MORGAN SINDALL

MORGAN SINDALL

4M3000 – PEAK EAST VIP

16866-MSI-0205-XX-RP-W-050006

SURFACE WATER MANAGEMENT STRATEGY

CLIENT

NATIONAL GRID

Management System

Plan

Morgan Sindall business unit / region:			**Energy | Water**
Project name:			**Peak East VIP**
Project no.:			**4M3000**
Customer:			**National Grid**
Location:			**Dunford Bridge Car Park, Dunford Bridge, S36 4TF**
Revision no.:	**03**	**Date:**	**25th March 2021**

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1. Introduction

1.1 Project Background

The project is located within Dunford Bridge in close proximity to the eastern entrance of the Woodhead Tunnel, within the administrative boundaries of the Peak District National Park Authority (PDNPA) and Barnsley Metropolitan Borough Council (BMBC).

The project aims to reduce the visual impact of National Grid's Overhead Line (OHL) in and around the village of Dunford Bridge, by removing a section of OHL and replacing it with underground electric cables.

1.2 Project Outline

The project includes the following principal elements which are described in detail in the Environmental Assessment Report;

- Removal of the existing Dunford Bridge Sealing End Compound (SEC) to a depth of approximately 1.1m below ground level;
- Removal of the existing section of OHL, including eight pylons (one of which will be replaced, see replacement tension pylon below) and approximately 2km of OHL.
- Underground cabling of approximately 1.8km along the Trans Pennine Trail (the Cable Corridor) from the entrance of the Woodhead Tunnel to the proposed new SEC at Wogden Foot;
- Construction of a new SEC and replacement tension pylon (with the circuits terminating onto two full tension gantries within the SEC) to connect the Cable Corridor to the remaining existing OHL. A permanent access off the Trans Pennine Trail will be required to the proposed SEC. The proposed SEC is located within Wogden Foot Local Wildlife Site (LWS) and the replacement tension pylon (Pylon 4ZO157R) is located approximately 40m north east of the SEC on the northern side of the River Don (outside Wogden Foot LWS).
- Jointing of the new underground cable to the existing cable within the Woodhead Tunnel;
- Construction and removal of temporary access roads to the pylons and along the Trans Pennine Trail to the SEC at Wogden Foot;
- Construction and removal of a temporary Trans Pennine Trail diversion (TPT-d) for use during the construction phase of the Proposed Project. The diversion will involve the use of two bridges, one being a permanent replacement of an existing bridge; the other a temporary bridge to cross over the River Don. The diversion is proposed in farmland immediately north of the River Don. Following construction, a stretch of approximately 410m of the diversion surface will be retained permanently to the east and west of the replacement permanent bridge; and
- Temporary laydown areas, access tracks and site offices to facilitate construction activities.

1.3 Planning Status

Planning permission for the Sealing End Compound, Trans Pennine Trail diversion (including two bridges) and Northern Access Road was approved at Committee in May 2020 by Peak District National Park Authority (Planning Application Ref NP/B/0819/0885 – Decision Notice dated 08.10.20) and approved by Barnsley Metropolitan Borough Council at Committee (BMBC) in June 2020 (Planning Application Ref 2019/1013 - Decision Notice issued 21.09.20), subject to a number of planning conditions and the completion of a Section 106 legal agreement relating to Biodiversity Net Gain.

Planning Condition 20 from the BMBC Decision Notice states:

Prior to the commencement of any works on site, a strategy for the control of surface water run-off during the construction works shall be submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be implemented and retained throughout the construction period.

Reason: To prevent pollution of the water environment in accordance with Local Plan Policy Pol1.

1.4 Document Purpose

This document has been prepared in order to fulfil the requirements of Condition 20 of the planning permission as detailed in Section 1.3 above, and provides:

- The overarching strategy for the management of water on the scheme for those areas that fall under the planning approval, which has been reproduced from the Construction Environmental Management Plan (CEMP) (16866-MSI-1405-XX-PL-W-050000); and
- An initial overview of the proposed surface water drainage designs for the Northern Access Road and Trans Pennine Trail Diversion (TPT-d).

2. Water Management Strategy

The following sections identify known characteristics and best practice principles with regard to water management on the project.

2.1 Site Drainage

Drainage systems can act as rapid pathways for the spread of pollutants. Small quantities of pollutants such as oil and sediment can spread over large areas and cause significant harm.

Best practice measures to be implemented include:

- Construction will not be undertaken during extreme wet weather where erosion of sediments and risk from flooding may increase and where there is a risk of structural damage to soils during handling.
- All soils will be stored as far away from watercourses as practical (not within 10m). Stockpiled soils will be protected by appropriate measures, for example, membranes, spraying or seeding to reduce the risk of windblown dust, surface water run-off and to reduce the risk of overland migration of silt and sediment to surface waters.
- Any potentially contaminated soil will be stored on an impermeable surface and covered to reduce leachate generation and potential migration to surface waters.
- Where it is necessary to strip and store topsoil in a floodplain all year around, methods will be employed to ensure that the soil is protected, and flood waters are not impeded.
- Geotextile will be used on the ground in the immediate vicinity of watercourse/drain crossings to reduce damage to the surrounding ground and vegetation and reduce erosion, where required and practically possible.
- Clay bungs or other vertical barriers will be constructed within trench excavations where deemed necessary to prevent the creation of preferential drainage pathways or to prevent the creation of preferential migration pathways for contaminants (where suspected).
- Regular monitoring will be put in place to ensure that the site drainage features function as intended.

2.2 Foul Water Drainage

Other effluents may be produced that need to be properly managed and controlled in order to prevent contamination of surface water or groundwater. It will be ensured that:

- Foul effluent from the site welfare and offices in the main compound at Dunford Bridge will be discharged directly to the existing foul system with agreement from the Client or local sewerage undertaker, where possible.
- Where required, foul effluent from other welfare facilities shall be collected and removed from site by licensed waste contractors, usually via tanker. The foul effluent container will be subject to regular

inspection and a maintenance and emptying schedule as recommended by the manufacturer/installation company.

- Washing of vehicles or equipment using detergents will not be permitted on-site. Where washing is required for purposes of biosecurity management, this will be undertaken at designated locations and supervised to ensure effluent is contained for controlled disposal.

2.3 Groundwater & Dewatering (Pumping from Excavations)

Groundwater must be protected from contamination and cannot be abstracted (pumped) in significant volumes without permission and controls in place. The ground investigations undertaken on the site have identified the following key characteristics with regard to groundwater at the site:

- The site is not located within a groundwater Source Protection Zone (SPZ).
- Shallow and perched groundwater was identified along the TPT cable corridor, but more significant groundwater ingress may be encountered below 1.0m below ground level (bgl), which may require dewatering. Additionally, dewatering may also be required for the tower foundations (Pylon 4ZO157R).
- Leachable metals have been identified in groundwater, and as such may not be suitable for soakaway due to the presence of dissolved phase contamination. Additionally, it may be necessary to construct barriers within trench excavations to prevent the creation of preferential drainage/migration pathways for contaminants (where suspected).

Pumping operations and working in water lead to the largest number of environmental incidents for the construction industry. Best practice measures for managing this risk include:

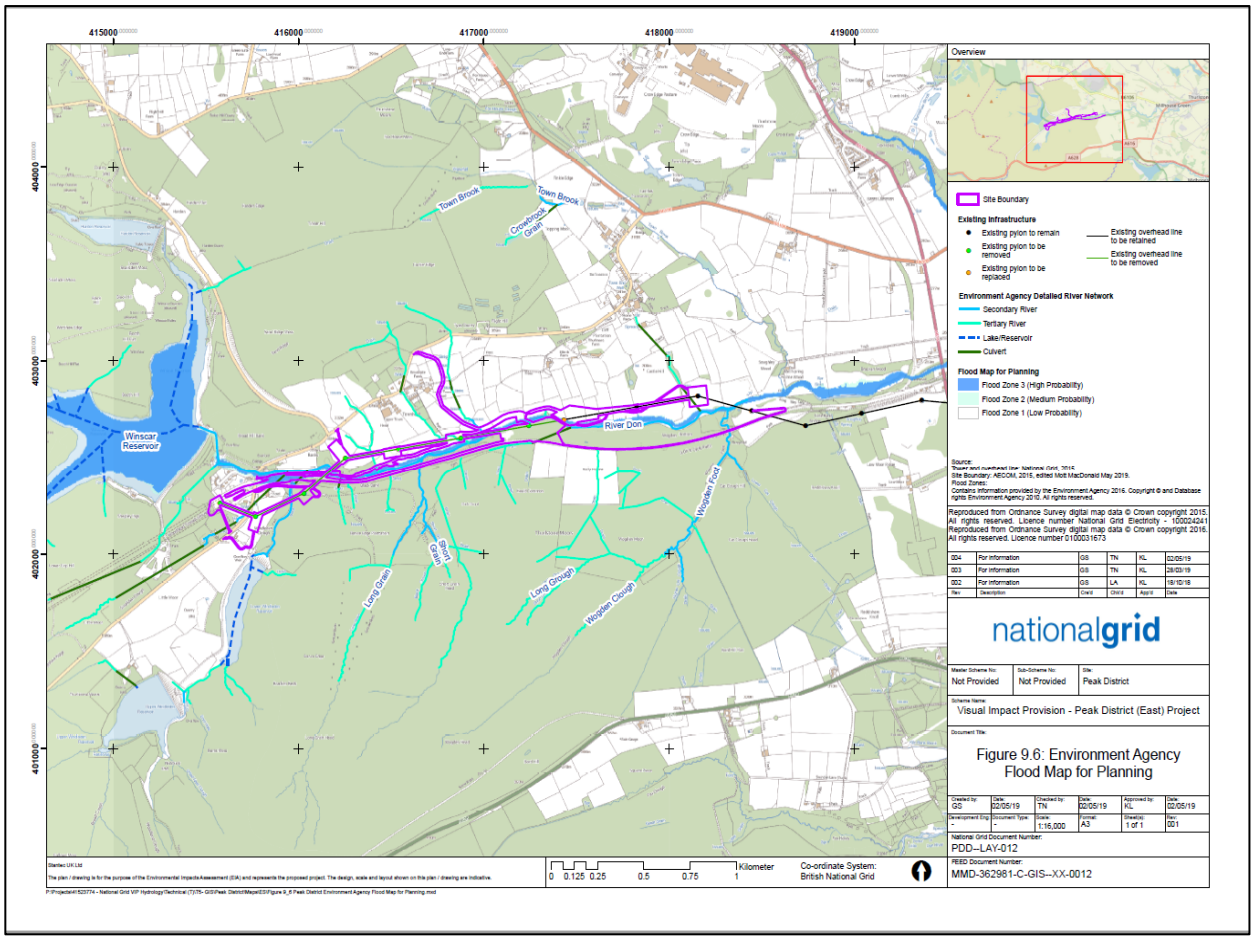
- To prevent the ingress of surface water and the disturbance of clean water wherever possible.
- Where groundwater is suspected (an excavation cannot be easily emptied and continually refills), the project is limited on how much groundwater can be removed, with 50m3 per day over a period of 6 months being the prescribed exemption from requiring an Abstraction Licence. A simple ‘bucket test’ will allow approximate volumes / flow rates to be estimated.
- Discharges (including potentially uncontaminated surface water run-off) will require a permit from the Environment Agency (for discharges to Controlled Waters, including rivers, other watercourses and soakaways) or the local sewerage undertaker (for discharges to sewer). Discharges will not be made without prior consent from the EA or sewerage undertaker.
- Silty water will be passed through a filtration or settlement system of appropriate capacity before discharge to the receiving medium.
- Water known to be contaminated with hydrocarbons or other hazardous substances will be handled in accordance with a specific Risk Assessment and Method Statement (RAMS).
- The production of a task-specific Permit to Pump (PTP) which include details of inspection, equipment, location of dewatering and discharge, consent conditions and any applicable monitoring.

2.4 Flood Risk

A Flood Risk Assessment (FRA) has been carried out and identifies mitigation measures to reduce flood risk during the construction phase of the project. The project has been informed by results of flood risk modelling and has been designed to avoid, where possible, areas at risk of flooding. The FRA proposes the following general mitigation measures which will be built into the detailed design and implemented on site:

- Temporary attenuation storage, infiltration drainage, and sediment trapping techniques as appropriate and should be driven by source control techniques where possible;
- Construction will not be undertaken during extreme wet weather where possible. Local and national weather forecasts will be checked, and the site will sign up to Environment Agency Flood Alerts and Warnings;

- Following the completion of all construction works, the land within the working width will be fully reinstated to its former condition, and where possible all reinstated surfaces will have the same runoff properties and elevation as existing or as agreed with landowners and stakeholders in advance (this will include the reinstatement of drainage ditches and existing culverts) and replacement of community/recreational facilities impacted by the Proposed Project;
- Where possible, soils will be stored at least 10m away from watercourses, and outside of areas of floodplain. Where this is not possible, gaps will be provided in stored topsoil to prevent the impoundment of flood waters (all year around); best practice measures will be applied where required to ensure that stockpiled soil will not be eroded/ transported by overland flow and will not enter any water bodies (such as berms, vegetated strips and silt traps will be included where required).
- Permanent surface water/ agricultural drains will be re-installed to reinstate any pre-existing field drainage systems to pre-construction condition. All reinstated channels will have the same hydraulic properties as existing and temporary and permanent structures (culverts, flumes) should be appropriately sized except when alternative options, have been discussed and agreed with the Lead Local Flood Authority;
- The monitoring of flows in watercourses when crossing during the construction phase to avoid impeding flow. This can take the form of regular visual inspections of the temporary crossings. The visual inspections should check that the water levels on both the upstream and downstream faces of the temporary crossings remain similar throughout the duration of the crossing. This will help to confirm that each temporary crossing has been appropriately sized. The visual inspections should also check that each temporary crossing does not become blocked by debris and should be used to trigger immediate remedial action in the event of debris accumulation;
- All bridge crossings of the River Don, whether permanent or temporary, will be designed to the 1:100-year flood level;
- Appropriate signage along the Trans Pennine Trail diversion will be deployed to warn users of the potential flood risk in certain areas from the River Don, from overland flow (surface water sources) and from groundwater;
- All above ground assets will include a 300mm freeboard allowance to allow for uncertainties in modelling and mapping of flood risk areas; and
- Under the agreement/direction of BMBC, temporary closure of the Trans Pennine Trail diversion will be considered in case of flooding.
- Details of emergency evacuation plans in the event of a flood event will be included in the Emergency Response Plan (16866-MSI-1405-XX-PL-W-050003).



2.5 Consented Activities

Watercourses within and impacted by the project are defined as Ordinary Watercourses. A number of activities will require Ordinary Watercourse Consent under the Land Drainage Act 1991, for which Consent is required from the Lead Local Flood Authority (BMBC). These are currently likely to include:

- The installation of a permanent bridge on the Trans Pennine Trail Diversion (Jenga Bridge/Bridge 1);
- Crossing the watercourse on the Trans Pennine Trail Diversion (Culvert 1);
- Re-routing and crossing the watercourse in the field with Tower 159 including potential drainage works between spoil heaps on Trans Pennine Trail Diversion;
- Installation of a temporary bridge across the River Don to carry the Trans Pennine Trail Diversion (Bridge 2); and
- Management of the ditch on the existing Trans Pennine Trail.

It shall be ensured that conditions or monitoring required as part of these consents, once granted, will be adhered to.

With the exception of the ditch on the TPT, an Approval in Principle (AIP) shall be obtained from BMBC for each crossing which will be used by members of the public. The proposer must receive endorsement of the AIP before proceeding with any design, subject to the planning permission. The completed design cannot be implemented until Barnsley MBC is in receipt of certified confirmation that the implementation documents are accurate and fully in compliance with the requirements of the AIP.

Other consents may be required for water activities once construction methodologies are confirmed.

3.0 Drainage Design Principles

The TPT-d has been designed for a 1:100 year rainfall event and the Northern Access Road for a 1:10 year rainfall event, both of these have included a 10% allowance to account for global warming. The designed rainfall intensities have been compared to local MET Office rainfall data and found to be comparable or larger and therefore acceptable.

The drainage designs are described in the following sections, with drawings available as Appendix A.

3.1 Northern Access Road

The philosophy for drainage design on the Northern Access Road has been produced in order to minimise the amount of silt picked up by rainwater, to attenuate and direct flows as far as possible within the site constraints, and to treat water prior to discharging.

Minimising Silt

Silt will be minimised through a series of protective measures including:

- Specifying fill materials which are low in fines.
- Designing dust free top surfaces composed of concrete for gradients over 10% and road planings for gradients below 10%.
- Directing water flows into drainage ditches to the side of the haul road as soon as possible to avoid water running through stone and collecting silt.
- Protecting construction bunds with erosion matting to prevent erosion.

Attenuating and Directing Flows

Rainwater will be directed off the haul road by designing appropriate falls and constructing embedded timber water breaks angled towards v shaped drainage ditches (v-ditches). On slopes, removed topsoil will be formed into bunds along contours at 25m intervals adjacent to the v-ditches to hold surface water providing attenuation and slowing the rate at which water flows downhill along the v-ditches. At the northern end of the haul road, soakaway pits will be installed to further attenuate flows and allow natural return of water into the ground over time.

Water from the Northern Access Road will flow downhill along the v-ditches into an attenuation pond situated between the proposed Northern Access Road and Trans Pennine Trail Diversion. Weirs will be installed along the base of the attenuation pond to slow water flow down and allow silt to settle. The attenuation ponds will be drained using filter drains passing below the Trans Pennine Trail Diversion discharging onto the slope down to the River Don.

3.2 Trans Pennine Trail Diversion (TPT-d) from Dunford Bridge to the Temporary Bridge

The philosophy for drainage design on the TPT Diversion (TPT-d) follows the same core principles as the Northern Access Road.

Minimising Silt

Silt will be minimised through a series of protective measures including:

- Specifying fill materials which are low in fines
- Specification of lowest risk surface material which complies with the surface identified on the planning application (hoggin).
- Protecting construction bunds with erosion matting to prevent erosion.

Attenuating and Directing Flows

Rainwater falling onto the TPT Diversion surface will be directed to the northern side with an appropriate fall towards v shaped drainage ditches (v-ditches). The v-ditches will be sized to collect flow from the Diversion and the catchment area to the north. Soakaways will be constructed at 20m centres to collect and attenuate water from the v-ditches. These will be drained using filter drains passing below the TPT Diversion discharging onto the slope down to the River Don.

At two locations along the Diversion route there are existing natural streams. At these locations, pre-cast concrete pipes or culverts will be installed to divert the existing flows underneath the TPT. Any exposed faces will be protected with erosion matting in these areas.

3.3 Trans Pennine Trail Diversion (TPT-d) from the Temporary Bridge to the Existing TPT Behind Wogden Foot and Cable Sealing End Compound

For the TPT-d south of the river from 1560m – 1728m (end of the TPT-d) and the Cable Sealing End Compound, the area will be relatively level and therefore minimal runoff is expected. From 1500m – 1560m chainage the TPT-d goes up the natural slope and will have an approximate 11% gradient. The natural catchment of surface water expected to run over this area of the TPT-d is limited and therefore the volume of surface water expected is minor and should be suitable for site to manage using siltation fencing, matting and sandbags in areas adjacent to the road to impede any surface water flow, taking due cognisance to the environmental sensitivity and constraints of the area. In addition, the tree protection area is downslope from the TPT-d along this section and will provide some natural dispersion and filtration of surface water and sediment.

4.0 Emergency Provisions

Although every effort will be made to contain and treat water, and clear water is expected at all discharge points, it is only during the construction phase that actual water flows within the system can be monitored, and there may be instances, such as during unprecedented rainfall events, where the drainage system is unable to function as intended.

In these circumstances, in order to ensure protection to the River Don, it may be necessary for additional emergency control measures to be utilised, some of which will need to be deployed outside the planning red line boundary, depending on the positions and nature of the water flows. The drawings within Appendix A identify the approximate location of these measures.

It is anticipated that these measures will only be used reactively and will only be in place on a temporary basis, until normal operating conditions/flows return.

These measures may include:

Within Red Line Boundary

Silt Treatment System – A platform is proposed at the eastern end of the attenuation area within the red line boundary to locate a silt treatment system which will be used in the event that the system becomes overwhelmed. This will allow localised pumping from the attenuation ponds.

Outside Red Line Boundary

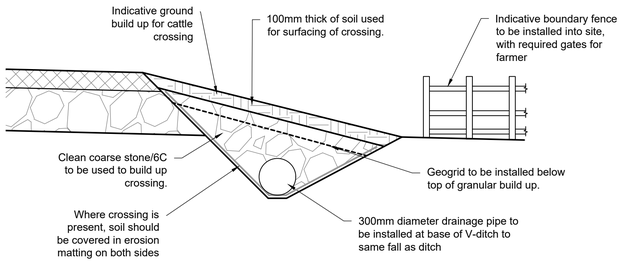
Silt fencing - installed at any points where there is risk of water escaping from the Northern Access Road onto neighbouring land. It may also be used to contain silt deposits in the event of very high rainfall events if water at discharge points is found to not be adequately free of solids.

Silt mats – Guided channels could be created at discharge points directing water through a series of silt mats in the event of very high rainfall events if water at discharge points is found to not be adequately free of solids.

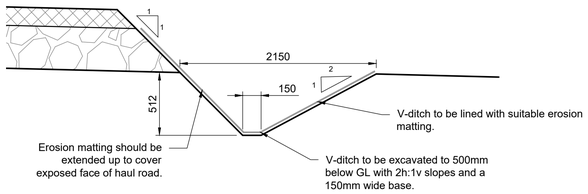
Sandbags - to help control the surface water flow and encourage deposition of sediments.

The procedures to be followed in the event of an emergency scenario will be outlined in the site's Emergency Response Plan (16866-MSI-1405-XX-PL-W-050003).

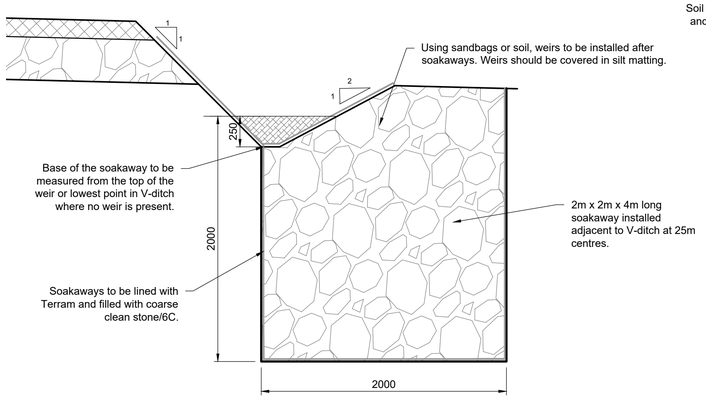
Appendix A **Drainage Drawings**



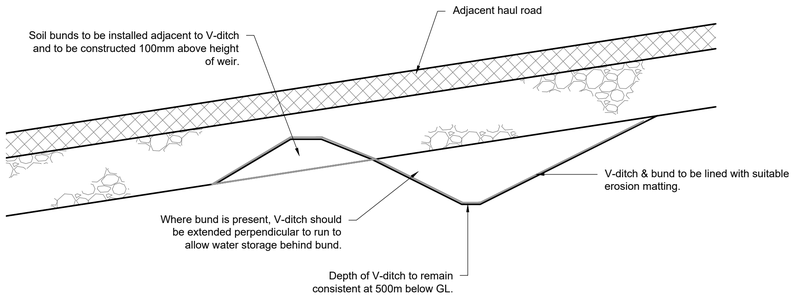
Detail 7 - Farmer Crossing
Scale 1:25



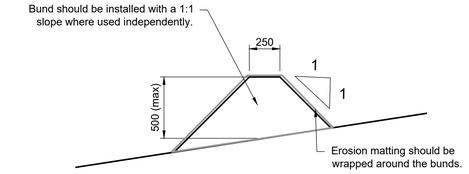
Detail 1 - Typical section of V-ditch
Scale 1:25



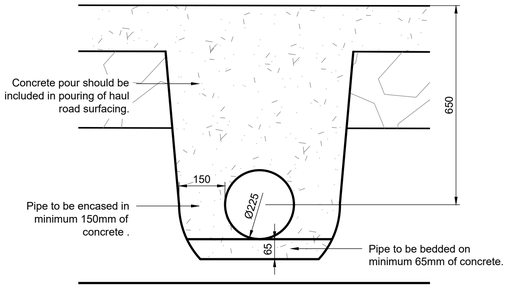
Detail 2 - Typical section of Soakaway
Scale 1:25



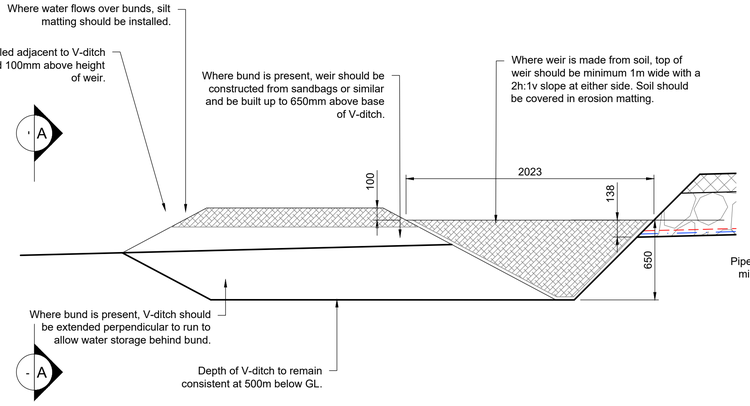
Section A-A - Typical bund
Scale 1:25



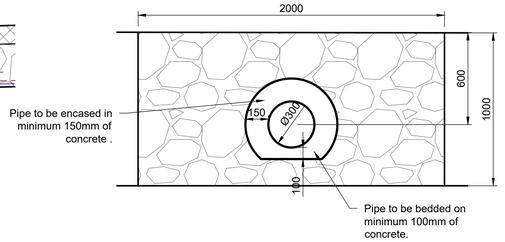
Detail 4 - Typical bund
Scale 1:25



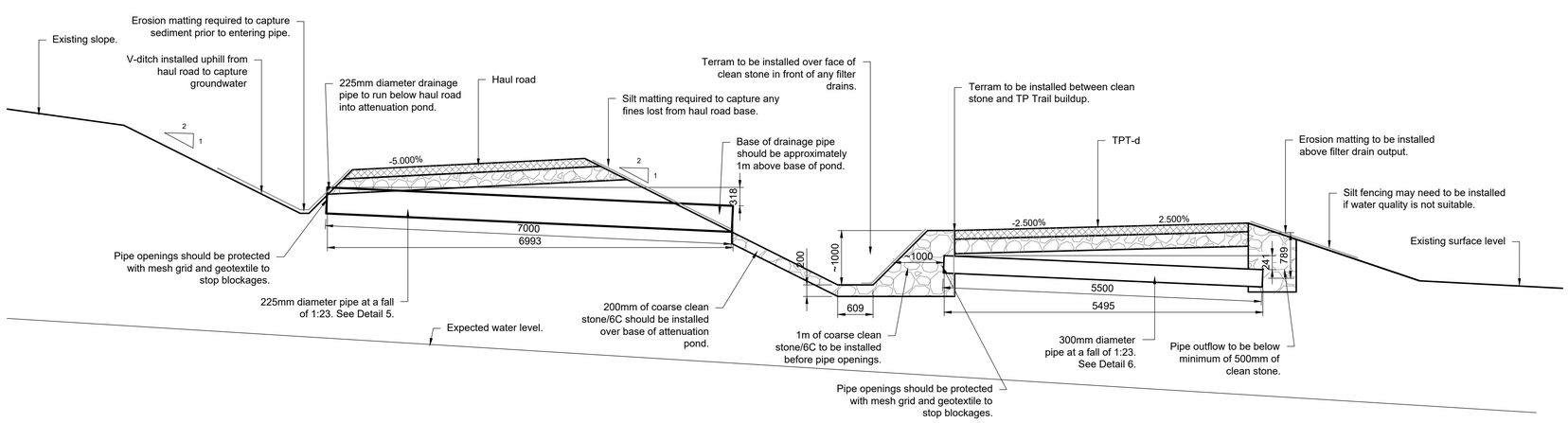
Detail 5 - Drainage to attenuation
Scale 1:10



Detail 3 - Typical section of Soil bund with V-ditch
Scale 1:25



Detail 6 - Filter drainage
Scale 1:25



Section B-B at 650m chainage
Scale 1:25

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
Residual Risks Associated With The Types Of Works Detailed On This Drawing

General
1) Generic Hazards and Risks, such as working at height, confined spaces, working with hazardous materials etc. have not been identified.
2)Significant residual risks have been identified. These are not necessarily those that involve the greatest risks but those (including health risks) that are not likely to be obvious, are unusual, or are likely to be difficult to manage effectively.
3) It is assumed that all personnel are competent to undertake the works shown on this drawing.
4) It is assumed that appropriate PPE will be worn as identified in the risk assessment of the construction method statement for these works.
5) It is assumed that proprietary equipment, plant, products and materials will be used in accordance with the manufacturer's / suppliers instructions and Materials Safety Data Sheets.

Construction	
C1	Pipe outflows should be above designed water level.
C2	Erosion matting to be used to protect V-ditches and bunds in areas of high flows.
C3	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Cast in timbers to be inspected regularly and if found to be worn down, should be replaced.
M4	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M5	Erosion & siltation mats to be cleaned regularly.
M6	Site to implement and manage suitable controls at farmer crossings to ensure no risk of collisions.
Decommissioning and Demolition	
D1	N/A
Hold Points (to be implemented before construction can commence)	

Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	No

Notes:
1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29302
   - 1.2. 16866-MSE-0703-XX-DR-X-B29303
   - 1.3. 16866-MSE-0703-XX-DR-X-B29304
   - 1.4. 16866-MSE-0703-XX-DR-X-B29305
   - 1.5. 16866-MSE-0703-XX-DR-X-B29306
   - 1.6. 16866-MSE-0703-XX-DR-X-B29310
   - 1.7. 16866-MSE-0703-XX-DR-X-B29311
   - 1.8. 16866-MSE-0703-XX-DR-X-B29312
   - 1.9. 16866-MSE-0703-XX-DR-X-B29313
   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:10 year rainfall and 10% allowance for global warming. This has been considered due to temporary nature of the haul road.
4. Runoff has been considered as 100% for all haul road areas, 70% for stripped site areas and 50% for grassed catchments.
5. Haul road to drain into adjacent V-ditch, water to be guided by regular timber water breaks cast into road surfacing.
   - 5.1. V-ditch to be reinforced with erosion matting and between 0m - 230m chainage 2m x 2m x 4m long soakaways to be installed at 25m centres along V-ditch. Positioning on drawing is indicative only.
   - 5.2. The base of the V-ditch should be 0.5m below the base of the haul road.
   - 5.3. The base of the soakaway should be 2m below the lowest ground surface, or the top of the weir.
   - 5.4. Sandbags or soil to be used to create a weir in the V-ditch directly after soakaways.
   - 5.5. Timber breaks to be installed at 25m intervals in road surfacing and to protrude by a maximum of 75mm but minimum of 50mm. Additional breaks required upslope of cattle grids.
6. Contour bunds with V-ditches should intersect the main V-ditch at 25m centres between 230m - 600m chainage to store water behind weirs.
   - 6.1. Bunds and weirs to be installed to height of 650mm above base of V-ditch. Bund should be 100mm higher than weir.
   - 6.2. If required due to overwhelming of rainfall, attenuation behind bund should be expanded at every 50m.
7. Siltation mats should be installed before and after every weir position.

Rev.	Description of Revision	Designed	Drawn	Checked	Approved	Date
B	For Construction	RD	RD	KET	ND	18/03/21
A	For Construction	RD	RD	CH	ND	12/03/21
P01	Preliminary Design	RD	RD	CH	ND	01/02/2021

Client: nationalgrid

Project: VIP Peak East

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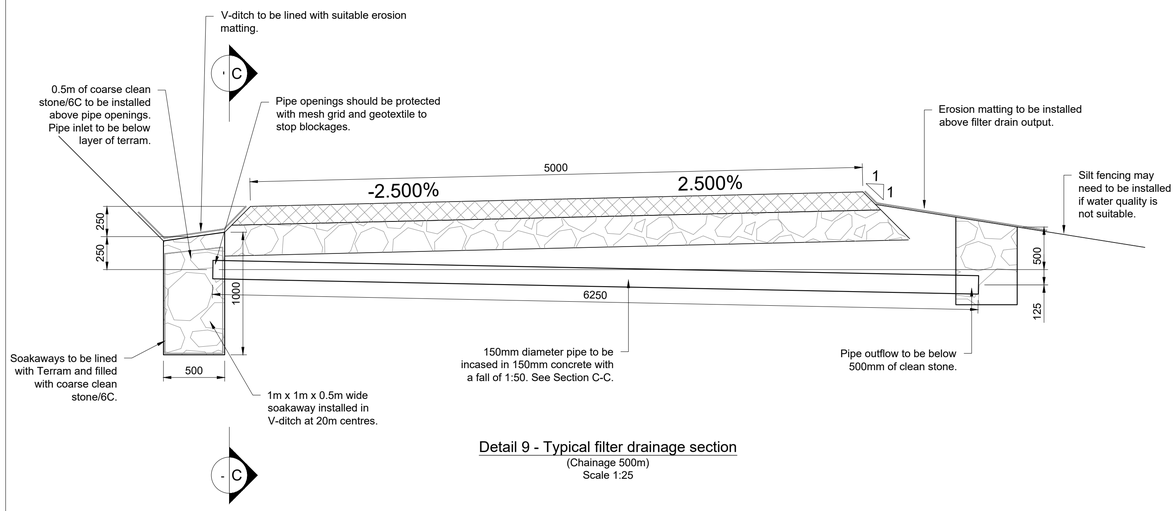
Drawing Title: Drainage Typical Details
North Haul Road
Page 1 of 6

Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29301	B

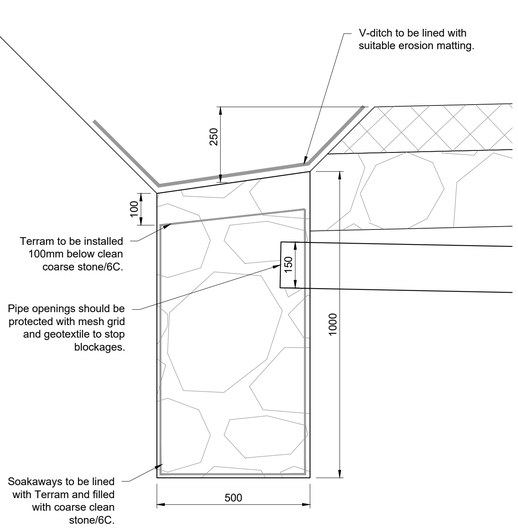
Scale: Varies | Original Size: A1

Drawing status: For Construction

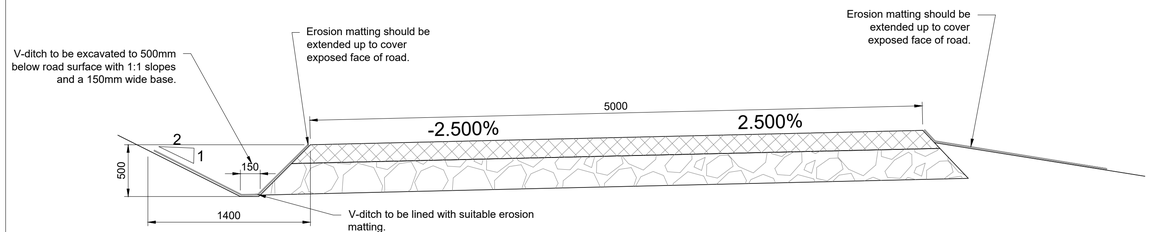
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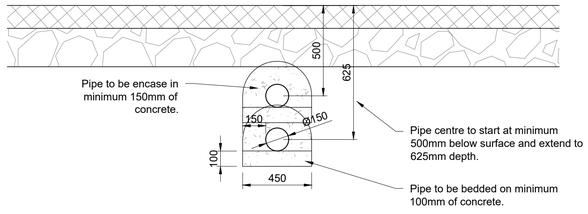
Detail 9 - Typical filter drainage section
(Chainage 500m)
Scale 1:25



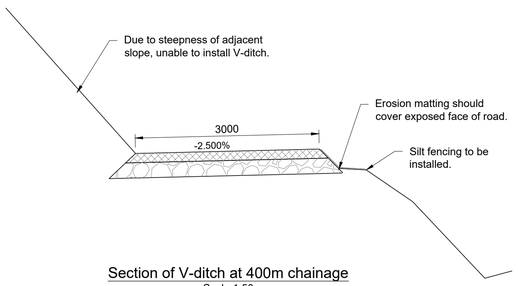
Soakaway Build Up
Scale 1:10



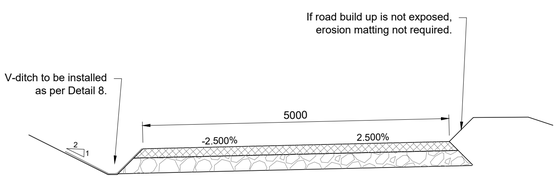
Detail 8 - Typical section of V-ditch
Scale 1:25



Section C-C - Drainage pipe below road
Scale 1:20



Section of V-ditch at 400m chainage
Scale 1:50



Section of V-ditch at 700m chainage
Scale 1:50

NOTES
1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29301
   - 1.2. 16866-MSE-0703-XX-DR-X-B29303
   - 1.3. 16866-MSE-0703-XX-DR-X-B29304
   - 1.4. 16866-MSE-0703-XX-DR-X-B29305
   - 1.5. 16866-MSE-0703-XX-DR-X-B29306
   - 1.6. 16866-MSE-0703-XX-DR-X-B29310
   - 1.7. 16866-MSE-0703-XX-DR-X-B29311
   - 1.8. 16866-MSE-0703-XX-DR-X-B29312
   - 1.9. 16866-MSE-0703-XX-DR-X-B29313
   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:100 year rainfall and 10% allowance for global warming. This has been considered due to the permanent nature of the TPT.
4. Runoff has been considered as 100% for all road surfacing, 70% for stripped site areas and 50% for grassed catchments.
   - 4.1. Road to drain into adjacent V-ditch, water to be guided by 5% fall of road towards ditch.
   - 4.2. V-ditch to be reinforced with erosion matting.
   - 4.3. The base of the V-ditch should be 0.5m below the top of the road.
   - 4.4. Sandbags or soil to be used to create a weir in the V-ditch directly after filter drainage points.

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
Residual Risks Associated With The Types Of Works Detailed On This Drawing

General
1) Generic Hazards and Risks, such as working at height, confined spaces, working with hazardous materials etc. have not been identified.
2)Significant residual risks have been identified. These are not necessarily those that involve the greatest risks but those (including health risks) that are not likely to be obvious, are unusual, or are likely to be difficult to manage effectively.
3) It is assumed that all personnel are competent to undertake the works shown on this drawing.
4) It is assumed that appropriate PPE will be worn as identified in the risk assessment of the construction method statement for these works.
5) It is assumed that proprietary equipment, plant, products and materials will be used in accordance with the manufacturer's / suppliers instructions and Materials Safety Data Sheets.

Construction	
C1	Erosion matting to be used to protect V-ditches road build up.
C2	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M4	Road surfacing to be regularly inspected and if puddling occurs, surfacing to be repaired in this area.
M5	Erosion mats to be cleaned regularly.
Decommissioning and Demolition	
D1	N/A
Hold Points (to be implemented before construction can commence)	
Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	N/A

Rev.	Description of Revision				
A	For Construction				
	Designed	Drawn	Checked	Approved	Date
	RD	RD	MHolt	ND	12/03/21
Rev.	Description of Revision				
P01	PRELIMINARY				
	Designed	Drawn	Checked	Approved	Date
	RD	KD	CH	ND	16/02/2021

Client
nationalgrid

Project
VIP Peak East

MORGAN SINDALL ENGINEERING SOLUTIONS

Morgan Sindall Engineering Solutions
Corporation Street Rugby Warwickshire CV21 2DW
T 01788 538731 morgansindall.com

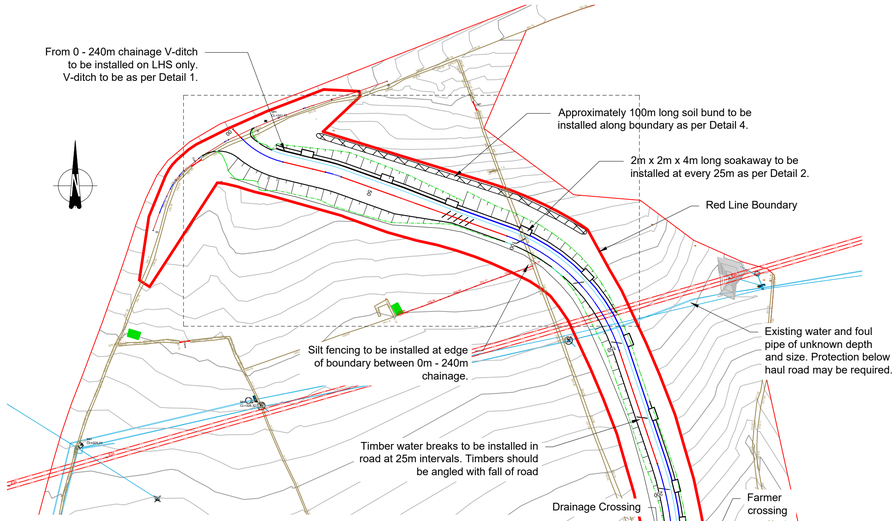
Drawing Title
Drainage Typical Sections
TPT Diversion
Page 2 of 6

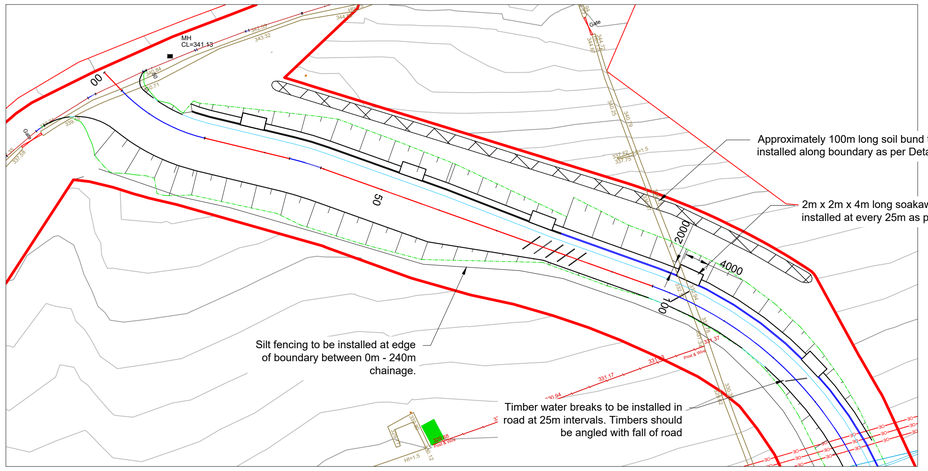
Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29302	A
Scale AS SHOWN	Original Size A1
Drawing status For Construction	

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DO NOT SCALE FROM THIS DRAWING

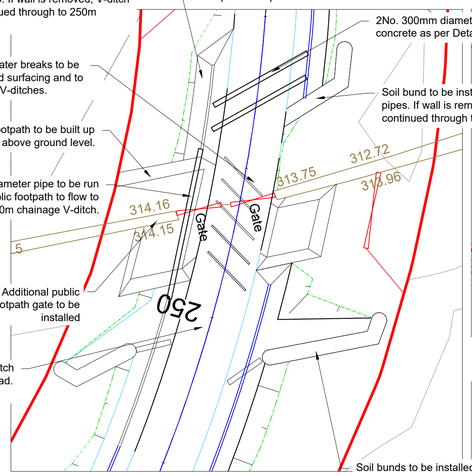
IF IN DOUBT ASK





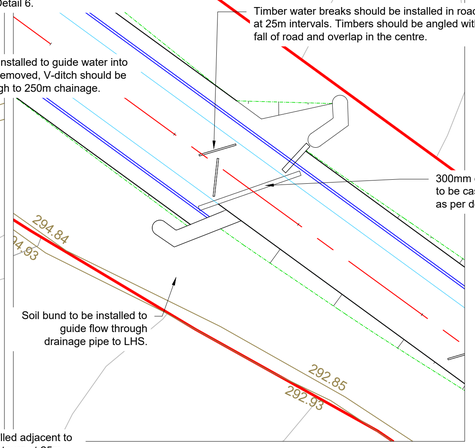
Drainage Plan

(Chainage 0m - 150m)
Scale 1:500



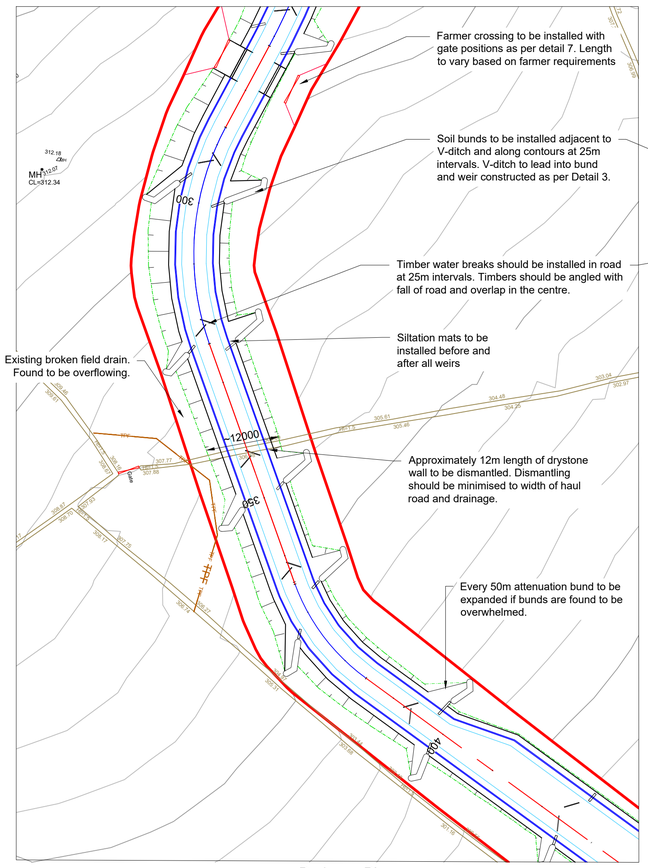
Gate Crossing

At 250m chainage.
Scale 1:200



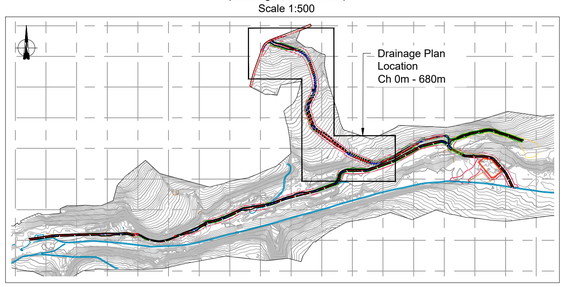
Drainage Crossing

At 480m chainage.
Scale 1:200



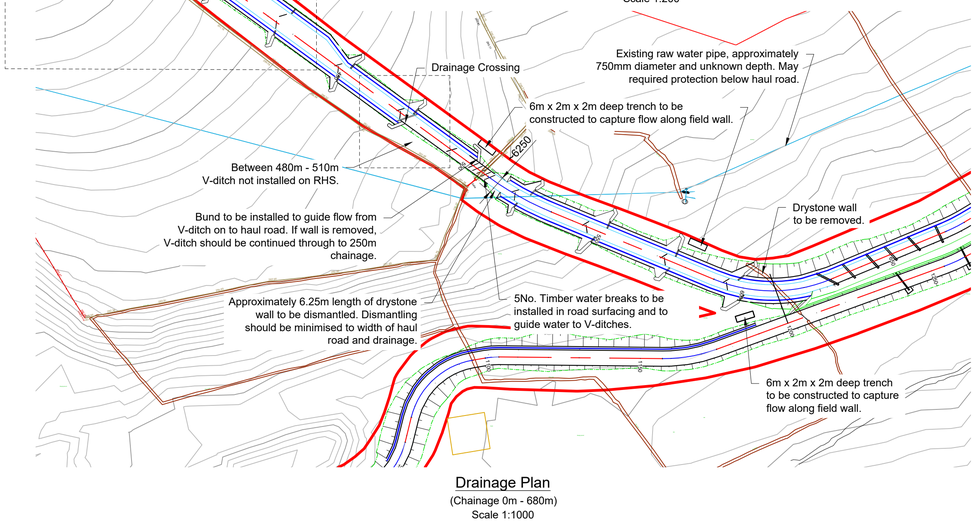
Drainage Plan

(Chainage 280m - 440m)
Scale 1:500



Key Plan

Scale N.T.S



Drainage Plan

(Chainage 0m - 680m)
Scale 1:1000

CONTINUED ON Dwg: 16866-MSE-0703-XX-DR-X-B29311

Notes:

1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29301
   - 1.2. 16866-MSE-0703-XX-DR-X-B29302
   - 1.3. 16866-MSE-0703-XX-DR-X-B29303
   - 1.4. 16866-MSE-0703-XX-DR-X-B29304
   - 1.5. 16866-MSE-0703-XX-DR-X-B29305
   - 1.6. 16866-MSE-0703-XX-DR-X-B29306
   - 1.7. 16866-MSE-0703-XX-DR-X-B29311
   - 1.8. 16866-MSE-0703-XX-DR-X-B29312
   - 1.9. 16866-MSE-0703-XX-DR-X-B29313
   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:10 year rainfall and 10% allowance for global warming. This has been considered due to the temporary nature of the haul road.
4. Runoff has been considered as 100% for all haul road areas, 70% for stripped site areas and 50% for grassed catchments.
5. Haul road to drain into adjacent V-ditch, water to be guided by regular timber water breaks cast into road surfacing.
   - 5.10. V-ditch to be reinforced with erosion matting and between 0m - 230m chainage 2m x 2m x 4m long soakaways to be installed at 25m centres along V-ditch. Positioning on drawing is indicative only.
   - 5.11. The base of the V-ditch should be 0.5m below the base of the haul road.
   - 5.12. The base of the soakaway should be 2m below the lowest ground surface, or the top of the weir.
   - 5.13. Sandbags or soil to be used to create a weir in the V-ditch directly after soakaways.
   - 5.14. Timber breaks to be installed at 25m intervals in road surfacing and to protrude by a maximum of 75mm but minimum of 50mm. Additional breaks required upslope of cattle grids.
6. Contour bunds with V-ditches should intersect the main V-ditch at 25m centres between 230m - 600m chainage to store water behind weirs.
   - 6.1. Bunds and weirs to be installed to height of 650mm above base of V-ditch. Bund should be 100mm higher than weir.
   - 6.2. If required due to overwhelming of rainfall, attenuation behind bund should be expanded at every 50m.
7. At 500m & 590m chainage additional 6m x 2m x 2m deep trench should be install on LHS to intersect surface water flow.
8. At 240m chainage a public footpath intersects haul road. Public footpath should be built up above ground level and 300mm diameter drainage pipe run underneath footpath.
9. Drainage pipes required at 240m & 480m chainage to allow flow to cross haul road.
10. Siltation mats should be installed before and after every weir position

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
Residual Risks Associated With The Types Of Works Detailed On This Drawing

General
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4) It is assumed that appropriate PPE will be worn as identified in the risk assessment of the construction method statement for these works.
5) It is assumed that proprietary equipment, plant, products and materials will be used in accordance with the manufacturer's / suppliers instructions and Materials Safety Data Sheets.

Construction	
C1	Pipe outflows should be above designed water level.
C2	Erosion matting to be used to protect V-ditches and bunds in areas of high flows.
C3	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Cast in timbers to be inspected regularly and if found to be worn down, should be replaced.
M4	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M5	Erosion & siltation mats to be cleaned regularly.
M6	Site to implement and manage suitable controls at farmer crossings to ensure no risk of collisions.
Decommissioning and Demolition	
D1	N/A

Hold Points (to be implemented before construction can commence)

Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	No

Rev.	Description of Revision				
A	For Construction				
	Designed	Drawn	Checked	Approved	Date
	RD	RD	MHolt	ND	12/03/21
Rev.	Description of Revision				
P01	Preliminary Design				
	Designed	Drawn	Checked	Approved	Date
	RD	RD	CH	ND	01/02/2021

Client: nationalgrid

Project: VIP Peak East

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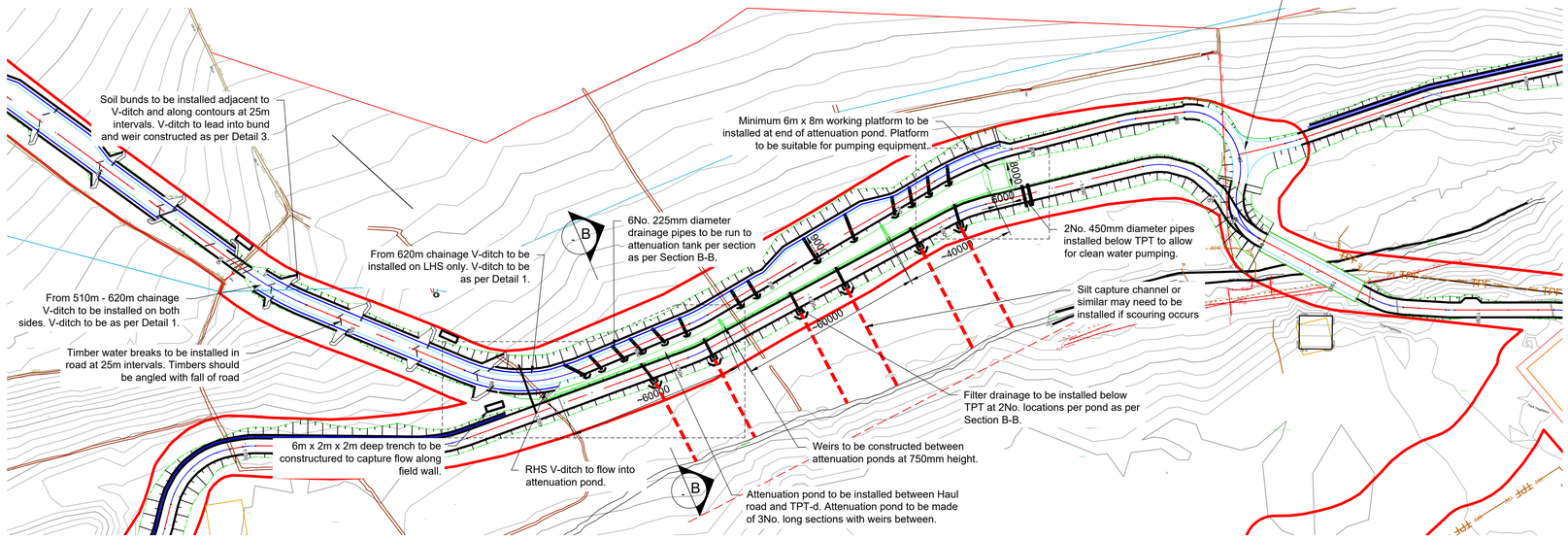
Morgan Sindall Engineering Solutions
Corporation Street Rugby Warwickshire CV21 2DW
T 01788 538731 morgansindall.com

Drawing Title: Drainage General Arrangement North Haul Road Page 1 of 7

Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29310	A

Scale Varies	Original Size A1
Drawing status For Construction	

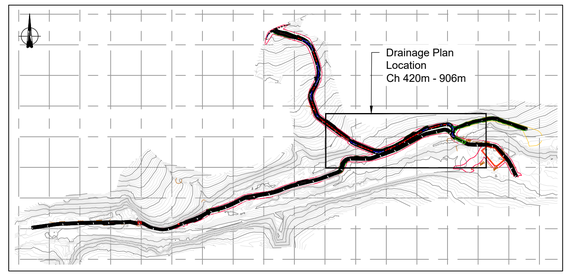
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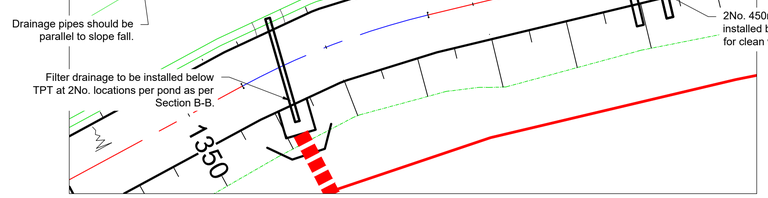
Drainage Plan
(Chainage 420m - 906m)
Scale 1:1000



Example Silt Capture Channel
Scale N.T.S



Key Plan
Scale N.T.S



Drainage Plan
(Chainage 420m - 906m)
Scale 1:200

Drainage Plan
(Chainage 590m - 680m)
Scale 1:200

Notes:

1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29301
   - 1.2. 16866-MSE-0703-XX-DR-X-B29302
   - 1.3. 16866-MSE-0703-XX-DR-X-B29303
   - 1.4. 16866-MSE-0703-XX-DR-X-B29304
   - 1.5. 16866-MSE-0703-XX-DR-X-B29305
   - 1.6. 16866-MSE-0703-XX-DR-X-B29306
   - 1.7. 16866-MSE-0703-XX-DR-X-B29310
   - 1.8. 16866-MSE-0703-XX-DR-X-B29312
   - 1.9. 16866-MSE-0703-XX-DR-X-B29313
   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:10 year rainfall and 10% allowance for global warming. This has been considered due to the temporary nature of the haul road.
4. Runoff has been considered as 100% for all haul road areas, 70% for stripped site areas and 50% for grassed catchments.
5. Haul road to drain into adjacent V-ditch, water to be guided by regular timber water breaks cast into road surfacing.
   - 5.1. V-ditch to be reinforced with erosion matting and between 0m - 230m chainage 2m x 2m x 4m long soakaways to be installed at 25m centres along V-ditch. Positioning on drawing is indicative only.
   - 5.2. The base of the V-ditch should be 0.5m below the base of the haul road.
   - 5.3. The base of the soakaway should be 2m below the lowest ground surface, or the top of the weir.
   - 5.4. Sandbags or soil to be used to create a weir in the V-ditch directly after soakaways.
   - 5.5. Timber breaks to be installed at 25m intervals in road surfacing and to protrude by a maximum of 75mm but minimum of 50mm. Additional breaks required upslope of cattle grids.
6. Contour bunds with V-ditches should intersect the main V-ditch at 25m centres between 230m - 600m chainage to store water behind weirs.
   - 6.1. Bunds and weirs to be installed to height of 650mm above base of V-ditch. Bund should be 100mm higher than weir.
   - 6.2. If required due to overwhelming of rainfall, attenuation behind bund should be expanded at every 50m.
7. At 605m chainage additional 6m x 2m x 2m deep trench should be install on RHS to intersect surface water flow.
8. 225mm diameter drainage pipes to be run under haul road from V-ditch into attenuation pond. Pipes to be approximately 8.5m long and have a fall of 4.5%.
9. 300mm diameter drainage pipes to be run under the TPT from the attenuation pond to the downslope of the TPT. Pipes to be approximately 5.5m long and have a fall of 4.5%.
10. Attenuation pond to be installed between 610m to 790m chainage and be installed in 3No. sections approximately 50m long with a 1m depth at the centre.
    - 10.1. Weirs to be installed between sections to approximate height of 750mm height and covered in erosion matting.
11. Working platform of minimum 6m x 8m to be installed at the end of the attenuation pond and be suitable for loading from pumping equipment.
12. Siltation mats should be installed before and after every weir position.
13. Filter drains range between 35.4m to 27.4m from water course with a gradient of between 1:13 to 1:16.

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
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Construction	
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C2	Erosion matting to be used to protect V-ditches and bunds in areas of high flows.
C3	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Cast in timbers to be inspected regularly and if found to be worn down, should be replaced.
M4	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M5	Erosion & siltation mats to be cleaned regularly.
M6	Site to implement and manage suitable controls at farmer crossings to ensure no risk of collisions.
Decommissioning and Demolition	
D1	N/A
Hold Points (to be implemented before construction can commence)	
Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	No

Rev.	Description of Revision				
B	For Construction				
	Designed	Drawn	Checked	Approved	Date
	RD	KD	KET	ND	18-03-21
Rev.	Description of Revision				
A	For Construction				
	Designed	Drawn	Checked	Approved	Date
	RD	RD	CH	ND	15/03/21
Rev.	Description of Revision				
P01	Preliminary Design				
	Designed	Drawn	Checked	Approved	Date
	RD	RD	CH	ND	01/02/2021

Client
nationalgrid

Project
VIP Peak East

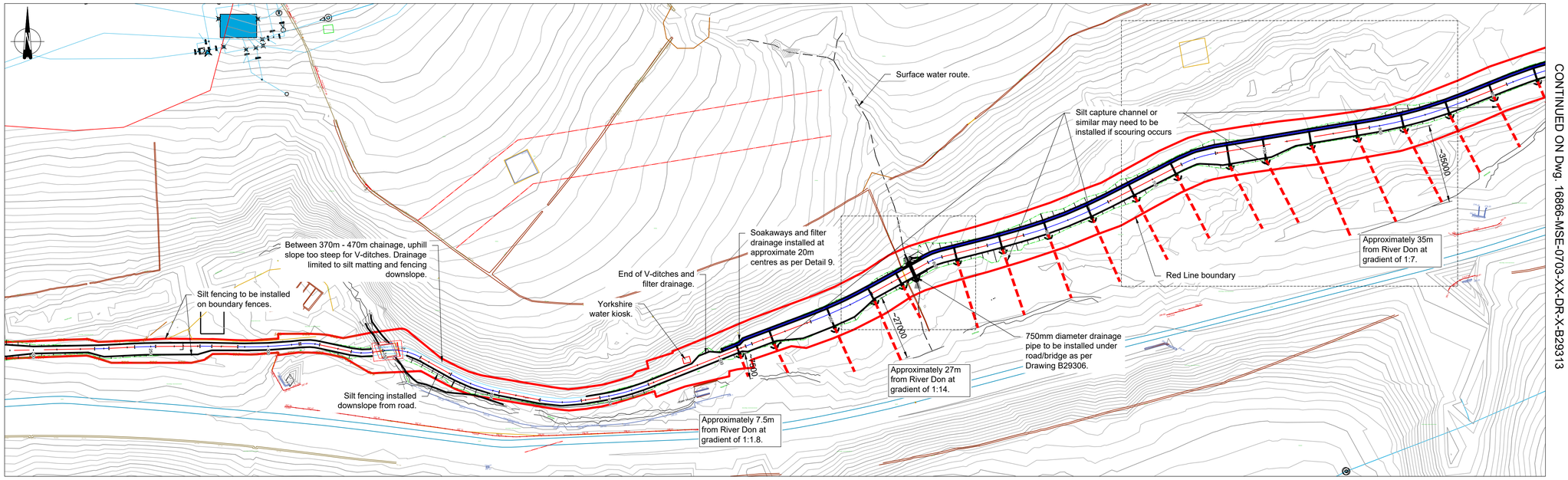
MORGAN SINDALL ENGINEERING SOLUTIONS

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T 01788 538731 morgansindall.com

Drawing Title
Drainage General Arrangement
North Haul Road
Page 2 of 7

Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29311	B
Scale Varies	Original Size A1
Drawing status For Construction	

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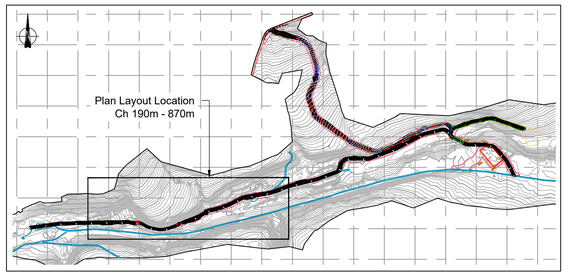


CONTINUED ON Dwg. 16866-MSE-0703-XX-DR-X-B29313

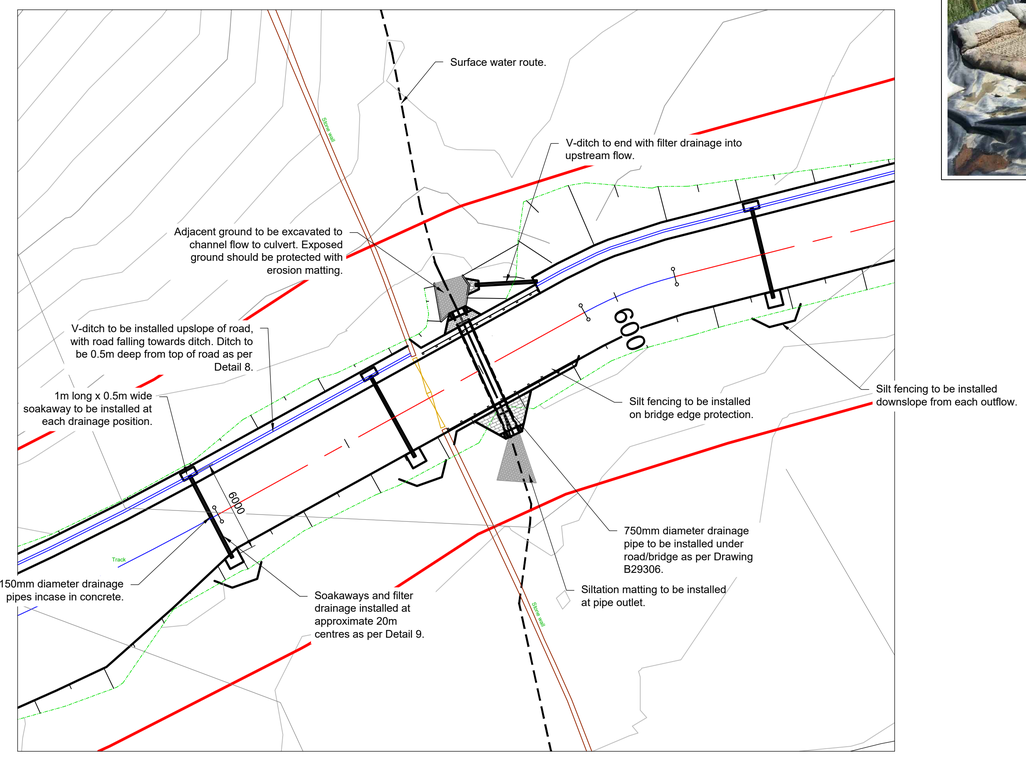
Plan Layout
(Chainage 190m - 870m)
Scale 1:1000



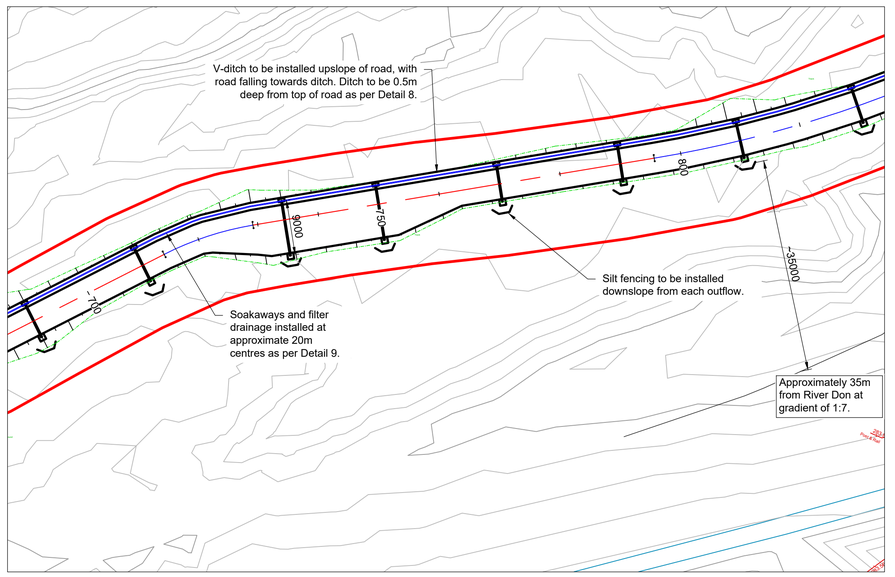
Example Silt Capture Channel
Scale N.T.S



Key Plan
Scale N.T.S



Bridge Crossing
Scale 1:200



Drainage Plan
(Chainage 690m - 830m)
Scale 1:500

NOTES
1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29301
   - 1.2. 16866-MSE-0703-XX-DR-X-B29302
   - 1.3. 16866-MSE-0703-XX-DR-X-B29303
   - 1.4. 16866-MSE-0703-XX-DR-X-B29304
   - 1.5. 16866-MSE-0703-XX-DR-X-B29305
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   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:100 year rainfall and 10% allowance for global warming. This has been considered due to the permanent nature of the TPT-d.
4. Runoff has been considered as 100% for all road surfacing, 70% for stripped site areas and 50% for grassed catchments.
   - 4.1. Road to drain into adjacent V-ditch, water to be guided by 5% fall of road towards ditch.
   - 4.2. V-ditch to be reinforced with erosion matting.
   - 4.3. The base of the V-ditch should be 0.5m below the top of the road.
   - 4.4. Sandbags or soil to be used to create a weir in the V-ditch directly after filter drainage points.
5. At 590m chainage surface water to be channelled below road using 750mm diameter pipe below road built into existing channel.
6. Siltation mats should be installed before and after every weir position.

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
Residual Risks Associated With The Types Of Works Detailed On This Drawing

General
1) Generic Hazards and Risks, such as working at height, confined spaces, working with hazardous materials etc. have not been identified.
2)Significant residual risks have been identified. These are not necessarily those that involve the greatest risks but those (including health risks) that are not likely to be obvious, are unusual, or are likely to be difficult to manage effectively.
3) It is assumed that all personnel are competent to undertake the works shown on this drawing.
4) It is assumed that appropriate PPE will be worn as identified in the risk assessment of the construction method statement for these works.
5) It is assumed that proprietary equipment, plant, products and materials will be used in accordance with the manufacturer's / suppliers instructions and Materials Safety Data Sheets.

Construction	
C1	Erosion matting to be used to protect V-ditches road build up.
C2	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M4	Road surfacing to be regularly inspected and if puddling occurs, surfacing to be repaired in this area.
M5	Erosion mats to be cleaned regularly.
Decommissioning and Demolition	
D1	N/A

Hold Points (to be implemented before construction can commence)	
Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	N/A

Rev.	Description of Revision	Designed	Drawn	Checked	Approved	Date
B	For Construction	RD	KD	KET	ND	18-03-21
A	For Construction	RD	KD	CH	ND	15/03/21

Client: nationalgrid

Project: VIP Peak East

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Drawing Title: Drainage General Arrangement TPT Diversion Page 3 of 7

Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29312	B

Scale: AS SHOWN | Original Size: A1

Drawing status: For Construction

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CONTINUED ON Dwg. 16866-MSE-0703-XX-DR-X-B29312

CONTINUED ON Dwg. 16866-MSE-0703-XX-DR-X-B29311

Soakaways and filter drainage installed at approximate 20m centres as per Detail 9.

Red Line boundary

Surface water route.

V-ditch to start downslope from attenuation pond.

End of V-ditches and filter drainage.

Soakaways and filter drainage installed at approximate 20m centres as per Detail 9.

Concrete culvert to be installed in water channel below road as per Drawing B29303.

Silt capture channel or similar may need to be installed if scouring occurs

Between 940m to 1050m chainage adjacent ground too steep for adjacent V-ditch.

Silt capture channel or similar may need to be installed if scouring occurs

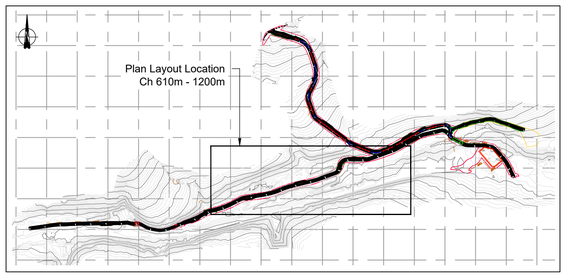
3500

Approximately 35m from River Don at gradient of 1:7.

Plan Layout
(Chainage 610m - 1200m)
Scale 1:1000



Example Silt Capture Channel
Scale N.T.S



Key Plan
Scale N.T.S

Surface water route.

Soakaways and filter drainage installed at approximate 20m centres as per Detail 9.

V-ditch to end with filter drainage into upstream flow. Erosion matting to be installed over face of outlet.

Silt fencing to be installed downslope from each outflow.

Adjacent ground to be excavated to channel flow to culvert. Exposed ground should be protected with erosion matting.

Silt fencing to be installed on edge protection.

V-ditch to be installed upslope of road, with road falling towards ditch. Ditch to be 0.5m deep from top of road as per Detail 8.

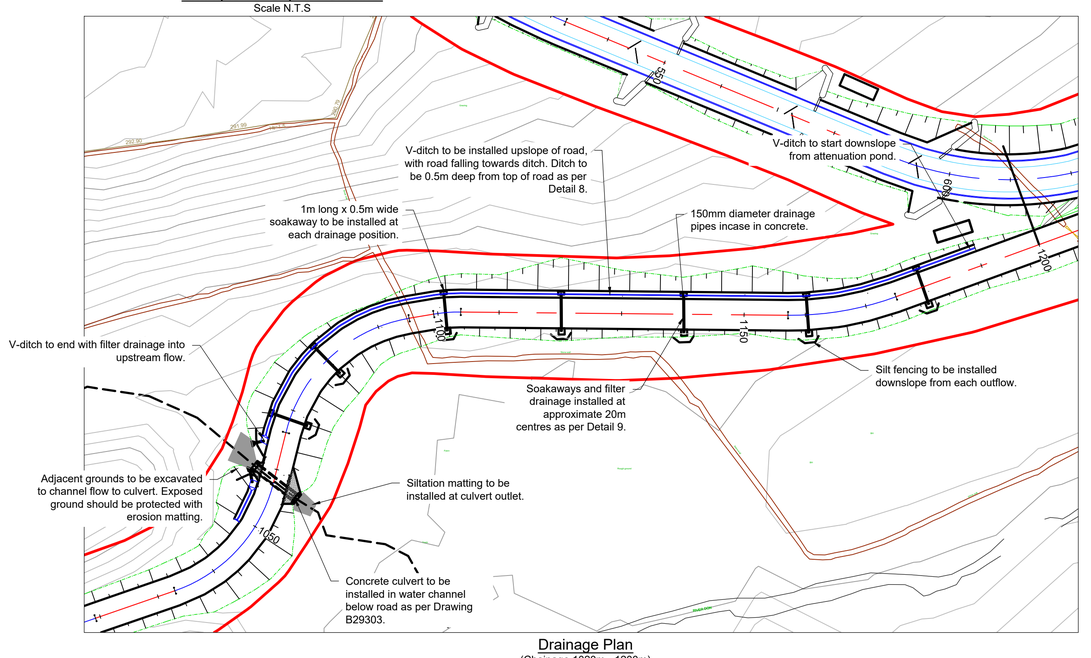
Siltation matting to be installed at culvert outlet.

Silt fencing to be installed downslope from V-ditch.

1050

Concrete culvert to be installed in water channel below road as per Drawing B29303.

Culvert Crossing
Scale 1:200



Drainage Plan
(Chainage 1020m - 1200m)
Scale 1:500

NOTES
1. Drawing to be read out in conjunction with the following drawings:
   - 1.1. 16866-MSE-0703-XX-DR-X-B29301
   - 1.2. 16866-MSE-0703-XX-DR-X-B29302
   - 1.3. 16866-MSE-0703-XX-DR-X-B29303
   - 1.4. 16866-MSE-0703-XX-DR-X-B29304
   - 1.5. 16866-MSE-0703-XX-DR-X-B29305
   - 1.6. 16866-MSE-0703-XX-DR-X-B29306
   - 1.7. 16866-MSE-0703-XX-DR-X-B29310
   - 1.8. 16866-MSE-0703-XX-DR-X-B29311
   - 1.9. 16866-MSE-0703-XX-DR-X-B29312
   - 1.10. 16866-MSE-0703-XX-DR-X-B29314
   - 1.11. 16866-MSE-0703-XX-DR-X-B29315
   - 1.12. 16866-MSE-0703-XX-DR-X-B29316
2. All dimensions are in millimetres unless otherwise stated.
3. Drainage design has been based on assumed permeability of $1x10^{-6}$m/s with a 1:100 year rainfall and 10% allowance for global warming. This has been considered due to the permanent nature of the TPT-d.
4. Runoff has been considered as 100% for all road surfacing, 70% for stripped site areas and 50% for grassed catchments.
   - 4.1. Haul road to drain into adjacent V-ditch, water to be guided by 5% fall of road towards ditch.
   - 4.2. V-ditch to be reinforced with erosion matting.
   - 4.3. The base of the V-ditch should be 0.5m below the top of the road.
   - 4.4. Sandbags or soil to be used to create a weir in the V-ditch directly after filter drainage points.
5. At 1060m chainage surface water to be channelled below road using concrete culvert below road built into existing channel.
6. Siltation mats should be installed before and after every weir position.

DESIGNER'S RISK ASSESSMENT
HEALTH, SAFETY AND THE ENVIRONMENT
Residual Risks Associated With The Types Of Works Detailed On This Drawing

General
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Construction	
C1	Erosion matting to be used to protect V-ditches road build up.
C2	Erosion matting should be installed over any excavated or exposed material on site.
Use and Maintenance	
M1	Drainage system to be inspected after heavy rainfall to ensure no blockages have occurred.
M2	Pipes to be regularly maintained to ensure no blockages have occurred.
M3	Site should be inspected for field drains, where field drains are found, location should be recorded and drain diverted or repaired as required.
M4	Road surfacing to be regularly inspected and if puddling occurs, surfacing to be repaired in this area.
M5	Erosion mats to be cleaned regularly.
Decommissioning and Demolition	
D1	N/A

Hold Points (to be implemented before construction can commence)

Does the Designer require a constructability review meeting to be held?	No
Does the Designer need to review the construction method statement?	No
Other?	N/A

Rev.	Description of Revision				
B	For Construction				
	Designed	Drawn	Checked	Approved	Date
	RD	KD	KET	ND	18-03-21
Rev.	Description of Revision				
A	For Construction				
	Designed	Drawn	Checked	Approved	Date
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Drawing Title: Drainage General Arrangement TPT Diversion Page 4 of 7

Drawing No.	Revision
16866-MSE-0703-XX-DR-X-B29313	B
Scale AS SHOWN	Original Size A1
Drawing status For Construction	

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