

Maendy Quarry Submission of Improvement Condition 2 Initial Restoration Scheme for Maendy Quarry

Prepared by
Technical Operations - Landfill
Veolia
Norwood Industrial Estate
Rotherham Road
Sheffield
S21 2DR

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Maendy Quarry

1. Background

Maendy Quarry is located approximately 2km north of the centre of Church Village near Pontypridd in South Wales.

Maendy Quarry comprises of two discrete areas known as the Western and Eastern Quarries, separated by a single track rural lane (Maindy Road). The location is centered at NGR ST075 876.

The Western Quarry was landfilled between 1966 and closed in 1970. Rainfall related site drainage from the restored and vegetated landfill in the Western Quarry drains to the western boundary into a weir box and discharges to a local surface watercourse at the quarry perimeter. This discharge point is referenced MAE002 – A2.

Rainfall related site drainage and seepages in the Eastern Quarry flows across the exposed rock head before entering a marshy area. It then passes into a weir box prior to discharging to the local surface water network. This discharge point is referenced MAE001 – A1.

Drawing CE-MQ1458-DW01 shows the existing situation at the site and the two discharge points (MAE001 – A1) and (MAE002 – A2).

2. Permitting

On the 18th January 2018 an application was submitted to National Resources Wales (NRW) to vary and consolidate the water discharge Environmental Permits for Maendy Quarry as set out above. The application was submitted in order to consolidate the existing permits AN0236801 (East Quarry) and AN236802 (West Quarry), update and vary the discharge consent limits and provide site specific improvement conditions. The permit variation was determined on 19th July 2018 (Permit Number: AN236801)

The Permit as issued regulates the discharge of rainfall related site drainage arising from the Maendy West Quarry and site drainage from Maendy East Quarry. Four improvement conditions have been included in the Permit to assisting in developing an appropriate scheme for the restoration of the site with the intention of encouraging a general improvement of the discharges, noting they are both currently compliant with the permitted limits. Further details of how this improvement in the discharge will occur are set out in the following sections of this document.

Improvement Condition 1 (IC1) required an initial restoration design scheme to be submitted to NRW for review. This was required within six months of the determination of the permit - (before 19th January 2019). This was completed and approval to the design was confirmed by NRW via email correspondence dated 4th February 2019.

A meeting and site visit was then held with NRW on 23rd April 2019, to further discuss the initial restoration design, with a view of obtaining feedback from NRW following the visit to incorporate into the final design scheme required as part of Improvement Condition 2 (IC2).

3. Final Restoration Scheme

This submission acts to discharge the requirements of IC2, listed in Table S1.3 of the Permit (Ref: AN0236801). This document should be read in conjunction with the IC1 submission.

IC2 condition requires the following:

“Final designs for restoration scheme and an outline construction programme to be completed and approved by NRW 6 months following NRW review/finalising of IC1”

The design layout is set out on drawing CE-MQ1458-DW03a, with cross sections of the design set out on drawing CE-MQ1458-DW04. In order to complete this design, Keith Knox and Crestwood Environmental have continued to support in both the design which has included choices around the restoration material to be used.

The restoration scheme aims to compliment the local surroundings by using materials which aim to minimise the need for any hard engineering. The basis of the proposed approach is that there is an observed natural improvement in the water discharged through the existing marshy wetland area to the south of the Eastern Quarry. The scheme will seek to replicate, as far as practical, the conditions already observed on the site with a view to providing further natural improvement in the water discharged.

The scheme will aim to restore the exposed Eastern Quarry exposed rock head and enhance the Western area with a view of attenuating the flows of site drainage water using the restoration materials. The approach seeks to provide extended contact times between the water and the restoration material within these areas which should encourage a diverse community of organisms to build up on the media surfaces which are capable of breaking down or transforming a wide variety of substances. The types of materials selected to assist in achieving this will be a mixture of sandy soil wood chip and coarse aggregate material.

The sandy soil and wood chip media will help to support grassland scrub vegetation, with the aim to keep a wet zone at the base of the placed material described. The vegetation growth will also help to slow the flow of water through the restoration material via root growth within the soil. The coarse aggregate material used will also encourage organism build up on the rough surfaces as well as providing access tracks into and around the restored wetland areas for monitoring and any maintenance that maybe required. The performance of the material selected will be reviewed over time in accordance Improvement Condition 4 (IC4).

As discussed in the IC1 submission, the receiving water environment is likely to benefit most from the restoration scheme's ability to deal with lower flow conditions at the site. This is when the potential concentrations might be relatively higher compared to the higher flow conditions, where rainfall events of varying intensities generate significant flashy runoff as a response. In reviewing the recorded flow data, peak flow rates occur at both discharge points very quickly in response to rainfall events.

4. Western Quarry Final Restoration Scheme

Drawing CE-MQ1458-DW03a and cross section C-C on drawing CE-MQ1458-DW04 sets out the final restoration scheme for the Western Quarry surface.

An initial collection area will be installed using coarse aggregate placed to a depth of approximately 0.9m which will assist in regulating the site drainage flow ahead of it entering into the restored footprint. The aggregate feature will also act as an access route for restoration and any maintenance required in the future.

As discussed in Section 3, a mixture of sandy soil and wood chip will be used as restoration material within the collection area, this material will be kept to a shallow depth approximately 0.90m mainly due to the topography of the area. By also having relatively shallow material depths this should assist the water flowing through it to have access to some oxygen and good contact with the media during low to medium flow conditions. A shallow bund will be created around the outer edge of the collection area using in situ material, this will assist in routing the flow of site drainage water towards the sump and pumping area.

During low to medium flow conditions (flows ranging from 0m³ to 50m³/day), site drainage will be directed through the collection areas and then drain to a sump, before reaching discharge point MAE002. A pump installed within the sump will direct the water into the Eastern quarry reception area, with the water passing through the wetland area and the existing marsh area prior to discharge via MAE001.

During medium to high flow conditions (volumes above 50m³/day) the rainfall related drainage from the Western Quarry will be directed through an overflow prior to being discharged via MAE002, as it currently does. At these higher flow rates only limited benefit will be obtained from passive collection area.

As part of the restoration required in the Western Quarry, some supplementary works maybe undertaken to the existing the ditches that run along the quarry boundary. As a result of this, sampling point MAE002 may need to be re-established for a short period. These requirements will be reviewed at the time of construction.

5. Eastern Quarry Restoration Proposal

Drawing CE-MQ1458-DW03a and cross section A-A and B-B on drawing CE-MQ1458-DW04 sets out the final restoration scheme for the Eastern Quarry surface. As discussed in Section 3, the aim of the restoration scheme is to replicate the marsh wetland area located to the south of this quarry area.

During low to medium flows site drainage from the Western Quarry will be pumped into a reception area in the Eastern Quarry which will be constructed using coarse aggregate material. This water will then move through a peripheral coarse aggregate area, approximately 4 - 5m wide, which will run around the north-east edge of the quarry. This

area will act as a means to disperse the water into the wetland area, with preferential release points included along the channel into the wetland. Small soil bunds approximately 0.2m high will be included periodically along the length of the area to ensure flow through the aggregate material is normalised, this will reduce the chance of preferential pathways forming through the wetland into the existing marshland to the south. The aggregate area will allow access for occasional maintenance.

The existing route by which the site drainage flows through the Eastern Quarry will not be disrupted. This will minimise the requirement to remove/disrupt large amounts of vegetation. During restoration a temporary diversion of the site drainage maybe undertaken to facilitate soil placement over the exposed rock head. Material will also be placed along the western edge of the eastern quarry to assist in routing site drainage into the wetland area.

As with the Western Quarry, the material used for restoration and creation of the wetland area will be a mixture of sandy soil and wood chip. As discussed in Section 3, this material will help to support grassland scrub vegetation in order to mimic the existing wetland area. The aim of the design is to keep a wet zone at the base of this material. The depth of the restoration material will generally be no greater than 0.9m as described earlier.

During higher flow conditions rainfall related site drainage will flow into the restored wetland area and then outflow from the site into the existing marshland, as it currently does.

6. Outline Construction Programme

Table 1 sets out the outline construction programme for the restoration works required.

Following approval of IC2 by NRW, further discussions will be required with the Planning Authority to ensure the Planning Conditions and relevant pre-construction requirements are discharged, these include the following areas:

- Access and Traffic Management
- Bulk storage of fuel, oils and chemicals
- Drainage arrangements for the development
- Building materials approval
- Wildlife protection plan for construction
- Ecological mitigation and Management Plan
- Noise attenuation and odour measures

Some of these conditions will affect the timing of the work outlined in the construction programme set out in Table 1. An example of this might include actions stemming from the Ecological Survey and the Wildlife Protection Plan.

There is also a requirement to gain the necessary approval for the importation of the material onto the site for the restoration works, which could also affect the timing of the work outlined in the construction programme.

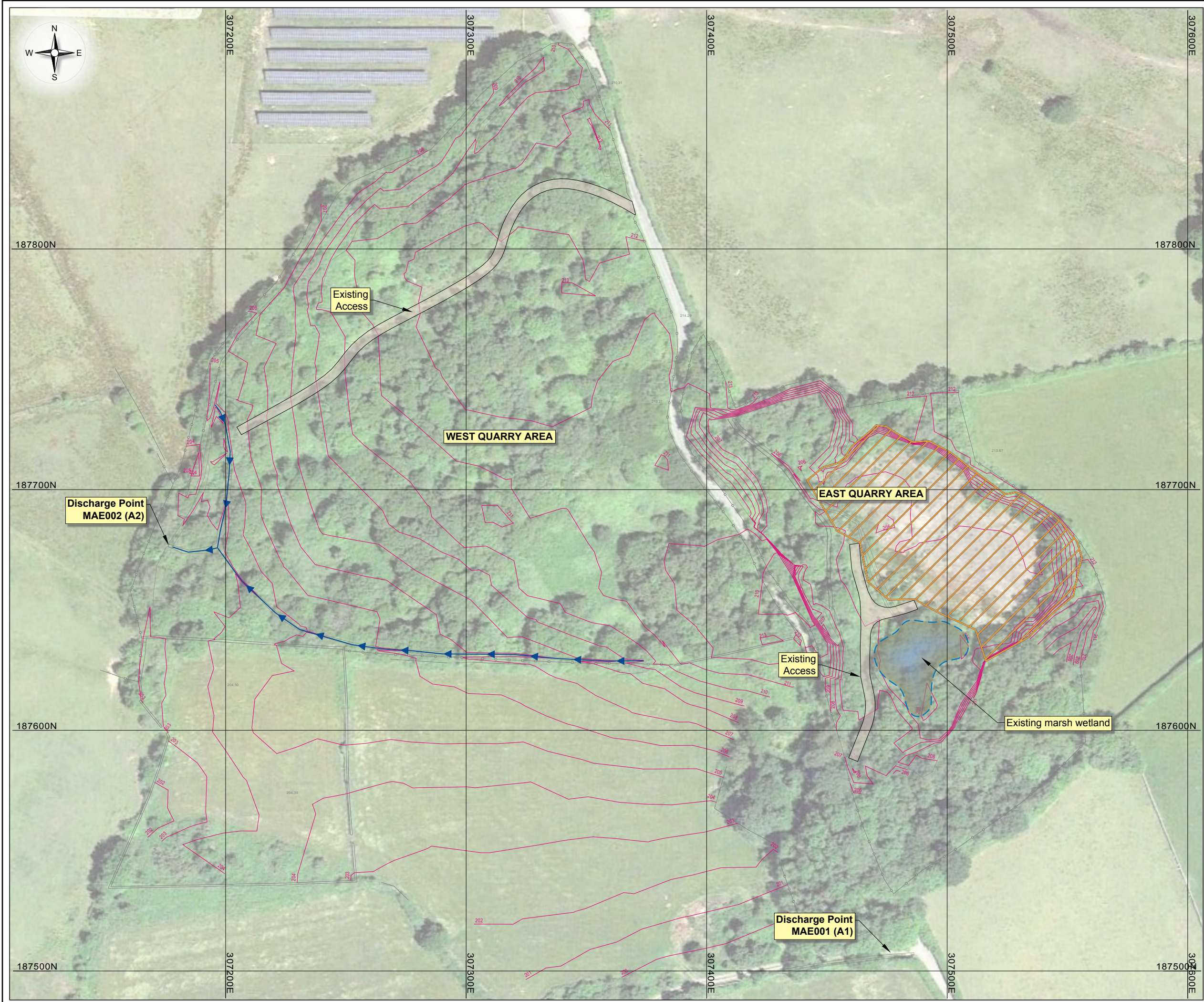
NRW will be kept informed of our progress in completing the Planning Conditions and as such there maybe a need to modify the outline construction programme, this will be agreed with NRW.

7. Summary

A final restoration scheme has been developed based on both the historic data and current site performance and is set out in this document and associated drawings.

The scheme proposes an approach to passively improve the quality of water discharged through the permitted discharge points by incorporating restoration measures to attenuate and route flows using a mixture of soily sand, wood chip and aggregate. This will assist in encouraging extended contact times between site drainage and media surfaces within these areas and encourage a diverse community of micro-organisms to build up in the restored surface. The micro-organisms are capable of breaking down or transforming a wide variety of substances, which will assist in improving the nature of the discharges.

An outline construction programme has also been completed, which is set out in Table 1 of this document. Following the approval of IC2 by NRW, the restoration scheme is to be built and commissioned no later than 21 months from approval of IC2, unless otherwise agreed with NRW, this is a requirement of IC3. As discussed in Section 6, there are a number of Planning Conditions that are required to be completed, which may affect the timing of the construction programme. There is also a requirement to gain approval for the importation of the restoration material. Therefore if the construction programme needs to be revised this will be agreed with NRW.



Legend:

- Existing rockhead area in East Quarry
- Access tracks
- Existing Site (Survey) Contours
- Existing ditch

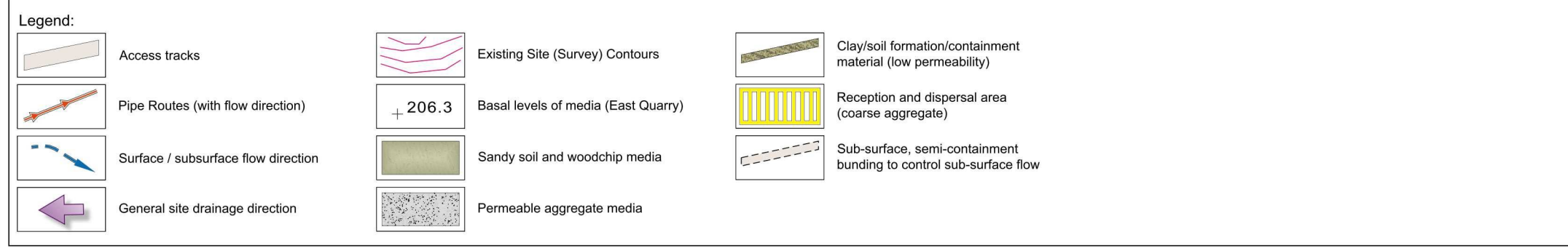
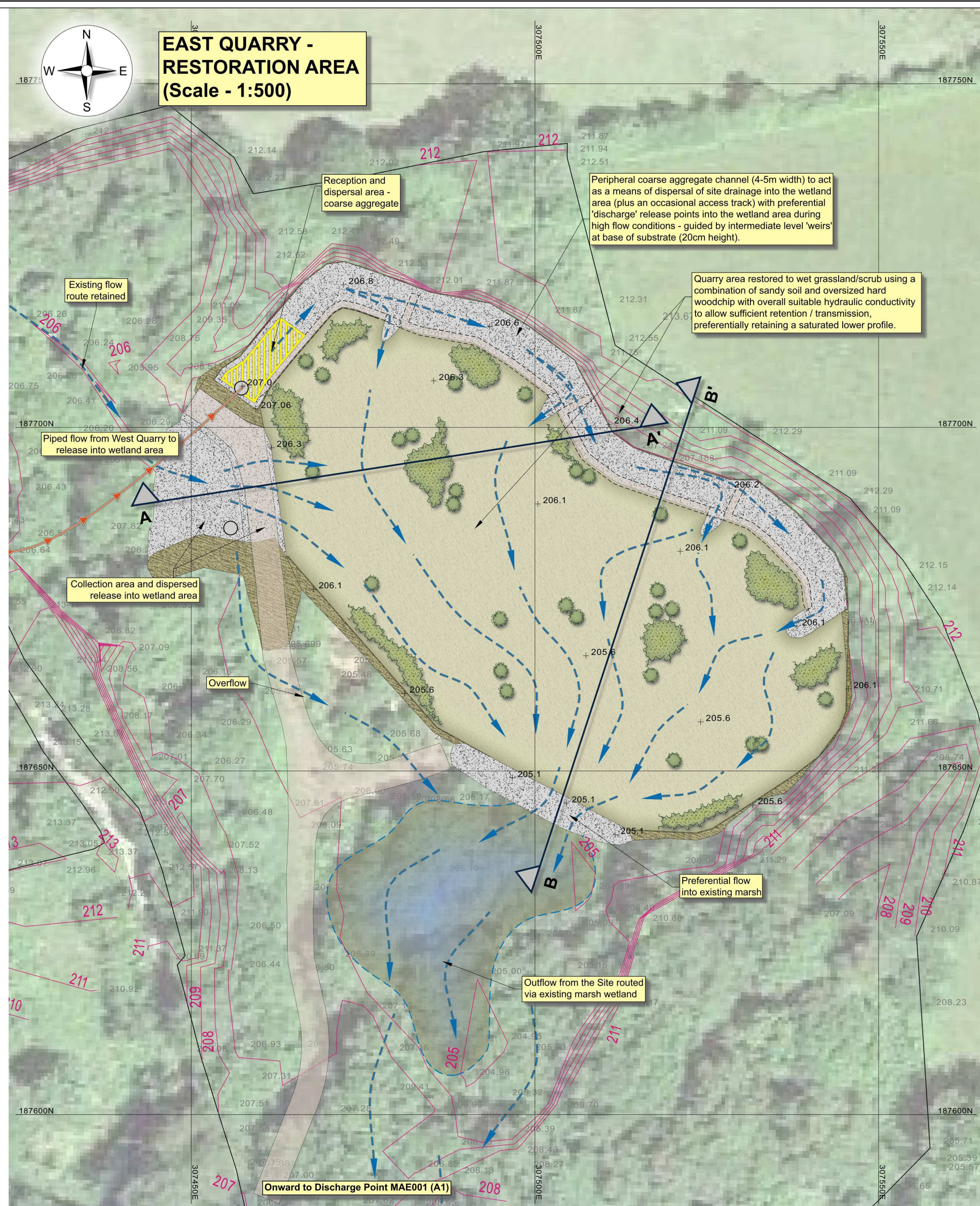
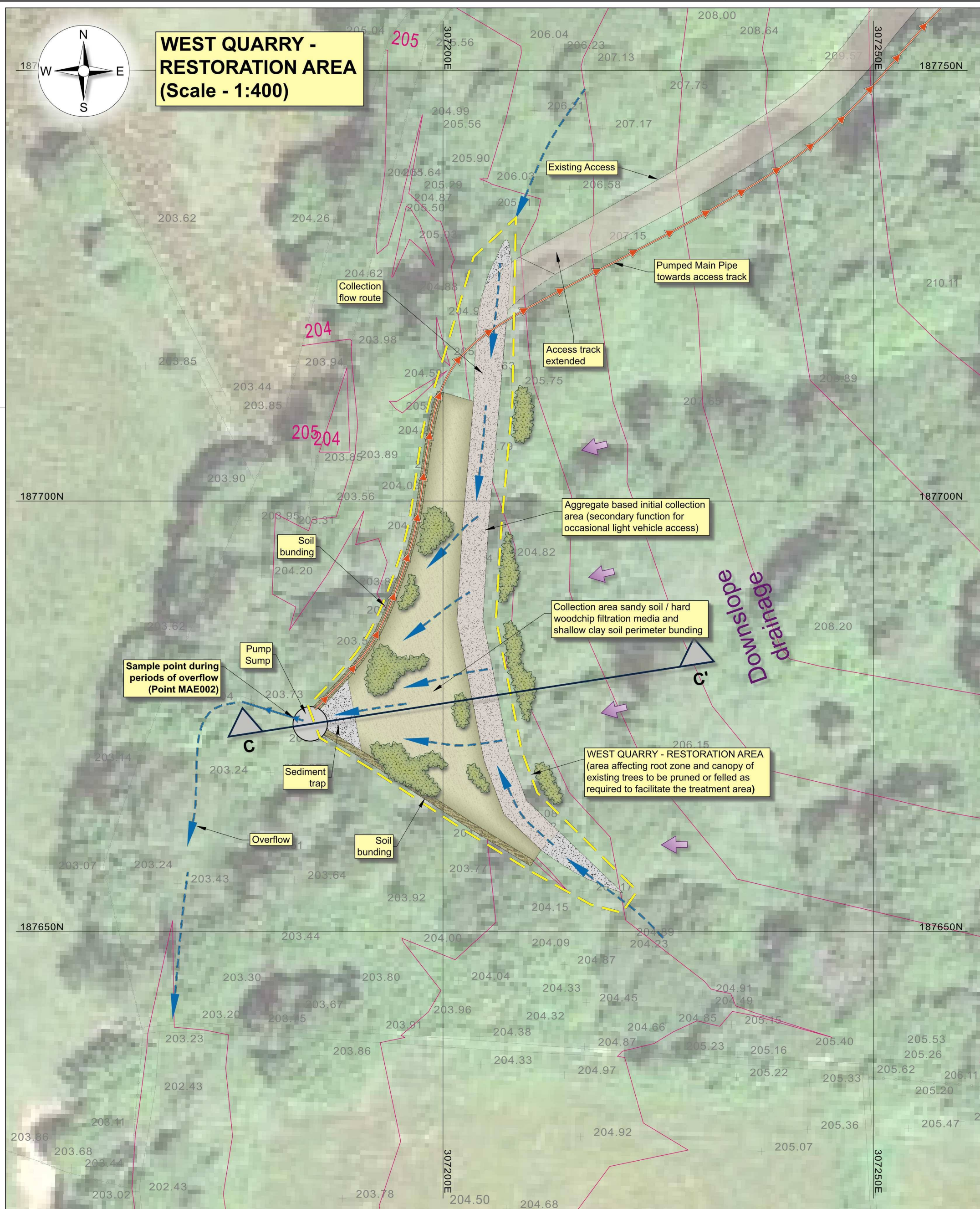
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| Final Revision: | Date: | Description: | By: | Chk: |

Consultant:
Crestwood Environmental Ltd
1-2 Nightingale Place
Penderford Business Park
Wolverhampton
West Midlands
WV9 5HF
Tel: 01902 229 563
www.crestwoodenvironmental.co.uk
info@crestwoodenvironmental.co.uk

Client:

| | | | |
|---|-----------------------|--------------------------------------|----------------------|
| Site: MAENDY QUARRY LANDFILL | | | |
| Drawing Title: Existing Situation | | | |
| Date: 16 Jan 2019 | Scale: 1:1,500 | Paper Size: A3 | |
| Drawn By: KJ | Checked By: CLIENT | Status: Final | Final Revision: - |
| CAD Ref: CE-MQ1458-DW01 - FINAL | | Drawing No: CE-MQ1458-DW01 | |



Notes:

Indicative layout only - may change depending on site conditions.

See Drawing no. CE-MQ1458-DW04a for cross sections.

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Consultant:
Crestwood Environmental Ltd
Units 1 & 2
Ridgeway Place
Preston Business Park
Wolverhampton WV9 5HF
Tel: 01902 624637
info@crestwoodenvironmental.co.uk
http://www.crestwoodenvironmental.co.uk/

Client:

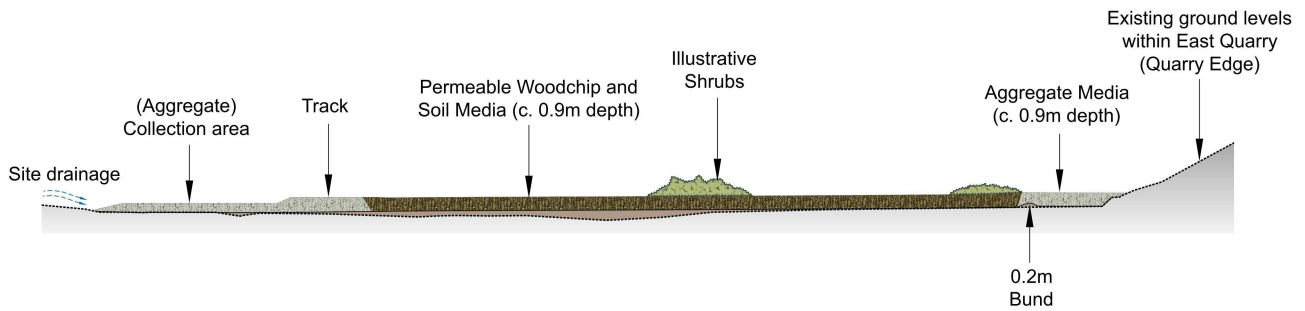
MAENDY QUARRY LANDFILL

West and East Restoration Scheme

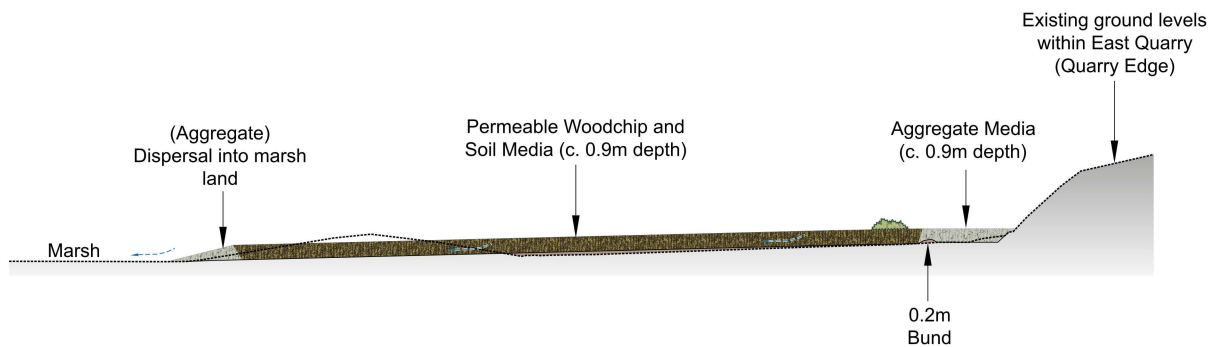
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| KJ | CLIENT | 30 Jul 2019 | As shown | A3 (594x420 mm) |

| Status: | Final Revision: | CAD Ref: | Drawing No: |
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| Final | b | CE-MQ1458-DW03b - FINAL | CE-MQ1458-DW03a |

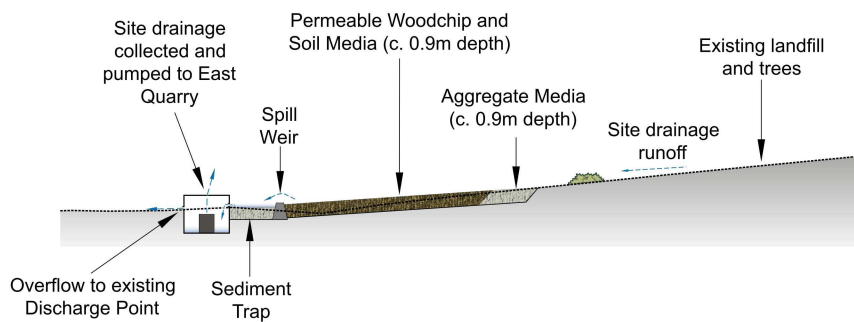
**Illustrative cross-section A-A' through restored East Quarry
(Scale 1:500)**



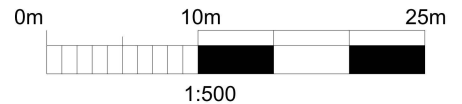
**Illustrative cross-section B-B' through restored East Quarry
(Scale 1:500)**



**Illustrative cross-section C-C' through restored West Quarry
(Scale 1:500)**



Based on indicative layout (Drawing no. CE-MQ458-DW03a) - this may change depending on site conditions.
All Dimensions to be checked on site and not scaled from this drawing.
This drawing is not for construction.
All services to be checked on site and not scaled from this drawing.



Consultant:
Crestwood Environmental Ltd
1 & 2 Nighthale Place
Penderford Business Park
Wolverhampton
West Midlands
WV9 5HF
Tel: 01902 229563
info@crestwoodenvironmental.co.uk
http://www.crestwoodenvironmental.co.uk/



Client:



Refer to drawing CE-MQ1458-DW03b for
cross-section locations

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| Final Revision: | Date: | Description: | By: | Chk: |
| Site: MAENDY QUARRY LANDFILL | | | | |
| Drawing Title: West and East Restoration Scheme - Illustrative Cross Sections | | | | |
| Drawn By: AC | Checked By: KJ | Date: 30 Jul 2019 | Scale: 1:500 | Paper Size: A4 (210×297 mm) |
| Status: Final | Final Revision: a | CAD Ref: CE-MQ1458-DW04a - FINAL | Drawing No: / Client Ref: CE-MQ1458-DW04 | |

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| OUTLINE CONSTRUCTION PROGRAMME - MAENDY QUARRY RESTORATION | | |
| | | |
| 2019 | Element | Description |
| 1 | Completion of Improvement Condition 2 | Submission of IC2 for approval from NRW. To be completed within 6 months following approval of IC1 (approved 4th February 2019) |
| 2 | Planning Approval | Following approval of final restoration scheme from NRW, the scheme will be sent to the Planning Authority for review inline with the present Planning Permission and conditions set out in the Planning Permission for comments. |
| 3 | Completion of ecological requirements | Ecological survey to be completed in line with the Planning Permission Requirements. These are as follows: 1. Development of Wildlife Programme 2. Ecological Mitigation Management Plan 3. List all other conditions |
| 4 | Source suitable restoration material | At present it is envisaged that the following volumes of material will be required to complete the Eastern and Western restoration Scheme, these may be subject to change following site investigation to understand whether in situ material can be utilised : 1. Bund Material (soily/clay) - 730m3 2. Aggregate Material - 1,035m3 3. Media Material (sandy soil and Woodchip) - 3,770m3 |
| 5 | Seek approval for importation | Following the finalisation of the materials required (see point 4) for the restoration, approval for the importation of the material for restoration will be required. |
| 6 | Removal of vegetation | Following completion of the ecological requirements (Point 3), any vegetation identified as needing to be removed from the Eastern and Western Quarry improvement works will be felled and chipped |
| 2020/2021 | | |
| 7 | Completion of ecological surveys | This is subject to any recommendations from the completion of Point 3. |
| 8 | Removal of vegetation | Subject to Point 3 and Point 6, any further removal of vegetation required in advance of the restoration works will be completed |
| 9 | Access track | •Access track to be extended in the Western Quarry, including a turning area will be installed further up the access track towards the Western Quarry entrance to aid vehicle movement. •Access track into Eastern Quarry is already in place, but some minor topping up may be required |
| 10 | Importation of material | Suitable material will be sourced and imported onto the sites. Some stockpiling may be required, where possible material will be delivered and placed immediately |
| | Restoration of western quarry | |
| 11 | collection area | Creation of initial collection area as per drawing ref: CE-MQ1458-DW03a & CE-MQ1458-DW04 |
| 12 | Installation of pumping infrastructure | Construction of a pump sump and settlement trap as per drawing ref: CE-MQ1458-DW04 section C-C |
| 13 | importation of material | A shallow clay bund will be created around the outer edge of the collection area, this may be created using in situ material. This will route the flow of site drainage water towards the sump and pump area. Restoration of the collection area with Sandy soil and hard woodchip filtration material to circa 0.9m depth |
| 14 | Pipework and Electrics | Install pipe and electric feed cable. The pipework will run from the Western Quarry to the Eastern Quarry reception area. The electric feed will run to the site's mains connection located at the Eastern Quarry entrance. |
| 15 | Pump and Control | Installation of pumps and control to facilitate pumping site drainage water from the Western Quarry to the Eastern Quarry reception area |
| 16 | Commissioning | Completion of a pumping trial to confirm system is operating and functioning correctly |
| | Restoration of eastern quarry | |
| 17 | Soil Import | Soil will be placed to assist in routing site drainage into the wetland area |
| 18 | Divert flow during restoration period | During the restoration of the eastern quarry surface a temporary diversion of the site drainage will be undertaken to facilitate soil placement over the exposed rock head. |
| 19 | Restoration Material | Importation of restoration material to regulate the base of the quarry as per drawing ref: CE-MQ1458-DW04 Section B-B and A-A |
| 20 | Install peripheral coarse aggregate area and access track | import and place material to form the aggregate area as per drawing ref: CE-MQ1458-DW03a & CE-MQ1458-DW04 |
| 21 | Install wetland media material | Place restoration material onto the base of the quarry as per drawing ref: CE-MQ1458-DW03a & CE-MQ1458-DW04 |
| 22 | Flow Routing | Remove the temporary diversion. Initiate pumping of surface water from the Western Quarry across the Eastern Quarry wetland. |