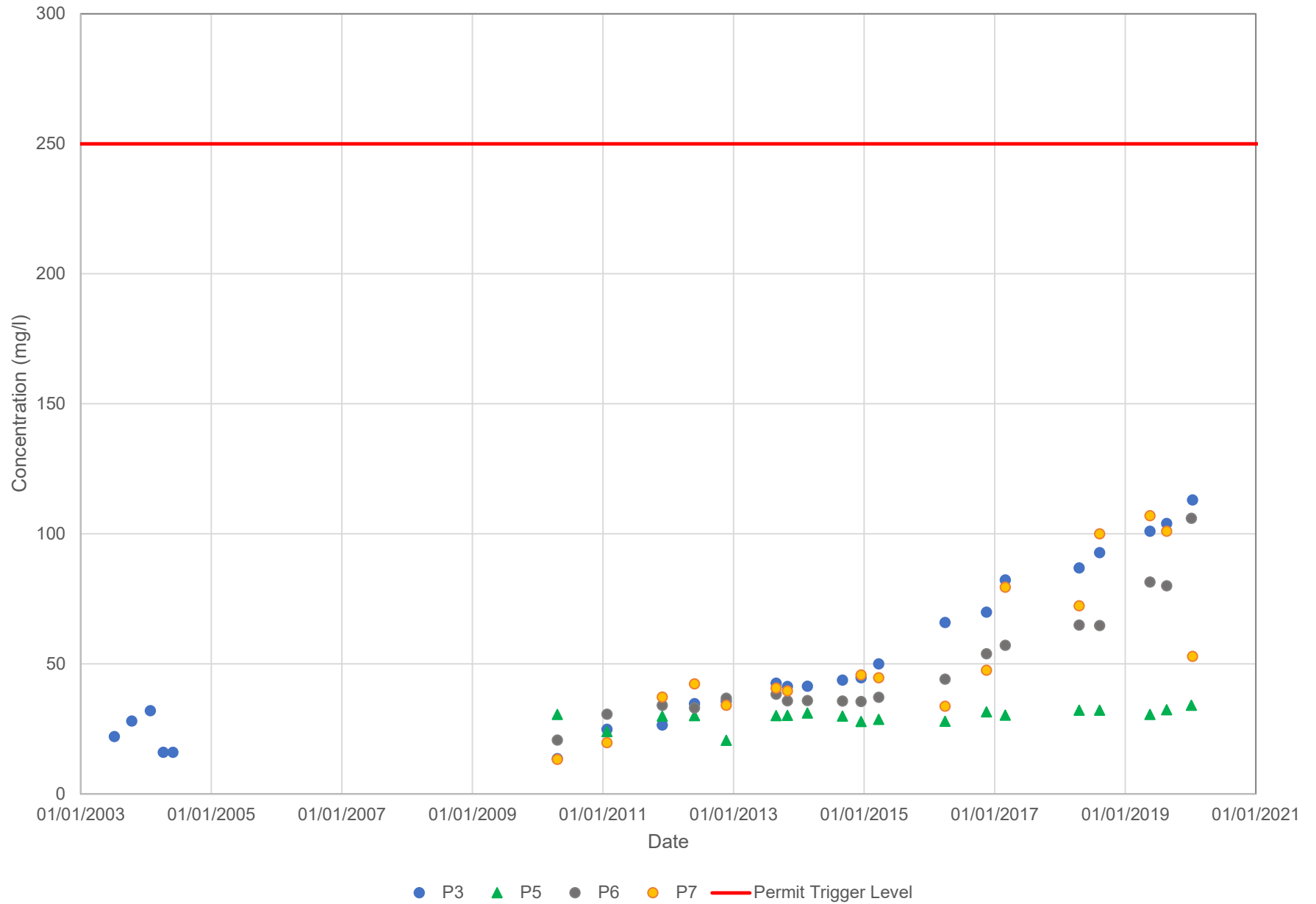
This report has been prepared by Nicola Sugg (trading style of NSugg Limited) with all reasonable skill and care, and in accordance with the services agreed with Olive Compliance Ltd. Relevant information provided by Olive Compliance Ltd. has been accepted in good faith as being accurate and valid. This report is based on the relevant guidance and legislation in force at the date of the report and should be reviewed if such guidance and legislation are amended or superseded.

This report is for the exclusive use of Olive Compliance Ltd. and A McCall & Sons (Houghton-le-Spring) Ltd.; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Nicola Sugg.

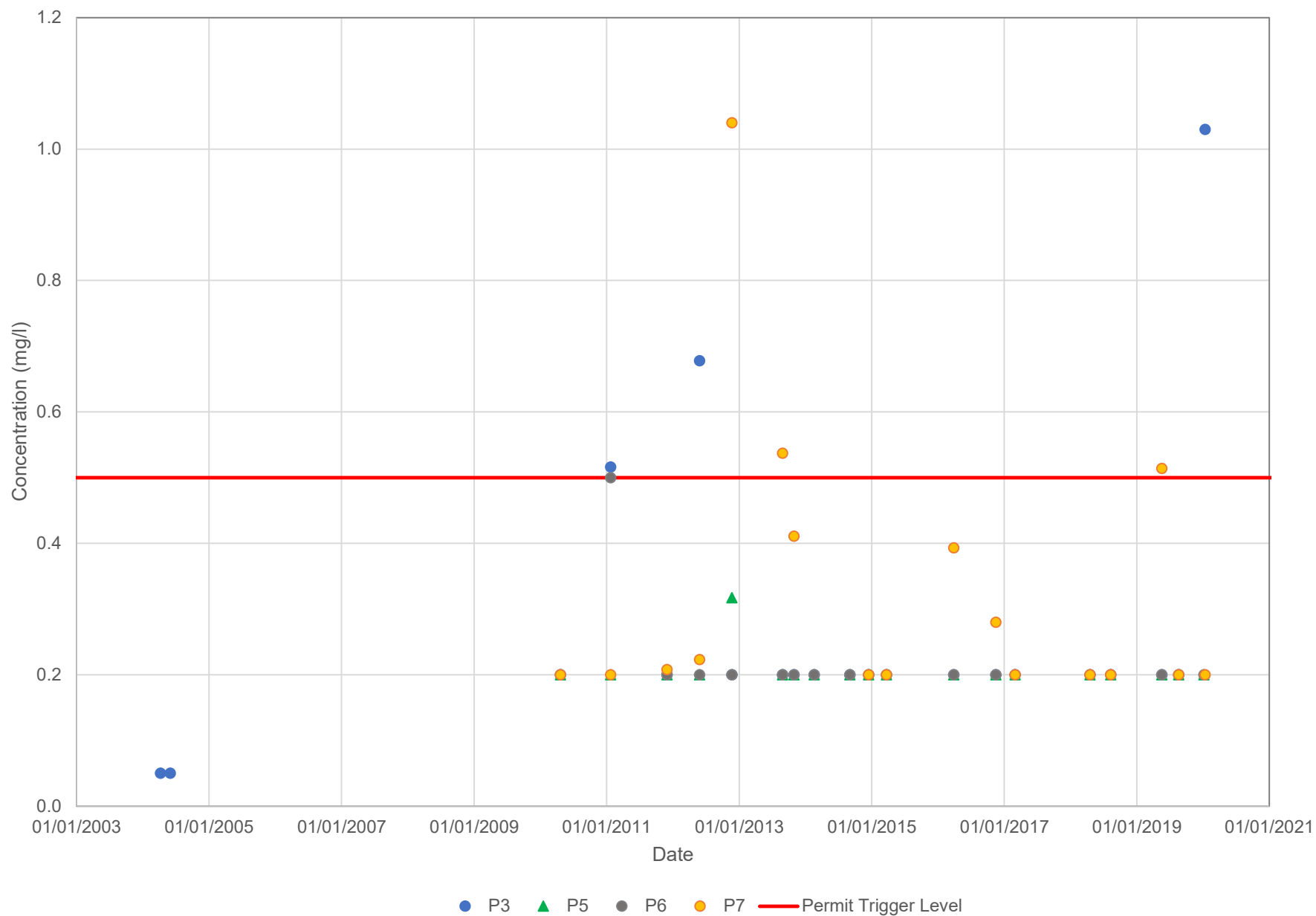
DRAWINGS

APPENDIX 1

Field House Quarry Landfill, Groundwater Quality - Chloride



Field House Quarry Landfill, Groundwater Quality - Ammoniacal-Nitrogen



APPENDIX 2



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

A McCall + Sons Ltd
The Weighbridge
Field House Farm
Houghton-le-Spring
Tyne and Wear
DH5 8AJ

Attention: Kathryn Bennison

CERTIFICATE OF ANALYSIS

Date of report Generation: 15 March 2021
Customer: A McCall + Sons Ltd
Sample Delivery Group (SDG): 210306-26
Your Reference:
Location: Houghton-Le-Spring
Report No: 590544

We received 4 samples on Saturday March 06, 2021 and 4 of these samples were scheduled for analysis which was completed on Monday March 15, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26
Location: Houghton-Le-Spring

Client Reference:
Order Number:

Report Number: 590544
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23849590	P3		46.71	04/03/2021
23849591	P5		69.00	04/03/2021
23849592	P6		53.50	04/03/2021
23849593	P7		36.70	04/03/2021

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26
Location: Houghton-Le-Spring

Client Reference:
Order Number:

Report Number: 590544
Superseded Report:

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	23849590		P3				46.71		Via (ALE297)		UNL	
	23849591		P5				69.00		Via (ALE297)		UNL	
	23849592		P6				53.50		Via (ALE297)		UNL	
	23849593		P7				36.70		Via (ALE297)		UNL	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4										
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4										
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 4										
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4										
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4										
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4										
Phenols by ms (w)	All	NDPs: 0 Tests: 4										
VOC MS (W)	All	NDPs: 0 Tests: 4										



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26 Client Reference: Report Number: 590544
Location: Houghton-Le-Spring Order Number: Superseded Report:

Results Legend			Customer Sample Ref.		P3	P5	P6	P7		
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		46.71	69.00	53.50	36.70		
M	mCERTS accredited.				Unspecified Liquid (UNL)	Unspecified Liquid (UNL)	Unspecified Liquid (UNL)	Unspecified Liquid (UNL)		
aq	Aqueous / settled sample.				04/03/2021	04/03/2021	04/03/2021	04/03/2021		
diss.filt	Dissolved / filtered sample.				11:40:00	14:00:00	12:15:00	11:00:00		
tot.unfilt	Total / unfiltered sample.				06/03/2021	06/03/2021	06/03/2021	06/03/2021		
*	Subcontracted - refer to subcontractor report for accreditation status.				210306-26	210306-26	210306-26	210306-26		
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				23849590	23849591	23849592	23849593		
(F)	Trigger breach confirmed									
1-4*5@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
Selenium (diss.filt)	<1 µg/l	TM152			1.03	<1	1.37	9.22		
					2	2	2	2		
PCB congener 28	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 52	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 101	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 118	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 138	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 153	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 180	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
Sum of detected EC7 PCB's	<0.105 µg/l	TM197			<0.105	<0.105	<0.105	<0.105		
PCB congener 77	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 81	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 105	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 114	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 123	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 126	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 156	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 157	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 167	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 169	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
PCB congener 189	<0.015 µg/l	TM197			<0.015	<0.015	<0.015	<0.015		
Phenol	<0.5 µg/l	TM205			<1	<1.5	<1	<1		
2-methylphenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
3-methylphenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
4-methylphenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
2-chlorophenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
2,4-dimethylphenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
4-chloro-3-methylphenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
2,6-dichlorophenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
4-Chlorophenol	<0.5 µg/l	TM205			<0.5	<1.5	<0.5	<1		
2,4-dichlorophenol	<0.5 µg/l	TM205			<0.5	<1	<0.5	<0.5		
2-nitrophenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
2,4,6-trichlorophenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		
2,4,5-trichlorophenol	<0.5 µg/l	TM205			<0.5	<0.5	<0.5	<0.5		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26 **Client Reference:** **Report Number:** 590544
Location: Houghton-Le-Spring **Order Number:** **Superseded Report:**

Results Legend			Customer Sample Ref.	P3	P5	P6	P7		
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4#&@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
4-nitrophenol	<0.5 µg/l	TM205	46.71 Unspecified Liquid (UNL) 04/03/2021 11:40:00 06/03/2021 210306-26 23849590	<0.5	<0.5	<0.5	<0.5		
2,3,5,6-tetrachlorophenol	<0.5 µg/l	TM205	69.00 Unspecified Liquid (UNL) 04/03/2021 14:00:00 06/03/2021 210306-26 23849591	<0.5	<0.5	3.18	<0.5		
2,3,4,6-tetrachlorophenol	<0.5 µg/l	TM205	53.50 Unspecified Liquid (UNL) 04/03/2021 12:15:00 06/03/2021 210306-26 23849592	<0.5	<0.5	2.82	<0.5		
2,4-dinitrophenol	<2.5 µg/l	TM205	36.70 Unspecified Liquid (UNL) 04/03/2021 11:00:00 06/03/2021 210306-26 23849593	<2.5	<5	<2.5	<2.5		
DNOC	<3 µg/l	TM205		<3	<3	<3	<3		
Pentachlorophenol	<2 µg/l	TM205		<2	<2	8.69	<2		
Dinoseb	<4 µg/l	TM205		<4	<8	<4	<4		
Cyanide, Total	<0.05 mg/l	TM227		<0.05	<0.05	<0.05	<0.05		
Cyanide, Free	<0.05 mg/l	TM227		<0.05	<0.05	<0.05	<0.05		
Cyanide, Complex	<0.05 mg/l	TM227		<0.05	<0.05	<0.05	<0.05		
Trifluralin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
alpha-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
gamma-HCH (Lindane)	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Heptachlor	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Aldrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
beta-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Isodrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
delta-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Heptachlor epoxide	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
o,p'-DDE	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Endosulphan I	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
trans-Chlordane	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
cis-Chlordane	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
p,p'-DDE	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Dieldrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
o,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Endrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
o,p'-DDT	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02		
p,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Endosulphan II	<0.02 µg/l	TM343		<0.02	<0.02	<0.02	<0.02		
p,p'-DDT	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02		
o,p'-Methoxychlor	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02		
p,p'-Methoxychlor	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26 **Client Reference:** **Report Number:** 590544
Location: Houghton-Le-Spring **Order Number:** **Superseded Report:**

Results Legend			Customer Sample Ref.	P3	P5	P6	P7		
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4\$@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
Endosulphan Sulphate	<0.02 µg/l	TM343		<0.04	<0.04	<0.04	<0.04		
Permethrin I	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
Permethrin II	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01		
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.2	<0.2	<0.04	<0.02		
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.2	<0.2	<0.04	<0.02		
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.2	<0.2	<0.04	<0.02		
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Dichlorvos	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Dichlobenil	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Mevinphos	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Tecnazene	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Hexachlorobenzene	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Demeton-S-methyl	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Phorate	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Diazinon	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Triallate	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Atrazine	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Simazine	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Disulfoton	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Propetamphos	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Chlorpyrifos-methyl	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Dimethoate	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Chlorpyrifos	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Methyl Parathion	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Malathion	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Fenthion	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Fenitrothion	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Triadimefon	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Pendimethalin	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Parathion	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
Chlorfenvinphos	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		
trans-Chlordane	<0.01 µg/l	TM344		<0.1	<0.1	<0.02	<0.01		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26
Location: Houghton-Le-Spring

Client Reference:
Order Number:

Report Number: 590544
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	P3	P5	P6	P7		
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	P3	P5	P6	P7		
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*5@	Sample deviation (see appendix)								
Component	LOD/Units	Method		P3	P5	P6	P7		
Dibromofluoromethane**	%	TM208		115	115	115	114		
Toluene-d8**	%	TM208		95.3	94.7	94.5	96.1		
4-Bromofluorobenzene**	%	TM208		94.3	93.5	94.7	97.5		
Dichlorodifluoromethane	<1 µg/l	TM208		<1	<1	<1	<1		
Chloromethane	<1 µg/l	TM208		<1	<1	<1	<1		
Vinyl chloride	<1 µg/l	TM208		<1	<1	<1	<1		
Bromomethane	<1 µg/l	TM208		<1	<1	<1	<1		
Chloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
Trichlorofluoromethane	<1 µg/l	TM208		<1	<1	<1	<1		
1,1-Dichloroethene	<1 µg/l	TM208		<1	<1	<1	<1		
Carbon disulphide	<1 µg/l	TM208		<1	<1	<1	<1		
Dichloromethane	<3 µg/l	TM208		<3	<3	<3	<3		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1	<1	<1	<1		
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1	<1	<1	<1		
1,1-Dichloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1	<1	<1	<1		
2,2-Dichloropropane	<1 µg/l	TM208		<1	<1	<1	<1		
Bromochloromethane	<1 µg/l	TM208		<1	<1	<1	<1		
Chloroform	<1 µg/l	TM208		<1	<1	<1	<1		
1,1,1-Trichloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
1,1-Dichloropropene	<1 µg/l	TM208		<1	<1	<1	<1		
Carbontetrachloride	<1 µg/l	TM208		<1	<1	<1	<1		
1,2-Dichloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
Benzene	<1 µg/l	TM208		<1	<1	<1	<1		
Trichloroethene	<1 µg/l	TM208		<1	<1	<1	<1		
1,2-Dichloropropane	<1 µg/l	TM208		<1	<1	<1	<1		
Dibromomethane	<1 µg/l	TM208		<1	<1	<1	<1		
Bromodichloromethane	<1 µg/l	TM208		<1	<1	<1	<1		
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1	<1	<1	<1		
Toluene	<1 µg/l	TM208		<1	<1	<1	<1		
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1	<1	<1	<1		
1,1,2-Trichloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
1,3-Dichloropropane	<1 µg/l	TM208		<1	<1	<1	<1		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26
Location: Houghton-Le-SpringClient Reference:
Order Number:Report Number: 590544
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	P3	P5	P6	P7		
#	ISO17025 accredited.	mCERTS accredited.							
M	Aqueous / settled sample.		Depth (m)	46.71	69.00	53.50	36.70		
dis.filt	Dissolved / filtered sample.		Sample Type	Unspecified Liquid (UNL)	Unspecified Liquid (UNL)	Unspecified Liquid (UNL)	Unspecified Liquid (UNL)		
tot.unfilt	Total / unfiltered sample.		Date Sampled	04/03/2021	04/03/2021	04/03/2021	04/03/2021		
*	Subcontracted - refer to subcontractor report for accreditation status.		Sample Time	11:40:00	14:00:00	12:15:00	11:00:00		
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		Date Received	06/03/2021	06/03/2021	06/03/2021	06/03/2021		
(F)	Trigger breach confirmed		SDG Ref	210306-26	210306-26	210306-26	210306-26		
1-4-9@	Sample deviation (see appendix)		Lab Sample No.(s)	23849590	23849591	23849592	23849593		
	AGS Reference								
Component	LOD/Units	Method							
Tetrachloroethene	<1 µg/l	TM208		<1	<1	<1	<1		
Dibromochloromethane	<1 µg/l	TM208		<1	<1	<1	<1		
1,2-Dibromoethane	<1 µg/l	TM208		<1	<1	<1	<1		
Chlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
Ethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
m,p-Xylene	<1 µg/l	TM208		<1	<1	<1	<1		
o-Xylene	<1 µg/l	TM208		<1	<1	<1	<1		
Styrene	<1 µg/l	TM208		<1	<1	<1	<1		
Bromoform	<1 µg/l	TM208		<1	<1	<1	<1		
Isopropylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
1,2,3-Trichloropropane	<1 µg/l	TM208		<1	<1	<1	<1		
Bromobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
Propylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
2-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1		
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
4-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1		
tert-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
sec-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
4-iso-Propyltoluene	<1 µg/l	TM208		<1	<1	<1	<1		
1,3-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,4-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
n-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,2-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1	<1	<1	<1		
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
Hexachlorobutadiene	<1 µg/l	TM208		<1	<1	<1	<1		
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1	<1	<1	<1		
Naphthalene	<1 µg/l	TM208		<1	<1	<1	<1		
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210306-26
Location: Houghton-Le-Spring

Client Reference:
Order Number:

Report Number: 590544
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
TM205		Determination of Phenols in Waste Waters using Solid Phase Extraction, Acetylation, Gas Chromatography and Mass Selective Detection
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

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Test Completion Dates

Lab Sample No(s)	23849590	23849591	23849592	23849593
Customer Sample Ref.	P3	P5	P6	P7
AGS Ref.				
Depth	46.71	69.00	53.50	36.70
Type	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq
Cyanide Comp/Free/Total/Thiocyanate	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021
Dissolved Metals by ICP-MS	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021
PAH Spec MS - Aqueous (W)	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021
PCB Congeners - Aqueous (W)	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021
Pesticides (Suite I) by GCMS	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021
Pesticides (Suite II) by GCMS	15-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021
Phenols by ms (w)	10-Mar-2021	11-Mar-2021	10-Mar-2021	10-Mar-2021
VOC MS (W)	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021



CERTIFICATE OF ANALYSIS

SDG:	210306-26	Client Reference:	Report Number:	590544
Location:	Houghton-Le-Spring	Order Number:	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

General

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX 3



Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment

Site Name:	Field House Quarry Landfill		
Site Address:	Houghton Le Spring, Durham		
Completed by:	N Sugg	Version:	1
Date:	15-Nov-22		
Contaminant	Chloride		
Target Concentration (C_T)	34.1	mg/l	Origin of C_T: maximum up-gradient concentration

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparison with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).

Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.

Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.

Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.

Data carried forward from an earlier worksheet are identified by a light green background

It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note



Input Parameters (using pull down menu)

Contaminant	Chloride	from Level 1
Target Concentration	3.41E+01	mg/l from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state Equations in HRA publication

Approach for simulating vertical dispersion:

Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants:

Apply degradation rate to pollutants in all phases (e.g. field derived value)

Initial contaminant concentration in groundwater at plume core	C ₀	1.13E+02	mg/l
Half life for degradation of contaminant in water	t _{1/2}	9.00E+99	days
Calculated decay rate	λ	7.70E-101	days ⁻¹
Width of plume in aquifer at source (perpendicular to flow)	Sz	2.50E+02	m
Plume thickness at source	Sy	2.00E+00	m
Saturated aquifer thickness	da	1.00E+01	m
Bulk density of aquifer materials	ρ	2.50E+00	g/cm ³
Effective porosity of aquifer	n	2.40E-01	fraction
Hydraulic gradient	i	1.00E-02	fraction
Hydraulic conductivity of aquifer	K	3.70E+00	m/d
Distance to compliance point	x	5.00E+01	m
Distance (lateral) to compliance point perpendicular to flow direction	z		m
Distance (depth) to compliance point perpendicular to flow direction	y		m
Time since pollutant entered groundwater	t	1.00E+100	days

Parameters values determined from options

Partition coefficient	Kd	0.00E+00	l/kg	see options
Longitudinal dispersivity	ax	5.00E+00	m	see options
Transverse dispersivity	az	5.00E-01	m	see options
Vertical dispersivity	ay	5.00E-02	m	see options

Calculated Parameters

Groundwater flow velocity	v	1.54E-01	m/d
Retardation factor	Rf	1.00E+00	fraction
Decay rate used	λ	7.70E-101	d ⁻¹
Rate of contaminant flow due to retardation	u	1.54E-01	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C _{0D}	7.11E+01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	AF	1.59E+00	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer

Organic carbon partition coefficient

Entry for ionic organic chemicals (option)

Sorption coefficient for related species

Sorption coefficient for ionised species

pH value

acid dissociation constant

Fraction of organic carbon in aquifer

Soil water partition coefficient

Kd 0.00E+00 l/kg

foc fraction

Koc l/kg

K_{oc,i} l/kgK_{oc,i} l/kg

pKa fraction

foc fraction

Kd 0.00E+00 l/kg

Source of parameter value

Maximum recorded in down-gradient BHS

No degradation assumed

After site geometry and south-east flow direction

After aquifer characteristics (predom. fracture flow)

After HRA Section 2.3.1

Typical value for sandstone

Mean value, after Major Aquifer Properties

After HRA Section 2.3.2

Mean value, after Major Aquifer Properties

50m receptor

time variant options only

Longitudinal dispersivity

Transverse dispersivity

Vertical dispersivity

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 * x, az = 0.01 * x, ay = 0.001 * x

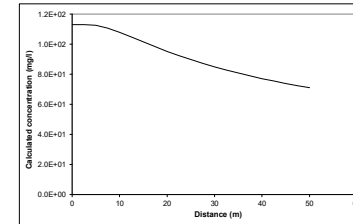
Xu & Eckstein (1995) report ax = 0.83(log₁₀x)^{0.414}; az = ax/10, ay = ax/100 are assumed

Enter value Calc value Xu & Eckstein m

ax 0.00E+00 5.00E+00 5.00E+00 m

az 0.00E+00 5.00E-01 2.68E-01 m

ay 0.00E+00 5.00E-02 0.00E-02 m



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action. Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state

From calculation sheet

Distance Concentration

mg/l

0 1.1E+02

2.5 1.13E+02

5.0 1.12E+02

7.5 1.11E+02

10.0 1.08E+02

12.5 1.05E+02

15.0 1.01E+02

17.5 9.82E+01

20.0 9.52E+01

22.5 9.24E+01

25.0 8.97E+01

27.5 8.73E+01

30.0 8.50E+01

32.5 8.28E+01

35.0 8.08E+01

37.5 7.89E+01

40.0 7.71E+01

42.5 7.55E+01

45.0 7.39E+01

47.5 7.25E+01

50.0 7.11E+01

Remedial Targets

Remedial Target	5.42E+01	mg/l	For comparison with measured groundwater concentration.
Domenico - Steady state			
Distance to compliance point	50	m	
Concentration of contaminant at compliance point	C _{0D} /C ₀	7.11E+01	mg/l Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99.

Site being assessed:	Field House Quarry Landfill
Completed by:	N Sugg
Date:	#####
Version:	1



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