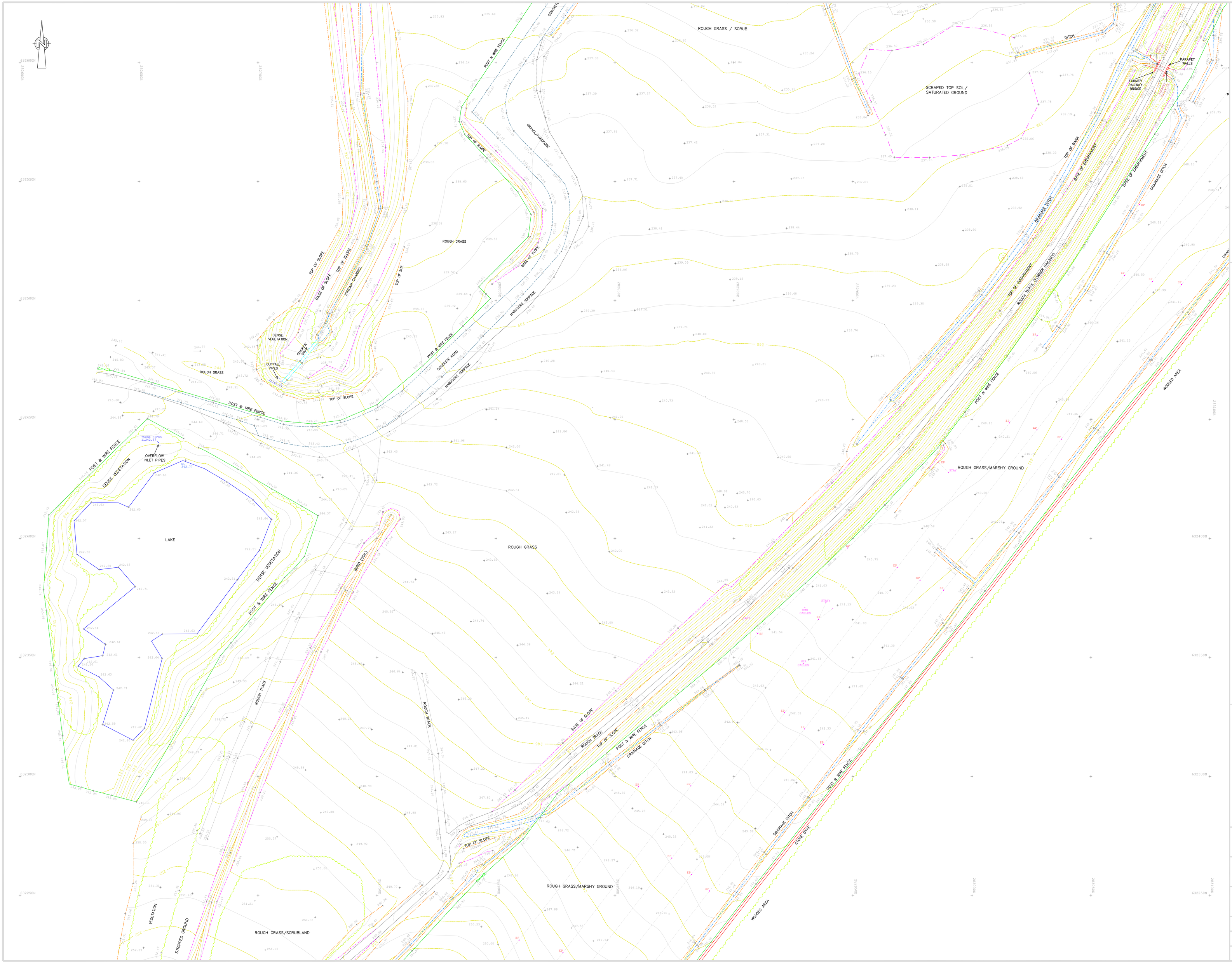


Notes

1. This site survey was carried out by A.Bryce on behalf of Granite City Surveys Ltd. during February 2025.
2. The weather during the survey was mixed.
3. All levels shown on this drawing are related to OS Newlyn datum derived from GPS.
4. Survey data is related to OS National Grid derived from GPS.
5. In general, only the corners of the buildings are identified by the survey, Buildings are not surveyed internally,
6. Some levels may have been removed from this drawing for clarity.
7. There may be features out with the scope of this survey which could have an affect on any proposed development,
8. Service covers are located in position by their centre point - symbol used is not indicative of actual size/orientation of the cover.
9. Whilst Granite City Surveys has made every effort to locate all major service covers (ie,manhole positions) it should be noted that this may not be possible in all cases due to ground conditions or local obstructions.
10. Trees displayed on this plan have been located at the centre of the base of the trunk. Due to the fact that trees do not always grow vertically, the extents of the tree may be out with what has been indicated on the survey.
11. The services on this plan have been derived by the visual ground site survey and are subject to confirmation by further investigation. Before commencement of any construction works, the location of all services must be verified on site by the relevant authorities.

Legend

BH	Borehole	PB	Post Box
BOB	Bottom Of Bank	OSTP	OS Trig Point
BOL	Bollard	OSBM	OS Benchmark
BUS	Bus Stop Sign	POST	Post
CL	Cill Level	RE	Rodding Eye
CTV	Cable TV Cover	SV	Stop Valve
CULV	Culvert Level	TBM	Temporary Benchmark
ELEC	Electricity Cover	TEL	Telecom Cover
EP	Electricity Pole	TL	Traffic Lights
ER	Earthing Rod	TOB	Top Of Bank
FH	Fire Hydrant	TP	Telegraph Pole
FLAG	Flagpole	WH	Wall Head Level
GU	Gully	WL	Water Level
GAS	Gas Cover	WM	Water Meter
STN	Permanent Ground Marker	WO	Washout Cover
IC	Inspection Cover		
IL	Invert Level		Coniferous Tree
KO	Kerb Outlet Cover		
LP	Lamp Post		Deciduous Tree
MH	Manhole		
MKR	Marker		

Granite City Surveys Ltd.

Land Surveying, Setting Out,
Elevational Surveys, Legal Title Surveys

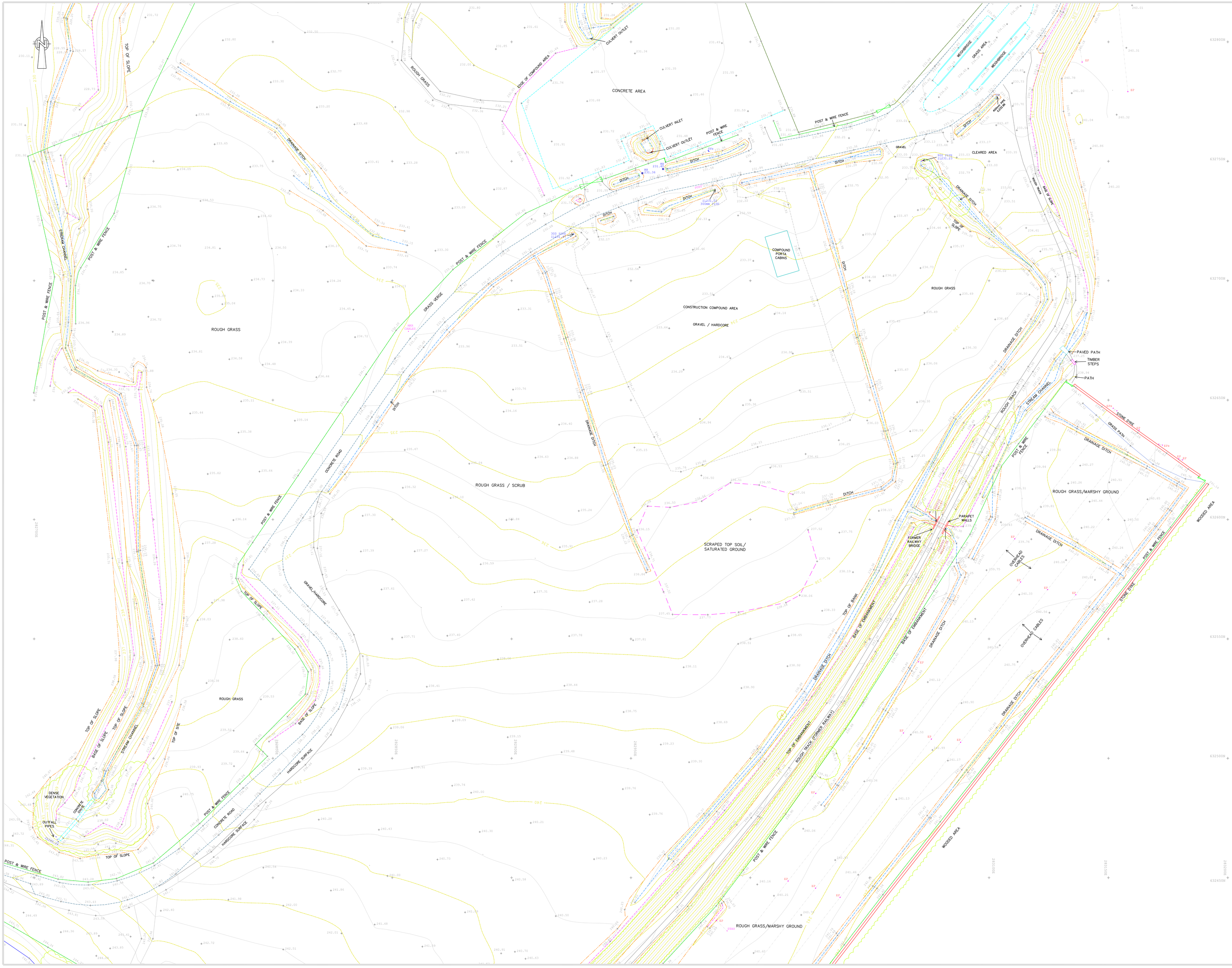
Chattan Mews Offices,
18 Chattan Place,
Aberdeen AB10 6RD

Tel: 01224 864263 Fax: 01224 864263

email: info@GraniteCitySurveys.co.uk
www.GraniteCitySurveys.co.uk

Project:	COALBURN LANARK
Drawing Title:	EXISTING SITE SURVEY LAYOUT PLAN
Client:	AARDVARK EM LTD.

Project No:	GCS7226	Drawing No:	T-02
Drawn by:	A.BRYCE		
Scale:	1:500 at A0	Date:	FEB 2025



Notes

1. This site survey was carried out by A.Bryce on behalf of Granite City Surveys Ltd. during February 2025.
2. The weather during the survey was mixed.
3. All levels shown on this drawing are related to OS Newlyn datum derived from GPS.
4. Survey data is related to OS National Grid derived from GPS.
5. In general, only the corners of the buildings are identified by the survey. Buildings are not surveyed internally.
6. Some levels may have been removed from this drawing for clarity.
7. There may be features out with the scope of this survey which could have an affect on any proposed development.
8. Service covers are located in position by their centre point - symbol used is not indicative of actual size/orientation of the cover.
9. Whilst Granite City Surveys has made every effort to locate all major service covers (ie,manhole positions) it must be noted that this may not be possible in all cases due to ground conditions or local obstructions.
10. Trees displayed on this plan have been located at the centre of the base of the trunk. Due to the fact that trees do not always grow vertically, the extents of the tree may be out with what has been indicated on the survey.
11. The services on this plan have been derived by the visual ground site survey and are subject to confirmation by further investigation. Before commencement of any construction works, the location of all services must be verified on site by the relevant authorities.

Legend

BH	Borehole	PB	Post Box
BOB	Bottom Of Bank	OSTP	OS Trig Point
BOL	Bollard	OSBM	OS Benchmark
BUS	Bus Stop Sign	POST	Post
CL	Cill Level	RE	Rodding Eye
CTV	Cable TV Cover	SV	Stop Valve
CULV	Culvert Level	TBM	Temporary Benchmark
ELEC	Electricity Cover	TEL	Telecom Cover
EP	Electricity Pole	TL	Traffic Lights
ER	Earthing Rod	TOB	Top Of Bank
FH	Fire Hydrant	TP	Telegraph Pole
FLAG	Flagpole	WH	Wall Head Level
GU	Gully	WL	Water Level
GAS	Gas Cover	WM	Water Meter
STN	Permanent Ground Marker	WO	Washout Cover
IC	Inspection Cover		
IL	Invert Level		Coniferous Tree
KO	Kerb Outlet Cover		
LP	Lamp Post		Deciduous Tree
MH	Manhole		
MKR	Marker		

Granite City Surveys Ltd.

Land Surveying, Setting Out,
Elevational Surveys, Legal Title Surveys

Chattan Mews Offices,
18 Chattan Place,
Aberdeen AB10 6RD

Tel: 01224 864263 Fax: 01224 864263

email: info@GraniteCitySurveys.co.uk
www.GraniteCitySurveys.co.uk

Project:	COALBURN LANARK
Drawing Title:	EXISTING SITE SURVEY LAYOUT PLAN
Client:	AARDVARK EM LTD.
Project No: GCS7226	Drawing No: T-03
Drawn by: A.BRYCE	
Scale: 1:500 at A0	Date: FEB 2025

Appendix C: SEPA Consultation

Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

RESPONSE TO F0198657

Request Timeline

Date	Status
07/02/2025	EIR Request received [statutory deadline 07/03/2025]
21/02/2025	EIR Response issued

Requested Information

[…] Please could you provide relevant flood information for Land at the M74 Heat and Power Park (now known as Conexus West), west of Junction 11 of the M74, Coalburn, Lanark, ML11 0RL (283125, 633088)? I attach a red line boundary for your information.

Please include the following information where available:

1. Fluvial/tidal flood levels where available;
2. Details of site-specific modelled flood levels or flood depth grid maps for the area if available;
3. Details of any main rivers in the area; and
4. Details of any flood defences for the area.

[…]

Response

We confirm that we have handled your request under the terms of the Environmental Information (Scotland) Regulations 2004 (EIRs).

Q	Response	Data Reuse
[1]	**Fluvial/tidal flood levels where available;** SEPA flood map viewer map.sepa.org.uk/floodmaps shows the main source of river flooding to be from Poniel Water, which runs parallel to the access route and about the main body of the site. There are several smaller burns cutting through the main site area, but as these have catchments which are less than three kilometres squared, their flood risk has not been assessed. There are isolated areas within the site boundary that are at risk of surface water flooding. As the site is located inland, it is not susceptible to coastal flood risk. However, for future reference, design sea level information is available through the Coastal Flood Boundary (CFB) dataset which is freely available under Open Government Licence from data.gov.uk. Extreme still water levels for the open coast and estuaries are available to download from the following links: data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018	This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Q	Response	Data Reuse
	data.gov.uk/dataset/5b9a5a99-e996-431b-b001-f364d53736f0/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-estuary-2018 Exceptions/Regulations Applied: **Regulation 9 – Advice and assistance** **Regulation 6(1)(b) - Publicly Availabe**	
[2]	**Details of site-specific modelled flood levels or flood depth grid maps for the area if available** SEPA is unable to provide site specific modelled river levels, flows, or depths as our flood hazard maps have been produced using methods and data appropriate for national scale mapping rather than detailed local models. It is possible that South Lanarkshire Council, who are the local authority for the area, may be able to provide this information if they have undertaken a flood study for this area. Contact details can be found in the 'Application of Regulations and Exceptions' section below. Exceptions/Regulations Applied: **Regulation 10(4)(a) – Information not held** **Regulation 14(1)(b) – Other Authority**	In cases where no information is held, data re-use does not apply.

Q	Response	Data Reuse
[3]	**Details of any main rivers in the area; and** Please see answer to Q1. Exceptions/Regulations Applied: **N/A**	This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/open-government-licence/version/3/
[4]	**Details of any flood defences for the area** In Scotland flood defences are constructed and maintained by the local authorities. Some information on flood defences in Scotland can be accessed via the SEPA website which is available here map.sepa.org.uk/floodmap/map.htm. The Flood Defences layer may show you where flood defences are located, but we may not have the most up to date information. From the Flood Defences layer, we are not aware of any flood protection scheme in the area. As we may not hold the latest information on flood defences or have detailed information on schemes that have been completed recently, we would recommend that you contact the Flood Risk Management team at South	This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Q	Response	Data Reuse
	Lanarkshire Council who are the local flood risk management authority and are responsible for flood defences for that area. They may be able to provide further details on flooding and flood alleviation in this area. Contact details can be found in the 'Application of Regulations and Exceptions' section below. <u>Exceptions/Regulations Applied:</u> **Regulation 6(1)(b) - Publicly available & easily accessible** **Regulation 9 – Advice and assistance**	

Application of Regulations and Exceptions

Section 39(2)

The information you are requesting is environmental information. We have applied Section 39(2) of the Freedom of Information (Scotland) Act 2002 (FOISA). We are therefore handling your request under the Environmental Information (Scotland) Regulations 2004 (EIRs).

Regulation 6(1)(b) Publicly available & easily accessible

As we have advised that information is publicly available & easily accessible we have applied Regulation 6(1)(b), the text of which is reproduced below.

6(1) Where an applicant requests that environmental information be made available in a particular form or format, a Scottish public authority shall comply with that request unless- (b) the information is already publicly available and easily accessible to the applicant in another form or format.

Regulation 9 – Advice and assistance

As we have issued additional information, advice, or assistance we have applied Regulation 9(1) of the EIRs, the text of which is reproduced below.

9(1) A Scottish public authority shall provide advice and assistance, so far as it would be reasonable to expect the authority to do so, to applicants and prospective applicants.

Regulation 10(4)(a) – Information not held

Where we have advised that we do not hold information we have applied Regulation 10(4)(a) of the EIRs, the text of which is reproduced below.

10 (4) A Scottish public authority may refuse to make environmental information available to the extent that;- (a) it does not hold that information when an applicant's request is received.

The exception in Regulation 10(4)(a) is subject to the public interest test in Regulation 10(1)(b) of the EIRs. As SEPA does not hold the information in question there is no conceivable public interest in requiring that the information be made available.

Regulation 14(1)(b) – Other authority

As we do not hold the information requested, but believe that another organisation may, Regulation 14(1)(b) of the EIRs applies. The text of which is reproduced below.

14(1) Where a Scottish public authority has received a request to make environmental information available and does not hold that information but believes that another public authority holds the information requested then it shall (b) supply the applicant with the name and address of that other authority,

Contact details:
South Lanarkshire Council
Information Compliance Officer
Finance and Corporate Resources
Council Offices Floor 11
Almada Street
Hamilton
ML3 0AA
Email: foi.request@southlanarkshire.gov.uk
Website:
www.southlanarkshire.gov.uk/info/200176/sharing_information_with_you/295/freedom_of_information_act/2

What to expect when making a Request for Information

Each request for information, under The Environmental Information (Scotland) Regulations 2004 or the Freedom of Information (Scotland) Act 2002, is formally logged by the authority. The request falls within a process that has two internal stages carried out by the authority; a right of appeal to the Scottish Information Commissioner followed by an appeal to the Court of Session on a point of law only.

•Stage 1 – Request for information
•Stage 2 – Formal Review
•Stage 3 – Appeal for decision by Scottish Information Commissioner (OSIC)
•Stage 4 – Appeal to the Court of Session on a point of law only.

Each enquiry will have a unique Reference Number which should be quoted when you contact us.

How you will be kept informed

You will receive an acknowledgement for your request and Formal Review. We aim to reply to all enquiries promptly, within 20 working days. You will receive a response along with the requested information and/or an explanation regarding any withheld information. We may also contact you if we require clarification or if we are issuing a fees notice.

What happens once your enquiry has been responded to?

If you are not happy with the response or have failed to receive a response, you have the right to request a Formal Review from SEPA.

Guidance on your rights and how to ask for a review is on the Scottish Information Commissioner's website; www.foi.scot/asking-for-a-review

We will ensure that all personal data is processed, recorded and retained in accordance with the requirements of the Data Protection Act 2018 throughout the handling of each request. You have a right to see information about yourself via submitting a Subject Access Request under the Data Protection Act 2018.

What to do if you are not happy with how your enquiry and review were handled

If you are unsatisfied with our Formal Review response or have failed to receive a response, you can then appeal to the Scottish Information Commissioner via the links below.

www.foi.scot/appeal
www.foi.scot/contact-us

Should you wish to appeal against the Scottish Information Commissioner's decision, you have the right to appeal to the Court of Session on a point of law only. Any such appeal must be made within 42 days after the date of intimation of the decision.

Appendix D:
Surface Water Drainage Strategy

3R Energy

Hagshaw LDES, South Lanarkshire

Surface Water Drainage Strategy

Surface Water Drainage Strategy

Issue/Revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	First Issue	Updated Issue	Updated Issue	Updated Issue
Date	17.03.25	21.03.25	11.04.25	29.04.25
Prepared by	Robbie Parnham	Robbie Parnham	Robbie Parnham	Robbie Parnham
Checked by	Stuart Williamson	Stuart Williamson	Stuart Williamson	Stuart Williamson
File reference	19860-R01-A	19860-R01-B	19860-R01-C	19860-R01-D

CONTENTS

Appendices

1 INTRODUCTION

Tumu Consulting Ltd have been appointed by 3R Energy to prepare a Surface Water Drainage Strategy for the proposed development of a Long Duration Electricity Storage (LDES) scheme on land at the M74 Heat and Power Park (now known as Conexus West), Coalburn, Lanark, ML11 0RL.

2 EXISTING SITE CONDITIONS

The site is predominately rough grassland sloping generally in a northwestern direction. It also incorporates a small biomass Combined Heat and Power facility, along with its associated hardstanding. An existing access road bisects the overall area. Overhead powerlines run north south along the site's eastern boundary adjacent to an embankment of a dismantled railway line. The western boundary is formed by the Alder Burn whilst the northern boundary is constrained by the Poniel Water.

The current site topography results from the restoration of land associated with the Dalquhandy Opencast Coal Mine back to an agricultural purpose, with many of the drainage features of its former use retained.

A topographic survey was completed by Granite City Surveys Ltd (ref: GCS7226 dated Feb 2025). The site levels in relation to the new LDES assets range from approximately 254mAOD in the extreme south to approximately 224mAOD in the extreme north, a distance of some 870m giving an average grade of 1 in 30. Localised gradients through are as steep as 1 in 16.

According to BGS British Geology Viewer, the site is underlain by sedimentary Passage Formation as bedrock geology which is overlain by Devensian – Diamicton till superficial deposits.

2.1 Existing Drainage

The site's surface water drains via a number of existing tributary watercourses and ditches, to a centralised watercourse which is culverted multiple times across the area. This eventually discharges to Poniel Water, which is classified as a river.

Alder Burn, a watercourse arising from the south west, discharges to a pond adjacent to the south western boundary as it reaches the main access road. The outfall of this pond comprises three 750mm pipes which pass under the road and drop back down to the original watercourse level. This eventually discharges to Poniel Water.

2.2 Existing Surface Water Runoff Rates

The greenfield runoff rates for the proportion of the site to be developed has been tabulated below. These have been calculated using FLOW software. Site specific FEH rainfall data has been used, with a standardised area of 1.0ha and soil conditions, to produce existing runoff rates per hectare for the Q_{BAR}, Q_{30} and Q_{100} return periods.

Return Period	Developed Site Area(ha)	Existing Discharge (l/s/ha)
Q_{BAR}	1	8.2
Q_{30}	1	16.3
Q_{100}	1	20.3

Table 1-1 Existing Greenfield Runoff Rates

3 PROPOSED DEVELOPMENT

The proposed development is the construction of a number of LDES flow battery containers and substations, The total area of the proposed development including the existing access road is 46.6ha. The area of the site which is to be developed, encompasses an approximate area of 17ha.

3.1 Design Life

It is anticipated that the design life will be approximately a maximum of 40 operational years.

4 PROPOSED SURFACE WATER DRAINAGE STRATEGY

The Surface Water Drainage Strategy will outline how surface water flows are proposed to discharge from the site in accordance with the relevant statutory standards and guidance, included but not limited to The CIRIA Report C753 ‘The SuDS Manual’ 2015.

4.1 Surface Water Discharge Arrangement

In line with the proposals set out in section 3.2 of the outline drainage strategy by MacArthur Green, it is proposed to discharge surface water flows to the existing unnamed watercourse to the north of the site, refer to Appendix A.

In order to attenuate the surface water flows, a 300mm stone drainage blanket will lay beneath the LDES development, with all flows generated for the site area stored in the porosity voids within the stones. The discharge from each blanket will be restricted by a flow control device locally, before discharging to the wider system.

A flow control device will be utilised to discharge at a controlled rate equal to the pre-development greenfield QBAR rate. This will ensure there is no increase in rate entering the watercourse for all storms up to and including the 200 year (ie 0.5% Annual Exceedance Probability, AEP) rainfall event, with an appropriate allowance for climate change. This will provide a betterment on existing overland flow rates, for the area of the associated development, for the 30 and 100 year storms.

The restricted surface water discharge rate for the site is in total 118.9l/s for a total contributing area of 14.51ha.

The restricted surface water discharge will then be conveyed from the site towards ponds located to the north, by a shallow swale, which will provide additional SuDS water quality treatment, interception and biodiversity.

The additional access routes across site are to be constructed of permeable materials, and replicate the existing greenfield nature of the ground. Refer to Appendix B for the Proposed Surface Water Drainage Strategy drawing.

4.2 Climate Change

In accordance with the Scottish Environmental Protection Agency (SEPA) document *Climate Change Allowances for Flood Risk Assessment in Land Use Planning – Volume 5*, the site is located within the Clyde river basin district. As such, a climate change allowance of 41% should be considered given development's anticipated 40 year operational life span.

4.3 Calculations

In order to ensure that the drainage blanket can accommodate the anticipated storms, calculations are shown in Appendix C, outlining the 1, 30 and 200 year storm events with climate change allowance. A typical drainage blanket has been modelled. As the discharge rate from each drainage blanket is a product of its own surface area, one drainage blanket can be modelled which represents each drainage blanket within the system. Drainage blanket DB-M has been modelled, and no flooding has been shown to occur in the 1 in 200 year rainfall event, while restricted to 12.7l/s for a contributing area of 1.55ha.

In the event of an exceedance event, or should the surface water outlet experienced a blockage, flows would follow the natural contours of the surrounding the site, and enter the watercourse to the north or west, just as would be the case were the site not to be developed.

4.4 Water Quality

The CIRIA 753 SuDS Manual has been consulted to ensure that the SuDS provided successfully mitigate the anticipated pollutants, which may arise from the land use. Table 26.2 of CIRIA 753 outlines the pollution hazard indices for the anticipated land use type. These are outlined below in Table 4-1.

Land Use	Pollution Hazard Level	TSS	Metals	Hydrocarbons
General low traffic access roads.	Low	0.5	0.4	0.4

Table 4-1 CIRIA 753 Table 26.2 Pollution Hazard Indices for General Low Traffic Access Roads

Table 26.3 of CIRIA 753 outlines the mitigation indices for a number of SuDS which can mitigate the pollution indices above. The mitigation indices for the swale and drainage blanket, which is closest in comparability to a filter drain, have been outlined below in Table 4-2.

Land Use	TSS	Metals	Hydrocarbons
Filter Drain	0.5	0.4	0.4
Swale	0.5	0.6	0.6
Total	**0.75**	**0.7**	**0.75**

Table 4-2 CIRIA 753 Table 26.3 Mitigation Indices for a Filter Drain and Swale.

As the mitigation indices for the pollutants are higher than the hazard indices, the SuDS provided successfully mitigate against the expected pollutants.

4.5 Maintenance Arrangements

All surface water drainage elements will be privately managed and maintained by the developer. Operation and maintenance will be undertaken in accordance with the recommendations outlined in the SuDS Manual (CIRIA C753), provided in Tables 4-3, 4-4, 4-5 & 4-6.

Table 4-3: Operation and Maintenance Requirements for Inlets, Outlets, Controls, and Inspection Chambers.

Maintenance schedule	**Required action**	**Typical frequency**
Regular Maintenance	Inspect surface structures, removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
	Remove cover and inspect, ensuring water is flowing freely and that the exit route for water is unobstructed. Remove any debris and silt Undertake inspection after leaf fall in autumn.	Annually
	Jet the pipes leading from overflow structures and check water is going through the overflow	Annually
Remedial actions	Repair physical damage	As required

Table 4-4: Operation and Maintenance Requirements for Ponds

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris.	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season ad autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for the first 3 years)	Monthly (at the start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May-October)
	Inspect silt accumulation ratesin any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-p has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices eg penstocks	Half yearly
	Hand cut submerged and emerged aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season	Annually
	Remove sediment from any forebay	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 5 years, or as required
Occasional Maintenance	Remove sediment from the main body of big ponds when the pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, every 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when the signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/ rehabilitate inlets, outlets and overflows.	As required

Table 4-5: Operation and Maintenance Requirements for Swales.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, records areas where water is ponding more than 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months. Quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practises	As required

Table 4-6: Operation and Requirements for Filter Drains.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut grass – to retain grass height within specified design range	Monthly (during growing season),or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, records areas where water is ponding more than 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months. Quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practises	As required

5 CONCLUSION

The Surface Water Drainage Strategy proposed provides a method of discharge at restricted rates (greenfield QBAR) which will mimic the existing site conditions. The development will not cause an increase in flows or increase in flood risk on or off site, while also providing a betterment in storms greater than the QBAR event.

Appendix A

Outline Drainage Strategy

M74 Heat and Power Park

Planning Permission in Principle

Outline Drainage Assessment

Prepared by:	Claire Hollingworth
Authorised by:	Dr Rob Sutton
Date:	15/03/2017
Tel:	0141 342 5404
Email:	claudia.gebhardt@macarthurgreen.com
Web:	www.macarthurgreen.com
Address:	95 South Woodside Road | Glasgow | G20 6NT

Document Quality Record

Version	Status	Author/Reviewer	Date
1	Final	CH/RS	15/03/2017

CONTENTS

1 INTRODUCTION

3R Energy Solutions Limited (3RE) are submitting an application for planning permission in principle (PPIP) for a proposed industrial/commercial development on part of the former Dalquhandy Opencast Coal Site; to be known as the M74 Heat and Power Park. As explained in the accompanying Planning Statement, the exact layout of the future development is not yet fixed but two main development scenarios have been considered for the purposes of this assessment; Drinks Industry Hub or Mixed Use Scheme (see Figures 2a and 2b).

MacArthur Green has been commissioned by 3RE to complete an outline drainage assessment to accompany the application for PPIP. This assessment aims to demonstrate that satisfactory drainage measures can be put in place to adequately drain the site to facilitate the proposed development, whilst safeguarding local hydrological features and managing flood risk. The assessment will recommend further detailed assessment work, suitable mitigation and enhancement measures which may need to be considered at the detailed design stage. A detailed design will be issued with the future reserved matters planning application(s).

The development also requires realignment of a currently dammed and straightened watercourse. Outline proposals are provided in this document recognising the need for subsequent detailed design to be submitted to South Lanarkshire Council (SLC) and Scottish Environment Protection Agency (SEPA) for approval. Detailed designs will be submitted alongside an application for a Controlled Activity Regulations (CAR) Licence.

2 SITE

The proposed M74 Heat and Power Park is located approximately 1.5 km north of Douglas, South Lanarkshire. The approximately 48 hectare (0.48 km^2) development is situated within the red-line application boundary of the wider Douglas West and Dalquhandy DP Renewable Energy Project, with existing access retained from the historic opencast works. A recently developed Wood-Gas CHP plant is located on the opencast hardstanding located within the development boundary, and, will form a key part of the Heat and Power Park.

Much of the historic drainage arrangements from the previous opencast works remain on the site today. This drainage proposal aims to utilise the existing drainage systems in the area of the development, where appropriate, in addition to implementing new measures to protect and enhance the water quality of the wider water environment.

2.1 Study Area

The development is located within the catchment of Alder Burn, a tributary of Poniel Water. A smaller unnamed tributary of Poniel Water also drains the site (Figure 2a and 2b).

2.1.1 Watercourses

The Alder Burn was dammed for the construction of the access route to Dalquhandy Opencast Mine. The dam and road remain in place, with the outflow piped under the access road to the downstream Alder Burn, as shown in Photographs 1a and 1b below. The initial downstream stretch of Alder Burn

and its tributary, have been historically realigned to allow for the opencast works. Aerial imagery of the development area during this time is shown in Figure 1a, with a layout plan of Dalquhandy Opencast Mine coal processing area provided in Figure 1b.

Photographs 1a & 1b: Alder Burn Outflow

2.1.2 Existing Drainage

The proposed development extends to areas both to the north and south of the existing access road as shown in Figure 2a and 2b. The area of the site to the south of the access road has been regenerated but was previously used for coal processing infrastructure and coal stocking grounds, as indicated in the opencast layout plan (Figure 1b). Drainage currently exists around this section of the development; runoff is captured in a perimeter channel, and, is routed under both the access track and hardstanding via two existing culverts (shown indicatively on Figures 2a and 2b). On the northern side of the hardstanding, drainage is routed to a man-made channel which runs through the now restored area of tailing ponds (see Photograph 1c below).

Photograph 1c: Man-made Drainage Channel

The outflow of the man-made channel has been connected to an unnamed tributary of the Poniel Water shown in Figure 1b and Photograph 2. In addition to the outflow channel, seepage and runoff from the area of historic tailing ponds flows over saturated ground to the same confluence.

The drainage proposal has been deisgned to capture the historic runoff from the tailing ponds area to a central SuDS pond, introduced for the Heat and Power Park. The SuDS feature will be designed to provide a level of passive treatment of site runoff before being discharged back to the unnamed tributary and the Alder Burn.

Photograph 2: Existing Drainage Channel

3 OUTLINE DRAINAGE PLAN

This document forms an outline drainage assessment which will be supplemented by a detailed drainage design, as part of the submission of the future reserved matters planning application(s) at the appropriate time. The proposal is based on the principles stated within CIRIA C697: The SuDS Manual.

3.1 Drainage channels

The development plans comprise industrial/commercial units located to the north and south of the existing access road. This is across the same area previously used for coal processing, stocking, and handling, including associated water treatment and settlement lagoons, and as such, an existing drainage network exists across the site. Runoff from the land on the south of the road, flows to existing drainage channels and through two existing culverts, routed under the access road and remaining area of hardstanding (Figure 2a and 2b). Site drainage naturally flows north to the culverts due to the topography of the land; the highest elevations are to the southern boundary of the site which is embanked by an old railway. The outflow on the northern side of the hardstanding, discharges into a

man-made swale (Photograph 1c) which routes flows across the restored area of tailing ponds, ultimately to the Poniel Water.

In principle, it is proposed that the current drainage provisions for land to the south of the access road will be utilised by the new development. The detailed drainage plan will include a review of the existing drainage network's current capacity against the greenfield and post-development runoff rates. It is proposed that a small pond will be introduced upstream of the existing culverts to attenuate peak flows and prevent any backing-up of flow at this point. Sections of the downstream swale may require modification to tie in with the development layout and location of the units. The design of the swale will also be reviewed as part of the detailed planning application with suitable long-term arrangements proposed to suit the final development footprint.

The outflow, which currently discharges directly into an unnamed tributary of Poniel Water, will be diverted to an appropriately designed and sized SuDS pond as described in Section 3.2.

3.2 SuDS Pond

To attenuate peak flows, and provide passive treatment of site runoff, a SuDS retention pond is proposed to the north of the development as shown in Figures 2 (a and b) and 3. The SuDS pond is located in the lowest point of the site to which flows will naturally drain. The SuDS pond will receive flows from the swale which routes runoff from land to the south of the access road. Drainage from the additional development units to the north of the access road and the existing hardstanding will connect to the same swale prior to discharge to the SuDS pond.

It is also proposed that historic runoff from the area of the previous tailing ponds, which currently flows to a low lying area of ground and eventually to the Poniel Water, will also be diverted to the SuDS pond.

The SuDS pond will be designed to include a permanent pool of water to provide attenuation and passive treatment of runoff. The pond will also provide an amenity feature as part of the wider development. The SuDS pond is proposed with two outflows, to apportion the flow appropriately to the Alder Burn and the unnamed tributary of Poniel Water. Both watercourses are downgradient of the proposed SuDS location, allowing for natural drainage channels to be created.

3.2.1 SuDS Design Principles

The development footprint is small covering an area of approximately 25 hectares (0.25 km^2), with the wider site boundary (including existing access road) extending to around 48 hectares (0.48 km^2). In accordance with CIRIA C753, the detailed design will be based on greenfield runoff rates using Institute of Hydrology (IoH) 124 method. Whilst it is noted that the area has previously been developed, the drainage design will aspire to meet greenfield runoff rates.

As the developable area is less than 50 hectares (0.5 km^2) the calculation of Qbar will be based on an area of 50 hectares, with the result factored to the ratio of the development area.

An initial estimate of 1 in 30 year greenfield runoff rate has been made using the HR Wallingford drainage tools. An initial value has been calculated of 526 l/s based on a SAAR value of 1114, SOIL type

5 and SPR value of 0.53. These initial calculations should be superseded based on detailed drainage calculations at the detailed design stage and detailed ground information. The calculation of post-development runoff rate will be based on the modified rational method.

The storage required has been approximated as 4,500 m^3 with a treatment storage of approximately 3,250 m^3. The SuDS pond will be designed in accordance with the minimum design criteria noted below:

- Length to width ratio: >3:1
- Maximum depth of permanent water: 2 m
- Maximum side slopes: 1 in 3
- Size of permanent pool: > treatment volume, V

An example size SuDS pond for the required treatment volume for the proposed development area could be of an area of approximately 2,700 m^2 (example 75 m length to 25 m width). This is easily accommodated within the land area available for the SuDS pond.

The development will be assessed for flood risk, including the route for the 1 in 200 year return period event to demonstrate no detriment to properties within, or out-with the site, as a result of the development. This is discussed in section 4.

3.3 SuDS Maintenance

The SuDS will be designed such that they are effective for the site specific conditions and require minimal maintenance. The detailed drainage plan will be designed so that sediment can be removed upstream of the inflow, preventing migration into the main waterbody. The outflows will be monitored and maintained as required to prevent blockage and any backing up of the flow.

All drainage features will be overlooked by the proposed development for passive monitoring and accessible for any required maintenance. A detailed plan of design, proposed remedial and long term maintenance of the SuDS will be issued with the future reserved matters planning application(s).

3.4 CAR Licence Requirements

The western edge of the proposed mixed use development scenario, and to a lesser extent, the drinks industry hub, require some limited realignment of the upper, currently modified stretch of Alder Burn. Realignment will be taken from the outflow of Alder Dam on the northern side of the access track (NGR 282686, 632463) and tie back into the watercourse approximately 250 m downstream (NGR 282750, 632970).

Currently the outflow channel routes flows from a height of approximately 240 mAOD at the access road, directly to the head of the realigned channel at approximately 235 mAOD (Photograph 1). The channel then has a gentle gradient (approximately 20 m drop over 700 m) to its confluence with Poniel Water at approximately 215 m AOD.

The realigned channel will be designed to the west of its current location. A layout is shown in Figures 2a and 2b for indicative purposes, and will be subject to site specific design at the appropriate stage of the development process. This immediate area of land has been raised slightly from the historic construction of the access road; a similar outflow channel will therefore be required from the access road to grade into the surrounding land. A detailed design will be provided with the reserved matters planning application(s), with the detailed watercourse design aiming to tie in with the natural topography downstream. Appropriate baseline surveys of the existing watercourse will be undertaken to inform the detailed design of the realigned channel.

The Alder Burn is not known to have any significant ecological value and flows into the Poniel Water. Poniel Water has a status of Moderate under SEPA's River Basin Management Plan. The status reflects a lower water quality status noted as resulting from elevated concentrations of manganese.

The stretch of Alder Burn requiring realignment was assessed as being less than 3 m wide from observations during a site walkover. As such, realignment will require consent in the form of a simple CAR Licence from SEPA. CAR Licence applications will be submitted alongside the future reserved matters planning application(s). It is noted that if survey data obtained as part of the design process, identifies areas of the watercourse to be greater than 3 m wide, the requirement for a complex licence will be discussed with SEPA.

4 FLOOD RISK

A Flood Risk Assessment (FRA) will be submitted with the reserved matters planning application(s). The receiving Poniel Water is shown on the SEPA Flood Map[1] to have marginal areas of Medium to High fluvial flood risk though there is no fluvial flooding mapped within the development area. The detailed drainage design will meet the required principle of ensuring no increase in the 1 in 200 year (0.5% AEP) flood risk, within or out-with, the site. The FRA will be completed in accordance with CIRIA C624 and SEPA reporting requirements.

As noted in 3.2.1, there is sufficient land available within the lower elevations of the site to provide adequate attenuation for the 1 in 200 year flood risk.

The potential flood risk from the realigned channel of Alder Burn, separate to the site drainage plan, will be assessed within the FRA and form part of the design process.

Small areas of pluvial (surface water) flooding are noted within the development area. The ponding of surface water reflects localised depressions within the modified area of the brownfield development. These areas will be levelled by the new hardstanding with runoff captured by the drainage design.

5 ENHANCEMENT OF THE WIDER ENVIRONMENT

The SuDS proposal has been designed specifically to manage both the drainage associated with the proposed development, and, capture runoff from the historic opencast area of the site. This aims to improve the overall water quality in the receiving watercourses within and adjoining the site.

[1] SEPA Flood Map (http://map.sepa.org.uk/floodmap/map.htm)

It has also been noted that there are a number of redundant culverts along Alder Burn where historic tracks have crossed the watercourse. Redundant culverts along Alder Burn will be removed as part of the development to prevent any localised back-up of flow and improve the overall status of the watercourse, to be discussed and agreed with SEPA. Photograph 3 below shows an example of a historic culvert on the Alder Burn.

Photograph 3

6 SUMMARY CONCLUSIONS

3RE are submitting an application for planning permission in principle (PPIP) for a proposed industrial/commercial development on part of the former Dalquhandy Opencast Coal Site; to be known as the M74 Heat and Power Park. This document has assessed the outline drainage proposals for the developable area to confirm that satisfactory measures can be put in place to drain the development. A detailed drainage design will be submitted as part of the submission of future reserved matters planning application(s) at the appropriate time, once the detailed design of the development is fully understood.

Aspects of the former opencast site remain on the ground including the access road to the development area, and, historic drainage around parts of the site. In principal, the proposed development will utilise the existing infrastructure as far as is feasible. The capacity of the existing drainage will be checked against the development requirements and increased/improved as required.

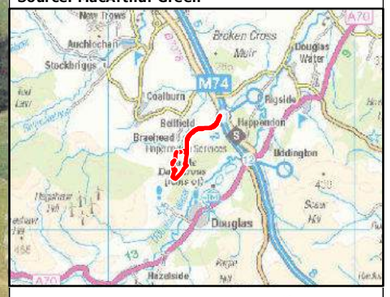
The site area has sufficient land available, at a lower elevation to the development, for the introduction of SuDS features. It is proposed that drainage will be routed through the main site via an existing swale (or appropriate amendment thereof) to an appropriately sized SuDS pond. The SuDS pond will capture drainage from the historic and proposed development and will discharge proportionately back into the Alder Burn and the unnamed tributary of the Poniel Water. The detailed drainage design will meet the required principle of ensuring no increase in the 1 in 200 year (0.5% AEP) flood risk, within or out-with, the site.

Finally, this assessment has highlighted that a section of the currently modified Alder Burn will require some limited realignment to facilitate the development. Appropriate baseline surveys of the existing watercourse will be undertaken to allow for detailed design of an alternative channel alignment. An FRA and CAR Licence Application will be completed alongside the detailed design, and submitted to SLC and SEPA for approval.

Annex 1. Figures

N

Source: MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 1a

Dalquhandy Opencast Mine Aerial Imagery 1990

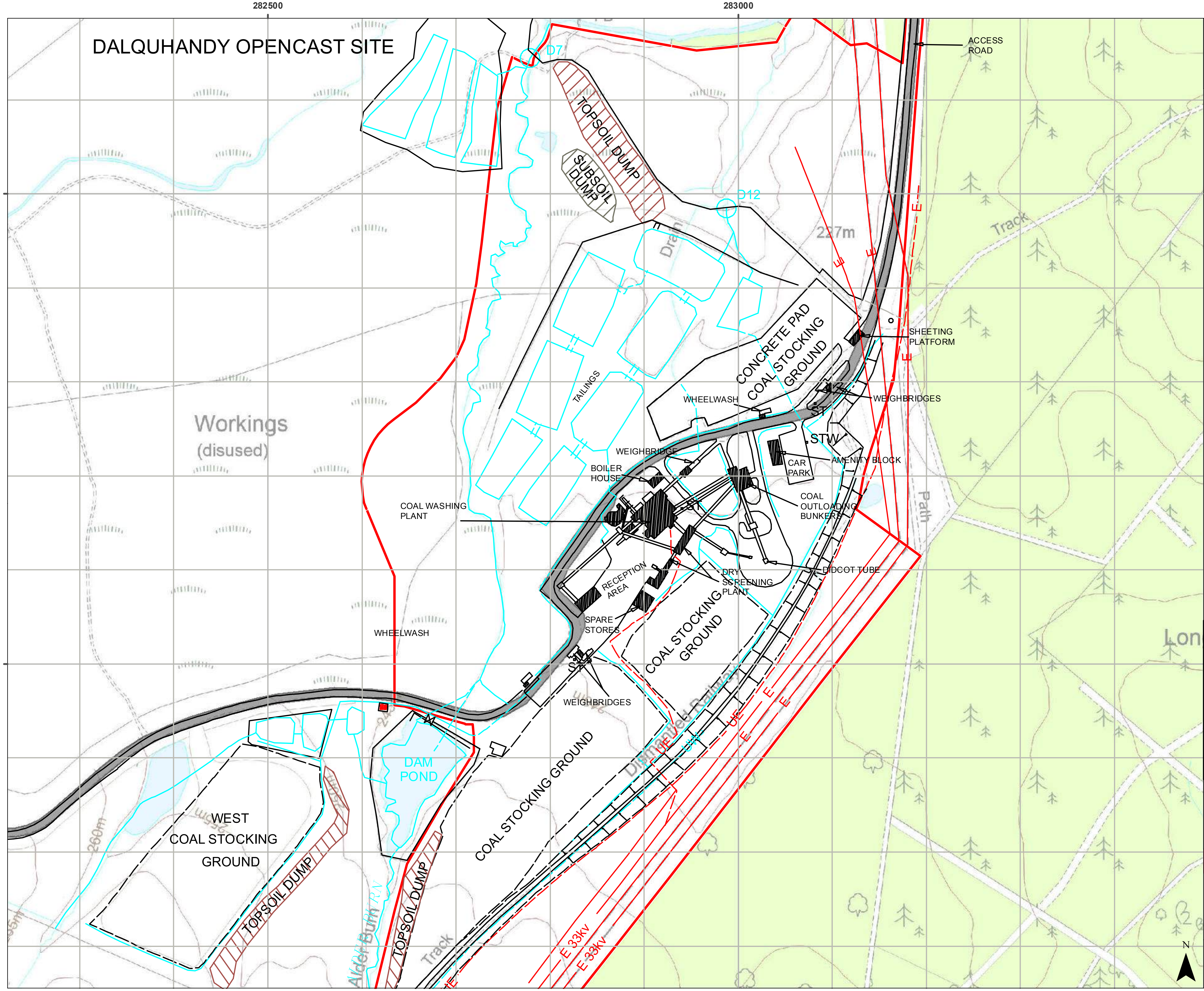
MAP SCALE: NOT TO SCALE

GIS TM: BJF Checked: BJF Approved: CH Status: Rev0

Document Path: S:\Project GIS\3REL001 Douglas West and Dalquhandy\H_R_Fig1a_DOMLP_1990_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 16/03/2017


282500
283000
633000
632500
DALQUHANDY OPENCAST SITE
ACCESS ROAD
D7
TOPSOIL DUMP
SUBSOIL DUMP
D12
227m
Track
Drain
CONCRETE PAD COAL STOCKING GROUND
SHEETING PLATFORM
WEIGHBRIDGES
WHEELWASH
TAILINGS
Workings
(disused)
STW
WEIGHBRIDGE
BOILER HOUSE
CAR PARK
AMENITY BLOCK
COAL WASHING PLANT
COAL OUTLOADING BUNKERS
Path
DIDCOT TUBE
RECEPTION AREA
DRY SCREENING PLANT
SPARE STORES
COAL STOCKING GROUND
WHEELWASH
WEIGHBRIDGES
Dismantled Railway
DAM POND
COAL STOCKING GROUND
WEST COAL STOCKING GROUND
TOPSOIL DUMP
TOPSOIL DUMP
260m
Alder Burn
Track
E 33kv
E 33kv
N

![3R Energy Wind • Biomass]

Legend:

- Application Site
- Existing Access Road

Source: MacArthur Green

MacArthur Green

M74 Heat and Power Park

Figure 1b

Dalquhandy Opencast Mine Layout Plan

0 70 140 Metres

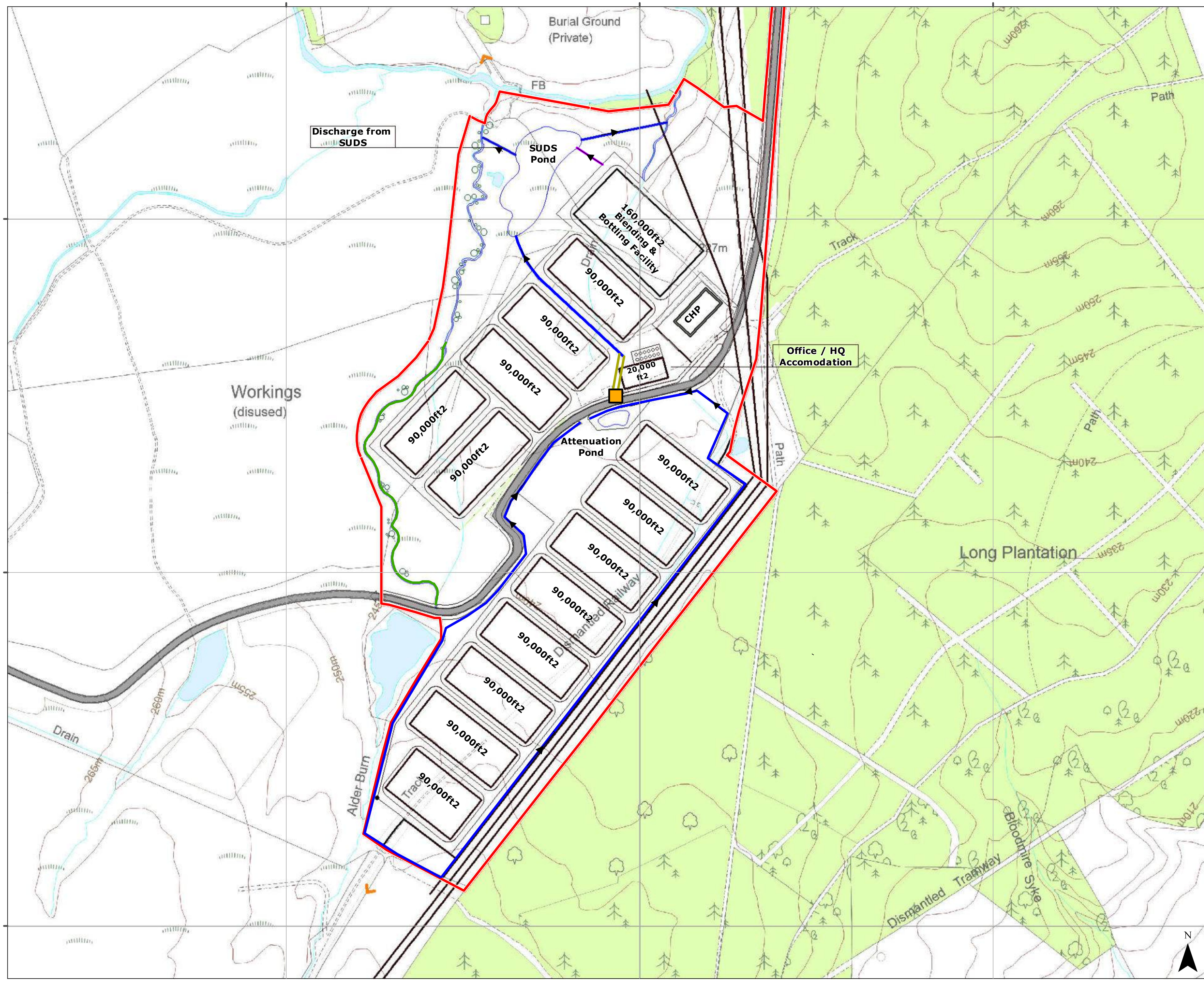
MAP SCALE: 1:3,750 @ A3

Status: Rev1 Approved: CH Checked: BJF GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\H_R_Fig1b_DOMLP_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 16/03/2017



3R Energy
Wind • Biomass

Legend:

- Application Site
- Diversion of Historic Tailings Runoff
- Drainage
- Realigned Channel
- Existing Pipelines
- Existing Culverts
- Drainage Direction
- Existing Access Road

Source: MacArthur Green

MacArthur Green

M74 Heat and Power Park

Figure 2a

Development Layout - Drinks Industry Hub

0 90 180
Metres
MAP SCALE: 1:5,000 @A3

Status: Rev1 Approved: CH Checked: BJF GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\H_R_Fig2a_DIHI_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 16/03/2017

282500 283000 283500

633000 632500 632000

Burial Ground (Private)

FB

Discharge from SUDS

SUDS Pond

70,000ft2

Drain

227m

200,000ft2

50,000ft2

CHP

50,000ft2

Offices / HQ Accommodation

20,000ft2

175,000ft2

Workings (disused)

Attenuation Pond

10,000ft2

10,000ft2

10,000ft2

10,000ft2

10,000ft2

10,000ft2

10,000ft2

400,000ft2

Path

Track

Path

Path

Long Plantation

Dismantled Railway

80,000ft2

80,000ft2

80,000ft2

Drain

Alder Burn

Dismantled Tramway

Bloodmire Syke

N

© Crown copyright and database rights 2017 Ordnance Survey 0100031673

Datum: OSGB 1936, Projection: British National Grid

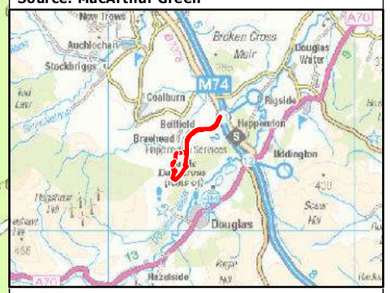
Date: 23/03/2017

3R Energy
Wind • Biomass

Legend:

- Application Site
- Diversion of Historic Tailings Runoff
- Drainage
- Realigned Channel
- Existing Pipelines
- Existing Culverts
- Drainage Direction
- Existing Access Road

Source: MacArthur Green



MacArthur Green

Dalquhandy

Figure 2b

Development Layout - Mixed Use Scheme

0 90 180

Metres

MAP SCALE: 1:5,000 @A3

Status: Rev2 Approved: CH Checked: BJF GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\H_R_Fig2b_MUL_DWDQ.mxd

282500 283000 283500 284000

633000 632500 632000

Discharge from SUDS

SUDS Pond

160,000ft2 Blending & Bottling Facility

90,000ft2

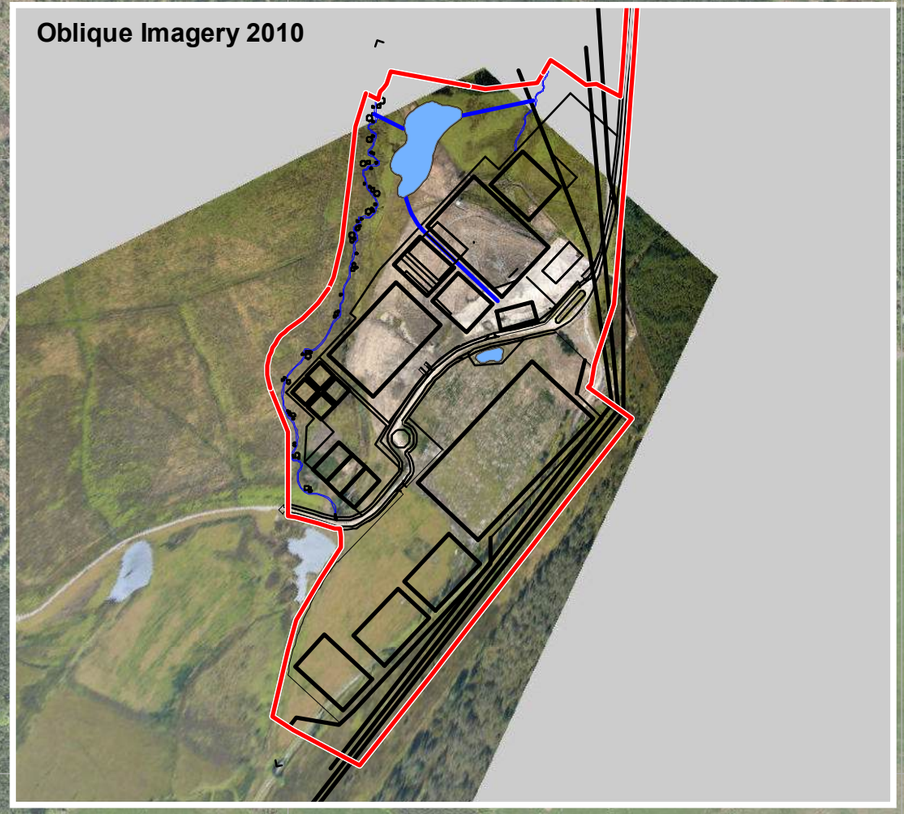
CHP

20,000 ft2

Office / HQ Accomodation

Attenuation Pond

Oblique Imagery 2010



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

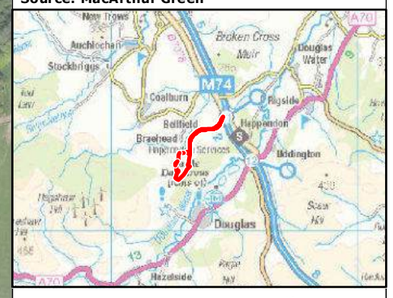
N

3R Energy
Wind • Biomass

Legend:

- Application Site
- Diversion of Historic Tailings Runoff
- Drainage
- Existing Pipelines
- Existing Culverts
- Drainage Direction
- Existing Access Road

Source: MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 3

Outline Drainage Proposal

0 90 180
Metres
MAP SCALE: 1:5,000 @A3

Status: Rev0 Approved: CH Checked: BJF GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\H_R_Fig3_ODP_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 16/03/2017

Appendix B

Surface Water Drainage Strategy