ENVIRONMENTAL STATEMENT – VOLUME 3 – APPENDIX 12.3 (TRACKED)

Existing Drainage Systems and Proposed Surface Water Drainage Strategy

Drax Bioenergy with Carbon Capture and Storage

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Applicant: Drax Power Limited

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PUBLIC

TABLE OF CONTENTS

TABLES

1. INTRODUCTION

1.1.1. Drax Power Limited (the Applicant) intends to install post combustion carbon capture technology on up to two of the existing 660-megawatt electrical ('MWe') biomass power generating units at the Drax Power Station in Selby, North Yorkshire. This will remove approximately 95% of the carbon dioxide from the flue gas, resulting in overall negative emissions of greenhouse gases.

1.1.2. The Proposed Scheme comprises an extension to the existing biomass generating units and includes the following:

- **a.** Carbon capture infrastructure at Drax Power Station on up to two biomass generating units;
- **b.** Infrastructure for the treatment and compression of carbon dioxide at Drax Power Station to allow connection to a National Grid carbon dioxide transport and storage system;
- **c.** Minor vegetation and street furniture management and other works to facilitate access during construction;
- **d.** Temporary construction laydown areas;
- **e.** Areas for habitat provision; and
- **f.** Supporting infrastructure required for the Carbon Capture Plant.

1.1.3. WSP has been commissioned by the Applicant to prepare an Environmental Statement (ES). This Surface Water Drainage Strategy Report has been produced to support the ES and sits as **Appendix 12.3** to it.

2. PROPOSED DEVELOPMENT LAYOUT

2.1.1. The area of Order Limits and the Proposed Scheme Layout are shown in **Appendix A** and **Appendix B** respectively. It needs to be noted that the Order Limits and the Proposed Scheme Layout have been revised since the consultation with the LLFA in December 2021. During this consultation, it was discussed that the Proposed Scheme will result in a maximum additional impermeable area of 18,600 m^2. This figure is conservative and provides a worst-case scenario. As such the changes to the Proposed Scheme layout introduced after December 2021, have not resulted in any changes to the extents of the additional impermeable area or require changes to the runoff calculations which were previously submitted to the LLFA and detailed within this report.

3. EXISTING SURFACE WATER DRAINAGE SYSTEM

3.1.1. Surface water runoff is collected across Drax Power Station Site by a network of surface water drains which direct these waters to the “purge”, at which point they are joined by all other waters (i.e., treated effluent and cooling water) to be discharged to the water environment via a pumped facility into the River Ouse. Due to the site constraints and continued operations the Applicant wishes to retain, enhance and reuse as much of this network as possible. A plan showing the existing surface water drainage system serving the area of the Proposed Scheme is shown in **Appendix C**.

4. GREENFIELD RUNOFF CALCULATIONS

4.1.1. The greenfield runoff rates were calculated for the maximum potential impermeable area of 18,600 m^2 which may be introduced by the Proposed Scheme. The rates were calculated based on the FEH Statistical Method using the online HR Wallingford tool[1]. The calculated greenfield runoff rates are summarised in Table 4.1 below, and details of the calculations are shown in **Appendix D**.

Table 4.1 - Greenfield Runoff Rates

Return Period	Greenfield Runoff Rate (l/s)
1 in 1 year	4.91
Q_{BAR}	5.71
1 in 30 years	9.99
1 in 100 years	11.88

[1] https://www.uksuds.com/

5. EXCEEDANCE FLOWS

5.1.1. An exceedance flows map has been produced based on the available LiDAR data[2]. The map shows the current situation and indicates the routes of potential exceedance flows. The map is shown in **Appendix E**.

5.1.2. The map indicates that exceedance flows which may potentially occur in the areas of the proposed works are likely to pond within the boundary of Drax Power Station Site, rather than be conveyed to the surrounding areas. The map also indicates that potential exceedance flows that may occur in the area of the existing woodyard are likely to be directed towards Carr Dyke, thus to the Selby Area IDB pumping station to the River Ouse, as such no offsite impacts are expected.

5.1.3. The changes to the existing surface water drainage infrastructure will not result in increases in the operation of the exceedance flow routes. The Proposed Scheme is therefore not envisaged to affect the existing exceedance flow routes.

5.1.4. Furthermore, given that there are no substantial offsite flow routes, it is considered that there is no requirement for Microdrainage modelling of the surface water network (either baseline or proposed). Any ponding that may occur for events greater than the design standards of the existing onsite surface water drainage network will be within Drax Power Station Site and thus not causing any third party impacts. This potential ponding will be gradually drained by the existing surface water drainage system once the capacity becomes available within the system. The Applicant has not experienced flooding from the existing surface water drainage system that prevented operation of Drax Power Station.

[2] https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

6. PROPOSED SURFACE WATER DRAINAGE SYSTEM

6.1. DRAINAGE HIERARCHY

6.1.1. In accordance with the National Planning Policy Framework (NPPF) and the National Planning Practice Guidance (NPPG), the site should be drained in the most sustainable way. The National Planning Policy Framework (NPPG) hierarchy, in the following order of priority is:

a. Into the ground (infiltration);

b. To a surface water body;

c. To a surface water sewer, highway drain, or another drainage system; and

d. To a combined sewer.

6.1.2. In addition, consideration should be made to the earlier SuDS principal interventions recommended in the SuDS Manual before considering the ultimate discharge pathway. These consist of:

a. Reducing and eliminating additional runoff; and

b. Reuse of runoff and harvesting.

6.1.3. For this site the drainage hierarchy is a combination of the above and the drainage scheme for the development shall be in accordance with the following hierarchy

a. Reducing and eliminating additional runoff;

b. Reuse of runoff and harvesting;

c. Discharge into the ground (infiltration);

d. Discharge to a surface water body;

e. Discharge to a public / third-party surface water sewer (e.g., highway drain, or another drainage system); and

f. Discharge to a combined sewer.

6.1.4. The approach to incorporating the drainage hierarchy in the proposed surface water drainage strategy is provided below.

REDUCING AND ELIMINATING ADDITIONAL RUNOFF

6.1.5. It is impossible to eliminate additional surface water runoff generated in the Proposed Scheme. However, the opportunities will be sought during detailed design to incorporate soft landscaping areas, where feasible, to reduce the additional runoff.

REUSE OF RUNOFF AND HARVESTING

6.1.6. Surface water runoff will remain being collected across Drax Power Station Site, outside of the Proposed Scheme area, by a network of surface water drains. Within the Proposed Scheme areas within Work Nos. 1D and 2 (and 3 if required) shown on the Works Plans AS-073, a new surface water drainage system will be installed. These new drains ~~from the Proposed Scheme~~ will ~~then~~ be directed~~, as collected surface water~~, to a new sump and pump arrangement which, under normal operating conditions, ~~will then~~ direct these waters to the existing "northern cooling water reservoir", at which point they will be utilised as cooling water (i.e. not discharged to the River Ouse, as is the current scenario), thus reducing the volume of water which needs to be abstracted from the River Ouse (which currently occurs under an abstraction licence) this is a far more sustainable solution. It is currently envisaged that the runoff from the other parts of Drax Power Station Site will be connected to the existing cooling water system, subject to detailed design.

6.1.7. After the waters are used in the cooling water they are then directed to the "purge" and pumped into the River Ouse – as per the current arrangement. The plan shown in Appendix F indicates ~~the changes to the existing~~a potential layout for the new surface water ~~surface water~~ drainage system which would be required ~~to allow~~ for the Proposed Scheme. Further details are provided in Section 6.6~~ and a new connection between the existing surface water drainage system and the cooling system~~.~~ Due to the site constraints the existing surface water drainage system will be retained, enhanced and reused as much as possible.~~.

INFILTRATION TO THE GROUND

6.1.8. A number of in-situ soil infiltration tests were undertaken as part of the site investigation undertaken to inform the White Rose Carbon Capture and Storage Surface Water and Flood Risk Environmental Statement Chapter[3], this was another project associated with Drax Power Station. The results show a very low permeability ranging between 1.1 x 10^{-5} m/s and 6.97 x 10^{-8} m/s. These results confirm that infiltration techniques are unlikely to be feasible in Drax Power Station Site.

6.1.9. Additionally, options for infiltration are not possible due to underlying clay ground conditions and likely high groundwater levels as advised by the Selby Area IDB. Furthermore, the site lies partially within a groundwater Source Protection Zone 3.

DISCHARGE TO SURFACE WATER BODY

6.1.10. No new discharges to surface water body from the Proposed Scheme are envisaged, as generated runoff is proposed to be utilised in the existing cooling water system. This would result in a reduction of the total discharge from Drax Power Station Site.

DISCHARGE TO PUBLIC / THIRD-PARTY SURFACE WATER / COMBINED SEWERS

6.1.11. No connection to public or third-party sewers are proposed. There is therefore no impact on the Yorkshire Water assets.

6.2. DESIGN PRINCIPLES

6.2.1. Detailed design of the new aspects of the surface water drainage strategy will be in accordance with the following guidance:

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[3] White Rose Carbon Capture and Storage Surface Water and Flood Risk Environmental Statement Chapter, by ERM, 2014

a. North Yorkshire County Council SuDS Design Guide 2018;

b. Should any (minor) ~~A~~alterations be required to the existing surface water drainage network, these would ensure continuation of the existing design standards as a minimum for each modified section of the infrastructure; and

c. The ~~N~~new surface water drainage networks~~s~~, ~~where~~ which are required for the Proposed Scheme will be designed for no flooding in 1 in 30 year event and that any flooding from 1 in 100 year event with a climate change allowance[4] is contained within Drax Power Station Site.

6.3. PUMP RATES

6.3.1. The new pump which will convey water from the Proposed Scheme's surface water drainage system to the cooling water system will be sized to have a minimum pump rate ~~of 695 m^3/hr which will~~ which~~to~~ ensures that there is no offsite flooding for the 1 in 100 year plus climate change event.~~,~~ T~~t~~his is currently calculated as 695 m^3/hr, but will be subject to the detailed design of the new drainage infrastructure. Higher pump~~s~~ rates will be required, if areas beyond the Proposed Scheme are to be connected.

6.3.2. Any flooding from the surface water drainage system occurring during the 1 in 100 year event with climate change allowance will be contained within Drax Power Station Site. This is demonstrated to be achieved through the analysis of the exceedance flow paths shown in Appendix E.

6.4. PROPOSED POLLUTION PREVENTION MEASURES

6.4.1. The Proposed Scheme would include a system of containments to mitigate potential risk of pollution surrounding site area and / or environment.

6.4.2. The following areas would include containment measures to collect potentially contaminated surface water runoff:

a. Solvent Storage and Make-up System;

b. Chemicals for Carbon Capture Waste Water Treatment Plant;

c. Chemicals for Quench Column; and

d. Chemicals for Absorber Column.

6.4.3. These areas would be kerbed or bunded to collect surface water runoff. These will be designed in accordance with the COSHH / COMAH / HSE guidance / GPPs requirements at the detailed design stage. Consideration will be given to any additional requirements to prevent damage to the sensitive infrastructure from the debris during flood events. As part of the operating procedures for these areas the discharge valves would be kept closed and the water collected would be tested (the approach is subject to detailed design) to identify if contaminants are present. Where

[4] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances, May 2022`

the water meets discharge criteria, the surface water would be discharged in line with the Drax Power Station discharge consent. If the surface water does not meet consent conditions it would either be transferred to the Carbon Capture Waste Water Treatment Plant for treatment or, if contaminant levels are such that they cannot be treated on site, to a storage tank prior to removal and treatment off site under a waste transfer licence to a suitable licensed wastewater treatment facility. The environmental controls to operate these areas would be included in the Drax Power Station environmental management system (EMS) certified in accordance with the ISO 14001.

6.4.4. Oil Storage for the Flue gas blower, CO_2 compressor and air compressor unit would be designed in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001. All potentially oil contaminated storm water in these areas would be collected into the oil water drain pit and transferred to the existing oily wastewater system.

6.4.5. Rich Solvent / Lean Solvent Heat Exchangers would be individually bunded. The bunds will be designed in accordance with the COSHH / COMAH / HSE guidance / GPPs requirements at the detailed design stage.

6.4.6. As part of the detailed design an assessment of the risk for all the tanker / chemical unloading bays will be undertaken, this will determine whether they are designed as fully bunded areas or require suitable protection measures to prevent the entry of any spillages to the on-site surface water drainage systems. The bunds, if required, will be designed in accordance with the COSHH / COMAH / HSE guidance / GPPs requirements at the detailed design stage.

6.4.7. There would be additional control measures in accordance with the ISO 14001 certified EMS for the Proposed Scheme in order to control surface water runoff that could become contaminated by chemicals and oil. These would include, but not be limited to, the following:

- **a.** A minimum of twice daily checks would be undertaken to inspect for chemical and oil leakage. Furthermore, there is a constant presence of key operative staff at Drax Power Station Site, who wound undertake informal checks as part of their other duties and could undertake immediate rectification / pollution prevention measures as required;
- **b.** Drip trays, or similar, would be installed under pumps to capture any potential leaks; and
- **c.** Containment trays / pans and shrouds will be installed for the Plate Heat Exchanger (PHE).

6.4.8. Leakage detection systems will be considered for high risk areas during detailed design.

6.4.9. The surface water drainage network for the Proposed Scheme will include oil separators as required during detailed design in accordance with the best practice.

POLLUTANTS CONTAINED IN FIRE WATER RUNOFF

6.4.10. In accordance with the existing site operating procedures / emergency plan should a major fire incident occur at Drax Power Station Site, the valve in the main ‘purge’ pump (the discharge to the River Ouse) will be closed with fire waters retained within Drax Power Station Site. These will be than treated / transported off site as needed.

6.5. HABITAT PROVISION AREA AND OFF-SITE HABITAT PROVISION AREA

6.5.1. The works proposed in Habitat Provision Area and Off-Site Habitat Provision Area are limited to biodiversity improvements / planting. No increase in impermeable areas or runoff volumes / rates are expected. Therefore, no surface water drainage strategy is required for these areas as the proposals will mimic the existing drainage patterns.

6.6. CONCEPTUAL SURFACE WATER DRAINAGE STRATEGY

6.6.1. The conceptual surface water drainage strategy has been designed in accordance with the above principles and is shown in **Appendix F**. This strategy is focused on the areas of the Proposed Scheme (within the areas of Work Nos.~~-~~ 1D and 2, as shown in the Works Plans, AS-073), where demolition / development is proposed, thus new surface water drainage infrastructure will be required. However, depending upon the requirements established during detailed design, changes to the surface water drainage infrastructure or features may also be required in the area of Work No. 3.

6.6.2. The strategy is based on a principle of reuse of the runoff generated in the Proposed Scheme~~. **Appendix F** demonstrates that the proposed drainage strategy would require minor changes to the existing surface water drainage network, as such in these instances the current design standards will be retained. In locations where more substantial works are required, than~~ and adoption of the design standards / ~~will be in accordance with design~~ principles specified in Section 6.2 of this report, and pollution prevention measures will be in accordance with Section 6.4. It should be noted that this is one potential option, which demonstrates that drainage routes to the purge and reservoirs could be achieved, without adversely impacting flood risk or existing drainage capacity of the existing infrastructure. Alternative options / routes / layouts may be considered during detailed design, when further detail on the final design of the Proposed Scheme is known. However, any layout must accord with the principles set out in this document

~~6.6.1.~~6.6.3. The drainage strategy will be approved by the LLFA during detailed design and must be appropriately maintained throughout the lifetime of the Proposed Scheme.

6.7. SUMMARY

6.7.1. As stated above, the Proposed Scheme will lead to an increase in total impermeable area however, the drainage strategy developed in accordance with the site specific drainage hierarchy will result in a reduction in runoff volume and peak discharge rate to the water environment and include appropriate pollution prevention measures.

7. ESTIMATED PEAK RUNOFF GENERATED IN THE NEW IMPERMEABLE AREAS

7.1.1. To demonstrate that the cooling reservoirs have sufficient capacity to receive and store the surface water runoff generated from the Proposed Scheme, an assessment, using conservative principles, given the stage of the design, has been undertaken to assess the maximum likely runoff volume.

~~7.1.1.~~7.1.2. A peak flow of 695 m^3/hr was estimated for the 1 in 100-year 6 hours storm event with ~~40%~~ climate change allowance[5] for the indicated new impermeable areas. The estimation was undertaken using the Rational Method, as agreed with the Lead Local Flood Authority (LLFA) on 17/12/2021 (**Appendix H**), and based on the following information:

- **a.** Proposed impermeable area of approximately 18,600m^2 – it should be noted that this is considered to be a very conservative approach indicating a worst-case scenario (and will be updated as refined information becomes available);
- **b.** 40% climate change allowance[5]~~[4]~~. Even though the design life of the Proposed Scheme is 25 years meaning that climate change allowance lower than 40% should be acceptable, a conservative allowance of 40% has been taken for the purpose of this assessment of the capacity of the existing cooling tower reservoirs;
- **c.** FEH2013 Point Rainfall Data; and
- **d.** Hyetograph derived from ReFH2 outputs.

~~7.1.2.~~7.1.3. The peak runoff volume calculations are attached to this report in Appendix G.

[5] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances, May 2022

8. CURRENT ABSTRACTION RATES

8.1.1. The water used within the existing cooling system is abstracted from the River Ouse, this is termed “make up water”, given that it is abstracted to make up the water lost in the cooling process. Water abstracted from the River Ouse is directed to a sedimentation tank, then a flow balancing tank prior to pumping to the cooling water reservoirs, the need for and rate of is controlled by the levels in the reservoir. The silt collected in the sedimentation tanks is returned to the River Ouse via the purge pump together with the other water discharged from Drax Power Station Site.

8.1.2. The volume of abstracted water is divided roughly evenly between the southern and northern cooling towers. The permitted abstraction volume is 470,000 m^3/day (19,583 m^3/hr). Information on the abstracted water volumes recorded for years 2006 – 2020 is summarised in the **Table 8.1** below. The same table provides a comparison of the volume of abstracted water required for the northern cooling towers with a peak flow estimated for the 1 in 100-year 6 hours storm event with 40% climate change allowance[6] (see Section 7 for context).

8.1.3. **Table 8.1** shows that currently more than 3,000 m^3/hr is abstracted, used and stored in the existing cooling system. The Proposed Scheme will not result in any changes to the existing cooling water requirements / operation. The peak runoff of 695 m^3/hr from the new impermeable areas makes up only approximately 20% of the total volume of water per hour needed for the cooling process, therefore, even with this water diverted into the northern cooling reservoir, there will be a short fall of more than 2,000 m^3/hr, which will need to be abstracted from the River Ouse.

8.1.4. The figures shown in **Table 8.1** also provide evidence that the proposed usage of surface water runoff in the cooling system will reduce the volume of water which needs to be abstracted from the river. The remainder of water required for the cooling process will be supplied by surface water runoff generated in other areas of Drax Power Station Site (subject to detailed design) and / or make up water from the River Ouse. This will result in the reduction of surface water discharge during storm events.

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[6] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances, May 2022

Table 8.1 - Abstraction Volumes and Rates

<table>
<tr><th rowspan="2">Year</th><th>Permitted Total Abstraction Volume</th><th>Current Total Abstraction Volume</th><th>Volume of Abstracted Water Required for Northern Cooling Towers only</th><th>Scheme Resultant Peak Flow for 1 in 100yr 6hrs Storm Event, incl. 40% Climate Change Allowance</th><th>Additional Volume for Northern Towers Cooling Process Required During 100yr 6hrs storm event</th></tr>
<tr><th>m^3/hr</th><th>m^3/hr</th><th>m^3/hr</th><th>m^3/hr</th><th>m^3/hr</th></tr>
<tr><td>2020</td><td rowspan="15">19,583</td><td>6,260</td><td>3,130</td><td rowspan="15">695</td><td>2,435</td></tr>
<tr><td>2019</td><td>7,306</td><td>3,653</td><td>2,958</td></tr>
<tr><td>2018</td><td>6,804</td><td>3,402</td><td>2,707</td></tr>
<tr><td>2017</td><td>6,518</td><td>3,259</td><td>2,564</td></tr>
<tr><td>2016</td><td>6,039</td><td>3,019</td><td>2,325</td></tr>
<tr><td>2015</td><td>6,918</td><td>3,459</td><td>2,764</td></tr>
<tr><td>2014</td><td>7,135</td><td>3,567</td><td>2,873</td></tr>
<tr><td>2013</td><td>6,495</td><td>3,248</td><td>2,553</td></tr>
<tr><td>2012</td><td>6,473</td><td>3,236</td><td>2,542</td></tr>
<tr><td>2011</td><td>6,610</td><td>3,305</td><td>2,610</td></tr>
<tr><td>2010</td><td>7,397</td><td>3,699</td><td>3,004</td></tr>
<tr><td>2009</td><td>6,644</td><td>3,322</td><td>2,627</td></tr>
<tr><td>2008</td><td>6,952</td><td>3,476</td><td>2,781</td></tr>
<tr><td>2007</td><td>6,826</td><td>3,413</td><td>2,719</td></tr>
<tr><td>2006</td><td>6,769</td><td>3,385</td><td>2,690</td></tr>
</table>

9. POST-DEVELOPMENT DISCHARGE

9.1.1. Construction of the Proposed Scheme and the harvesting of storm water will result in a reduction of water discharged (‘purged’) from the site during storm events. The purged water is water discharged to the River Ouse and is largely made up of water from the cooling water system which is no longer suitable for re-circulation but remains within the parameters of the current Environmental Permit for discharge of waters to the River Ouse. This water is current replaced by abstracted water, although there are also evaporation losses, hence in the current situation the volume of discharged water is less than the volume of that abstracted.

9.1.2. In the baseline scenario during a storm event, the surface water runoff from the entire site is directed to the purge system and is discharged to the River Ouse.

9.1.3. In the post-development scenario, surface water from the new impermeable areas and from the rest of Drax Power Station Site (the latter is subject to detailed design, if not feasible – the current regime for the area outside of the Proposed Scheme will be maintained) will be directed into the north cooling water reservoirs for use in the cooling process. This will result in substantial reduction in abstraction volumes and rates. Hence, the overall discharge volume to the River Ouse will be reduced (including climate change allowance) as surface water will be harvested with some of it effectively lost through the cooling process. Considering this and given the rapid usage of water in the cooling towers, as evidenced in Table 2 against the increase in impermeable areas, the overall impact will be no increase in a peak flow increase to the River Ouse during the large magnitude events and the reduction in runoff volume from all other lesser events.

9.1.4. In the unlikely scenario (given the high rate of water use) of the reservoirs being full during a storm event then excess surface water will be routed to purge and discharged to the River Ouse as is currently the case. It should be noted that the abstracted water currently is and will remain to be directed to a sedimentation tank, then a flow balancing tank prior to pumping to the cooling water reservoirs, the rate of which is controlled by the levels in the reservoir. Considering this, surface water runoff directed to the cooling reservoirs will reduce the need for water abstraction from the river, so the double counting of flows from the surface water runoff and abstracted flows from the River Ouse is unlikely to happen.

10. APPROVAL IN PRINCIPLE

10.1.1. As part of the consultation, the LLFA reviewed the information provided in this report and confirmed that the proposed surface water drainage strategy is accepted in principle. The confirmation letter from the LLFA is shown in **Appendix I**.

10.1.2. The LLFA also requested further information on design standards and drainage layout, and calculations. These are provided in Section 6 (design standards and drainage layout), and Sections 4 and 7 (greenfield and post-development calculations respectively).

10.1.3. It is envisaged that the Proposed Scheme will not increase the existing discharge rate from Drax Power Station Site to the Selby Area IDB drainage network or include new outfalls into their assets. Therefore, the proposal meets the drainage requirements of the Selby Area IDB.

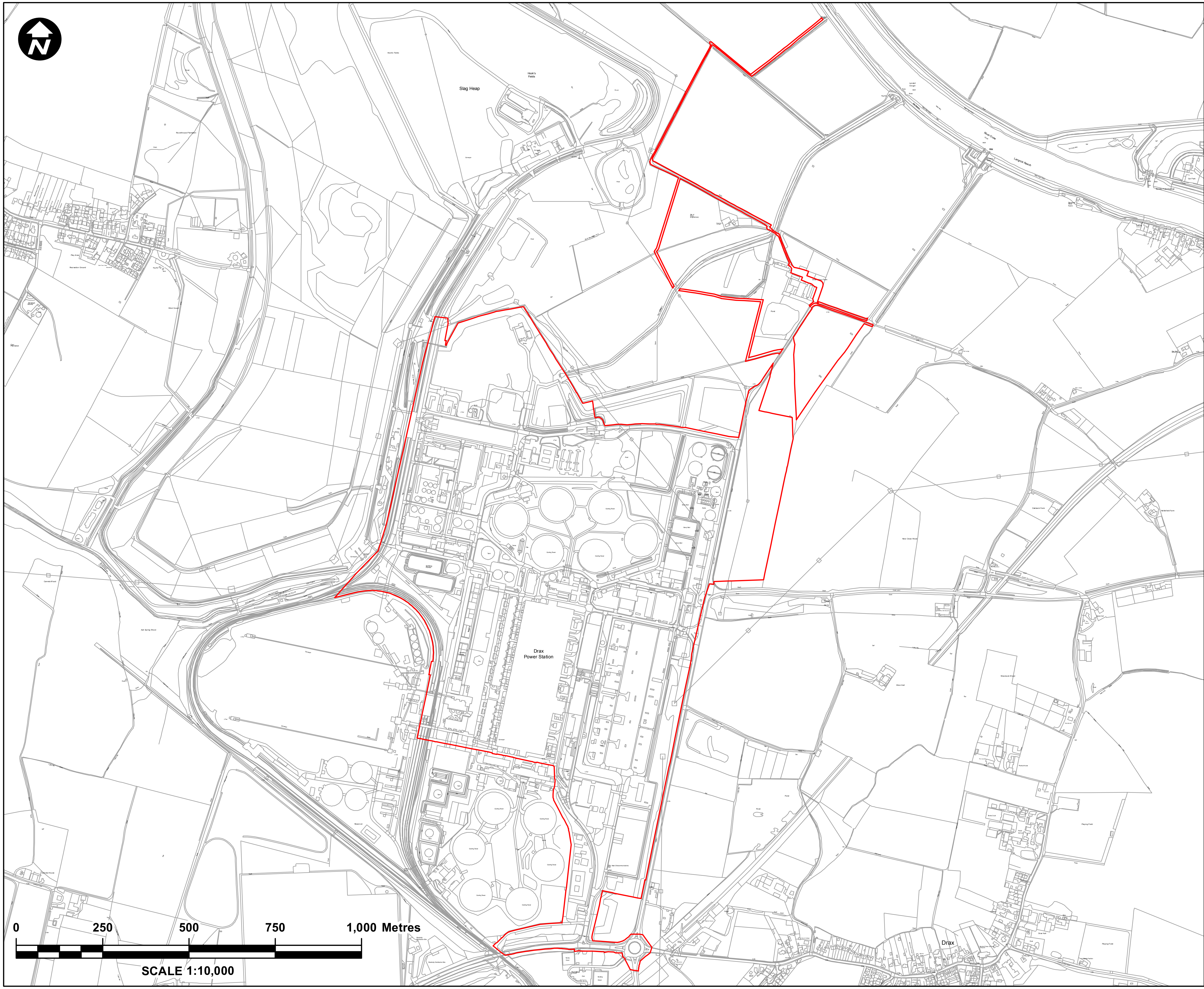
10.1.4. As part of the consultation with the Environment Agency, they stated that surface water drainage strategy is a matter for the LLFA / IDB. No further consultation on that matter with the Environment Agency is therefore required.

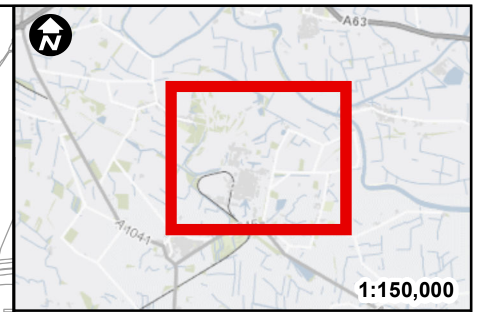
11. CONCLUSIONS

11.1.1. This report demonstrates that the additional surface water runoff that will be generated as a result in the change in impermeable areas as part of the BECCS scheme will be collected (via new surface water drainage infrastructure), stored and used within the cooling water process, with no increase in discharge off site. Furthermore, the Proposed Scheme may result in a decrease in surface water runoff from the wider Drax Power Station Site, especially for the more frequent events. This is because it is expected that surface water from the other parts of Drax Power Station Site, where feasible, will also be connected into the northern cooling water reservoir and used in the cooling process. This is a more sustainable option than abstracting water from the River Ouse.

APPENDICES

APPENDIX A – ORDER LIMITS





Key:

Order Limits

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

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drax

wsp

PROJECT TITLE

DRAX BECCS DCO

DRAWING TITLE

ORDER LIMITS

DRAWING STATUS

FOR ISSUE

DRAWN	CHECKED	APPROVED	AUTHORISED
LH	BS	ES	LM

SCALE @ A3 SIZE	DATE	REVISION
1:10,000	12/05/2022	P01

DRAWING NUMBER

SURFACE WATER DRAINAGE STRATEGY - FIGURE 1

APPENDIX B – INDICATIVE SITE LAYOUT

Item	Description
1	Gas / Gas Heat Exchanger
2	Quench Column
3	Absorber Column
4	Solvent Regeneration System (Regenerators and Solvent Processing)
5	Rich Solvent / Lean Solvent Heat Exchangers
6	Main Process and Services Rack
7	Steam Pipe Bridge
8	Combined Power Turbines Building
9	Pressure Reducing De-Superheating Station Buildings
10	Solvent Storage and Make-up System
11	Carbon Dioxide Pipe Bridge
12	Carbon Dioxide Processing and Compression Plant
13	Carbon Dioxide Main Vent Stacks
14	Carbon Capture Wastewater Treatment Plant
15	Electrical Switchroom Buildings
16	Carbon Dioxide Delivery Terminal Compound (National Grid Carbon Limited)
17	Fire Water Tanks

Key:

- Order Limits
- Pipe Bridges and Ducting
- Aboveground Carbon Dioxide Pipeline
- Underground Carbon Dioxide Pipeline

Notes:

1. This drawing includes only the main plant equipment / buildings as referenced in Schedule 14 of the draft DCO.
2. Although the layout configuration, dimensions and number of plant equipment / buildings presented should be considered indicative, it represents the current concept design which has been developed from thorough and detailed engineering work with consideration given to the deliverability and integration with the existing Drax Power Station. For reference of the maximum parameters used for the environmental assessment, please refer to Schedule 14 of the draft DCO.
3. 7 metre easement from the culvert walls of Carr Dyke required. Route and width of culvert indicatively shown on plan but to be confirmed during surveys at Detailed Design.
4. Any works associated with replacements, upgrades or modifications of existing plant equipment / buildings have not been shown in this drawing. However, specific details for each of these works have been outlined below for reference, and details of all works have been included in Chapter 2 - Project Description of the Environmental Statement and Schedule 1 of the draft DCO:
   - 4.1. An alternate secondary electrical supply for the BECCS equipment would be provided from the existing 132 kV air insulated switchgear through upgrade works on the existing 400 kV National Grid substation, the existing 132 kV air insulated switchgear, replacement of existing 132 kV underground cabling and restringing of existing 132 kV overhead powerlines, and installation of new distribution voltage infrastructure.
   - 4.2. Cooling requirements would be provided using the existing northern cooling towers. Modification works would be required to the existing cooling water pumps and reconfiguration of the cooling water discharge manifold.
   - 4.3. Modification, upgrade and extension works would be required to the existing Unit 1 and Unit 2 to enable steam extraction and supply to the BECCS equipment.
   - 4.4. Modification and refurbishment works would be required to the existing Unit 1 and Unit 2 electrostatic precipitators.
   - 4.5. Replacement and upgrade works would be required to the existing main generator transformers for Unit 1 and Unit 2.
   - 4.6. Retrofitting works would be required to the existing Sedimentation Tanks to ensure suitable quality of circulating water through the BECCS plant.

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(o)

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drax

wsp

PROJECT TITLE
DRAX BECCS DCO

DRAWING TITLE
INDICATIVE PLANT EQUIPMENT LAYOUT

DRAWING STATUS
FOR ISSUE

DRAWN	CHECKED	APPROVED	AUTHORISED
CH	RM	MM	NA

SCALE @ A0 SIZE	DATE	REVISION
1:1,250	06/05/2022	P01

DRAWING NUMBER
Surface Water Drainage Strategy - Figure 2

APPENDIX C – EXISTING SURFACE WATER DRAINAGE SYSTEM

NOTES:

SITE DRAINAGE SCHEME NOTES & OUTFALL DETAILS FROM DRAWING 038411 REVISION Z9 DATED 05/08/2020

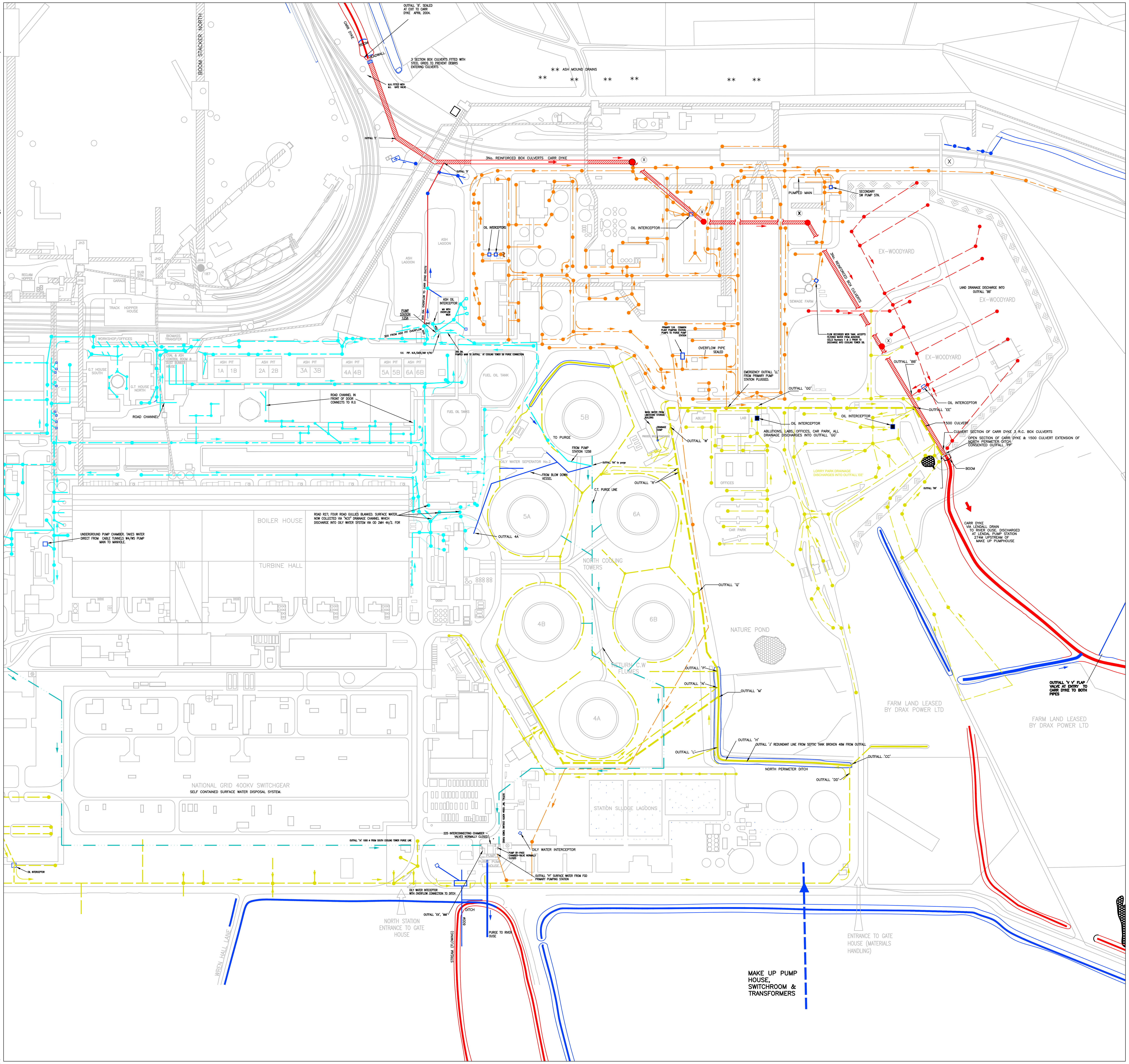
THE MAIN STATION AREA IS FLAT AND HAS BEEN RAISED FROM 4.25M TO 6.1M ABOVE ORDNANCE DATUM (OD) TO PROVIDE PROTECTION AGAINST FLOODING. A PERIMETER DITCH WHICH SURROUNDS THE STATION IS ARRANGED TO COLLECT THE ON & OFF SITE DRAINAGE AND CHANNEL THE WATER INTO CARR DYKE LOCATED TO THE NORTH WEST OF THE STATION. WHERE NECESSARY THE PERIMETER DITCH IS CULVERTED.
THE NORTH SIDE OF THE STATION DISCHARGES SURFACE WATER INTO CARR DYKE VIA CONSENTED OUTFALL 'PP'. THE WATER FROM CARR DYKE FEEDS INTO LENDALL DRAIN AND VIA LENDALL PUMPING STATION & IS DISCHARGED INTO THE RIVER OUSE. THE MAJORITY OF THE SITES' SURFACE WATER DISCHARGES VIA THE PURPE PUMPING STATION NEXT TO NORTH GATE INTO OUTFALL "K" INTO THE RIVER OUSE.
CONTAMINATED WATER FROM THE COAL AND ASH MOUNDS ETC. IS CHANNELED VIA DRAINS TO THE SLUDGE LAGOONS. THE RESULTING 'FILTERED WATER' IS THEN PUMPED TO THE PURGE SYSTEM TO DISCHARGE THROUGH OUTFALL "K", OR TO THE SEDIMENTATION TANKS AND THROUGH TO THE COOLING WATER MAKE-UP PIPELINE TO THE COOLING TOWERS. NOTE THE FILTERED WATER LINE DISCHARGE POINT IN THE PURGE PUMPING STATION BYPASSES THE MONITORING CHAMBER AND CAN ONLY CARRY SURFACE WATER.
THE LENDALL PUMPING STATION IS OWNED AND MAINTAINED BY THE N.R.A & IS LOCATED 274M UPSTREAM OF THE MAKE-UP PUMPHOUSE.
WHERE CONTAMINATION BY OIL IS POSSIBLE (E.G. IN TRANSFORMER OR OIL TANK STORAGE AREAS, CAR PARKS ETC) THE SURFACE WATER IS CHANNELED TO OIL INTERCEPTORS.

RED TEXT DENOTES OUTFALL IS NOT IN USE.

OUTFALL 'A'	COAL STORAGE EMERGENCY OVERFLOW TO CONCRETE CULVERT.
OUTFALL 'B'	COAL STORAGE OVERFLOW TO CONCRETE CULVERT 915MM DIA PIPE @ 457M /HR FLOW.
OUTFALL 'D'	WEST SIDE SURFACE DRAINAGE TO CONCRETE CULVERT. 915MM DIA PIPE @ 702M /HR FLOW. (NOT USED)
OUTFALL 'E'	OVERFLOW FROM COAL STORE TO CONCRETE CULVERT 305MM DIA PIPE INCLUDED IN "B" WEIR & SCUMBOARD FITTED.
OUTFALL 'H'	ROAD DRAINAGE TO PERIMETER DITCH FROM EAST LAGOONS 457MM DIA. PIPE @ 50M3//HR.
OUTFALL 'J'	SEPTIC TANK OUTFALL & SEDIMENTATION TANK AREA TO PERIMETER DITCH 102MM DIA.
OUTFALL 'K'	RIVER OUSE PURGE OUTFALL 1525MM DIA. 14822 M3/ /HR

NOTE OUTFALLS L, M, N, P, Q, R & EE GO TO NORTH PERIMETER DITCH.

OUTFALL 'L'	LAND DRAINS FROM NORTH COOLING TOWERS 152MM DIA. 468 M3 /HR TO NORTH PERIMETER DITCH.
OUTFALL 'M'	OVERFLOW FROM NORTH COOLING TOWERS 300MM DIA. 2304 M3 /HR TO NORTH PERIMETER DITCH.
OUTFALL 'N'	PUMPED OVERFLOW LAND DRAINAGE FROM NORTH COOLING TOWERS 2X150MM DIA. 75 M3 /HR NOMINAL FLOW TO NORTH PERIMETER DITCH.
OUTFALL 'P'	LAND DRAINAGE FROM NORTH COOLING TOWERS 150MM DIA. 46 M3 /HR FLOW TO NORTH PERIMETER DITCH.
OUTFALL 'Q'	MANHOLE CONNECTION FROM NORTH COOLING TOWERS 200MM DIA. 72 M3 /HR FLOW TO NORTH PERIMETER DITCH.
OUTFALL 'R'	PUMPED OVERFLOW OF LAND DRAINS FROM NORTH COOLING TOWERS 300MM DIA. 187 M3/HR FLOW TO NORTH PERIMETER DITCH
OUTFALL 'W'	F.GD PROCESS WATER PUMPHOUSE TO CULVERTED SECTION OF NORTH PERIMETER DITCH.
OUTFALL 'BB'	F.G.D CONTRACTORS AREA THROUGH OIL INTERCEPTOR TO CULVERTED SECTION OF CARR DYKE. 600MM DIA. 893 M3 /HR FLOW.
OUTFALL 'CC'	F.G.D ENTRANCE ROAD DRAINAGE TO OPEN DITCH. 300MM DIA. 133 M3 /HR FLOW
OUTFALL 'DD'	SEDIMENTATION TANK AREA TO OPEN DITCH. 300MM DIA. 133 M3 /HR FLOW
OUTFALL 'EE'	F.G.D CARPARK OIL INTERCEPTOR TO CULVERTED SECTION OF NORTH PERIMETER DITCH. 450MM DIA. 878 M3 /HR FLOW.
OUTFALL 'GG'	F.G.D CARPARK LAB & OFFICESTO CULVERT SECTION OF NORTH PERIMETER DITCH. 600MM DIA. 853M /HR FLOW
OUTFALL'HH'	Ø900 OVERFLOW CULVERT COAL MOUND DRAINAGE TO OFFSITE DITCH. CAN WORK OPPOSITE WAY, DITCH TO COAL MOUND DRAINAGE.
OUTFALL'JJ'	Ø900 OVERFLOW CULVERT COAL MOUND DRAINAGE TO OFFSITE DITCH. CAN WORK OPPOSITE WAY, DITCH TO COAL MOUND DRAINAGE. CULVERT FOUND IN CATCH PIT. NOT FOUND IN DITCH.
OUTFALL'KK'	OILY WATER SEPARATOR NO.2 CLEAN WATER TO COOLING TOWER 5B PURGE CHAMBER, TO PURGE PUMPHOUSE.
OUTFALL'LL'	F.G.D. SURFACE WATER PRIMARY PUMP STATION TO CULVERT. DISCHARGE TO CARR DYKE OVERFLOW.
OUTFALL'MM'	PURGE PUMPHOUSE ADJACENT NORTH GATE HOUSE. OVERFLOW FROM WATER TREATMENT PLANT: PUMPED.
OUTFALL'NN'	PURGE PUMPHOUSE ADJACENT NORTH GATE HOUSE. COOLING WATER FROM NORTH COOLING TOWERS
OUTFALL'PP'	CULVERT SECTION CARR DYKE, HEADWALL AT EXIT TO OPEN DITCH SECTION CARR DYKE, F.G.D.
OUTFALL'RR'	F.G.D. LAND DRAINAGE & ROAD DRAINAGE IN VICINITY OF MATERIALS HANDLING GATEHOUSE, TO OPEN SECTION OF CARR DYKE AT CULVERT EXIT HEADWALL.
OUTFALL'SS'	CARR DYKE AT LENDALL PUMP STATION TO RIVER OUSE
OUTFALL'TT'	PURGE OUTFALL & JETTY AT RIVER OUSE. SURFACE WATER FROM ROADS & BUILDINGS & FILTERED WATER FROM SEPTIC TANK TO OFF SITE DITCH. DITCH DISCHARGES TO RIVER OUSE.
OUTFALL'UU'	C.W. INLET AT RIVER OUSE. SURFACE WATER FROM ROADS & BUILDINGS & FILTERED WATER FROM SEPTIC TANK TO OFF SITE DITCH. DITCH DISCHARGES TO RIVER OUSE.
OUTFALL `VV'	CULVERT FROM PUMP STATION ECOLOGICAL LAGOON TO OPEN SECTION OF CARR DYKE. NOW REDUNDANT.
OUTFALL `WW'	PURGE PUMPHOUSE ADJACENT NORTH GATEHOUSE. SLUDGE DRAIN FROM SEDIMENTATION SETTLING TANKS. RIVER WATER. PUMPED.
OUTFALL `XX'	PURGE PUMP HOUSE ADJACENT NORTH GATE HOUSE. SURFACE WATER. ORIGIN UNKNOWN.
OUTFALL `YY'	PURGE PUMP HOUSE ADJACENT NORTH GATE HOUSE. SURFACE WATER FROM F.G.D. PRIMARY PUMP STATION.
OUTFALL `ZZ'	PURGE PUMP HOUSE ADJACENT NORTH GATE HOUSE. SURFACE WATER EMERGENCY DUMP TO PURGE VIA PUMP STATION NO. 125B
OUTFALL `1A'	PURGE PUMP HOUSE ADJACENT NORTH GATE HOUSE. COOLING WATER FROM SOUTH COOLING TOWER.
OUTFALL `2A'	FROM NO.1 OILY WATER INTERCEPTOR TO SOUTH COOLING TOWER PURGE LINE TO PURGE PUMPHOUSE. FILTERED WATER.
OUTFALL `3A'	SOUTH BLOWDOWN TANK TO SOUTH COOLING TOWER PURGE LINE TO PURGE PUMPHOUSE. CONDENSATE.
OUTFALL `4A'	NORTH BLOWDOWN TANK, NORTH OILY SEPARATOR & PUMP STN 125A.TO NORTH COOLING TOWER PURGE LINE TO PURGE PUMPHOUSE. CONDENSATE. FILTERED WATER & SURFACE WATER.
OUTFALL `5A'	ECO STORE ATTENUATION LAGOON TO PURGE C.T. 2A.



GENERAL ARRANGEMENT

SCALE 1: 2,500 @ A1
SCALE 1: 5,000 @ A3

DO NOT SCALE

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING WAS EXTRACTED FROM A DRAWING PROVIDED BY DRAX POWER LIMITED (DOCUMENT REFERENCE DF3-008)
2. TO BE READ IN CONJUNCTION WITH DRAWING 70072063 - INDICATIVE CHANGES TO EXISTING SW DRAINAGE SYSTEM

KEY:

- WOODYARD TO OUTFALL BB CAR DYKE CUL
- FILTERED WATER FROM FGD TO PRIMARY PUMP STATION TO PURGE
- WEST SIDE OF STATION TO PUMP STATION 125A TO CT
- SITE AREAS TO OUTFALL PP EAST
- PURGE SYSTEM
- IDB MAINTAINED DITCH
- CULVERTED SECTION OF DITCH (IDB MAINTAINED)

REV	DATE	DESCRIPTION OF REVISIONS	DRAWN	CHK	APP
P01	01/02/2022	EXISTING SURFACE WATER DRAINAGE SYSTEMS	BH	ES	AS

DRAWING STATUS: S2 - FOR INFORMATION

CONTRACTOR (S):

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PROJECT: DRAX BECCS

DRAWING TITLE: EXISTING SURFACE WATER DRAINAGE SYSTEMS

DESIGNED	-	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
DRAWN	BEN HOLLAND	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
CHECKED	ELZBIETA SZOSTAK	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
APPROVED	ANDY SMITH	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
SCALE @ A1: 1 : 2500		ELR & MILEAGE: N/A			
PROJECT NO: 70072063		SHEET: SHEET 1 OF 1			
DRAWING No: 70072063-EXISTING SURFACE WATER DRAINAGE SYSTEM		REV: P01			

File name \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70072XXX\70072063 - DRAX BECCS DCO\03 ENVIRONMENT\09 SURFACE WATER\04 WIP\DRAINAGE STRATEGY\EXISTING AND PROPOSED SW DRAINAGE\70072063-EXISTING SURFACE WATER DRAINAGE SYSTEM.DWG, printed on 30 March 2022 17:04:16, by Holland, Ben

APPENDIX D – GREENFIELD RUNOFF RATES

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Elzbieta Szostak
Site name:	Drax Power Station_BECCS
Site location:	Drax, North Yorkshire

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.74127° N
Longitude:	0.99745° W
Reference:	4293586361
Date:	Mar 23 2022 16:53

Runoff estimation approach FEH Statistical

Site characteristics

Total site area (ha): 1.86

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.325
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.06

Hydrological characteristics	Default	Edited
SAAR (mm):	597	597
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

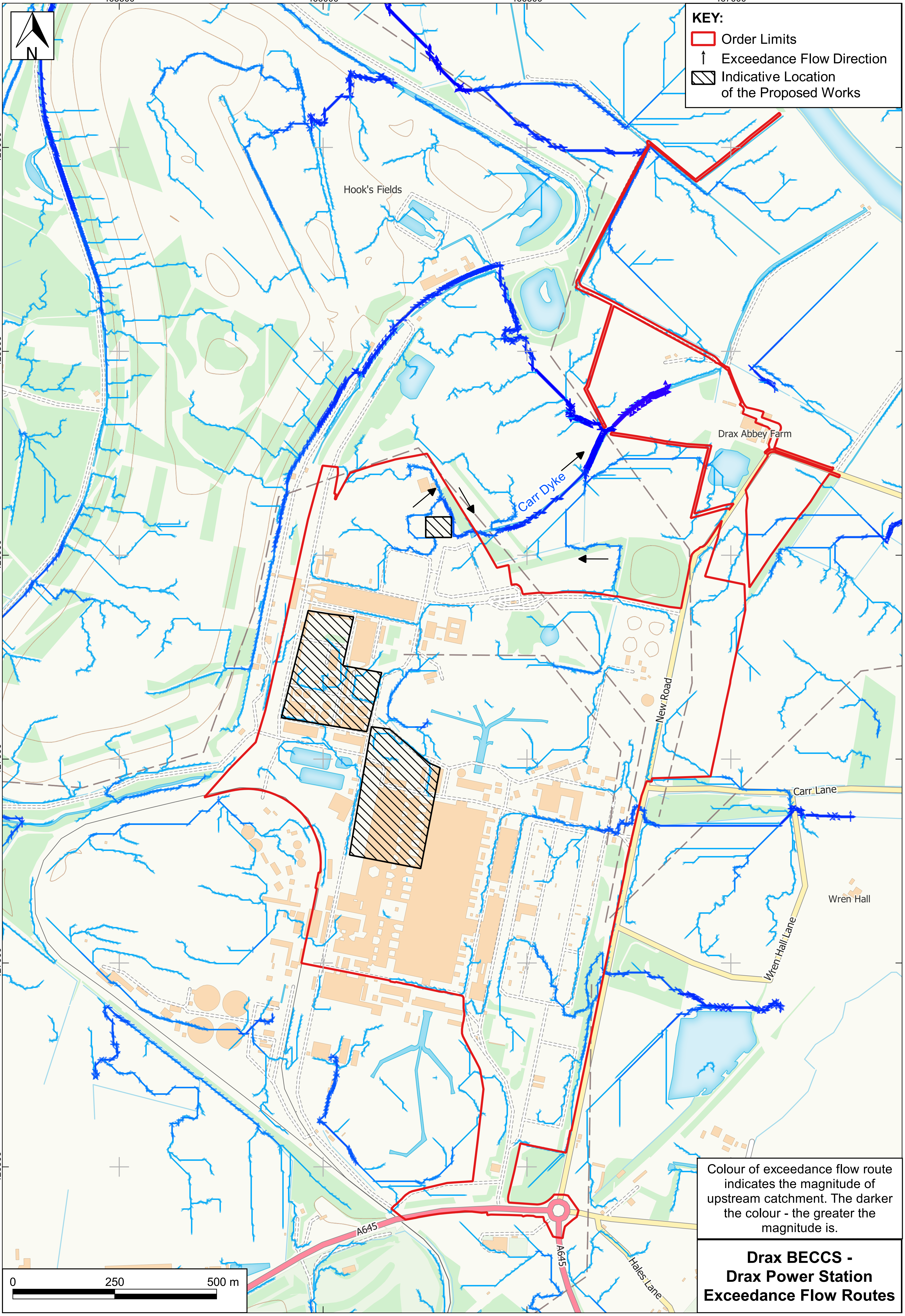
(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):		5.71
1 in 1 year (l/s):		4.91
1 in 30 years (l/s):		9.99
1 in 100 year (l/s):		11.88
1 in 200 years (l/s):		13.53

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX E – EXCEEDANCE FLOWS



Drax BECCS - Drax Power Station Exceedance Flow Routes

THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN WSP AND MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR WRITTEN CONSENT.

APPENDIX F – PROPOSED CHANGES TO EXISTING SURFACE WATER DRAINAGE SYSTEM TO ALLOW FOR THE PROPOSED SCHEME

NOTES:

EXISTING SITE DRAINAGE SCHEME NOTES & OUTFALL DETAILS FROM DRAWING 038411 REVISION Z9 DATED 05/08/2020

THE MAIN STATION AREA IS FLAT AND HAS BEEN [PREVIOUSLY] RAISED FROM 4.25M TO 6.1M ABOVE ORDNANCE DATUM (OD) TO PROVIDE PROTECTION AGAINST FLOODING. A PERIMETER DITCH WHICH SURROUNDS THE STATION IS ARRANGED TO COLLECT THE ON & OFF SITE DRAINAGE AND CHANNEL THE WATER INTO CARR DYKE LOCATED TO THE NORTH WEST OF THE STATION. WHERE NECESSARY THE PERIMETER DITCH IS CULVERTED.

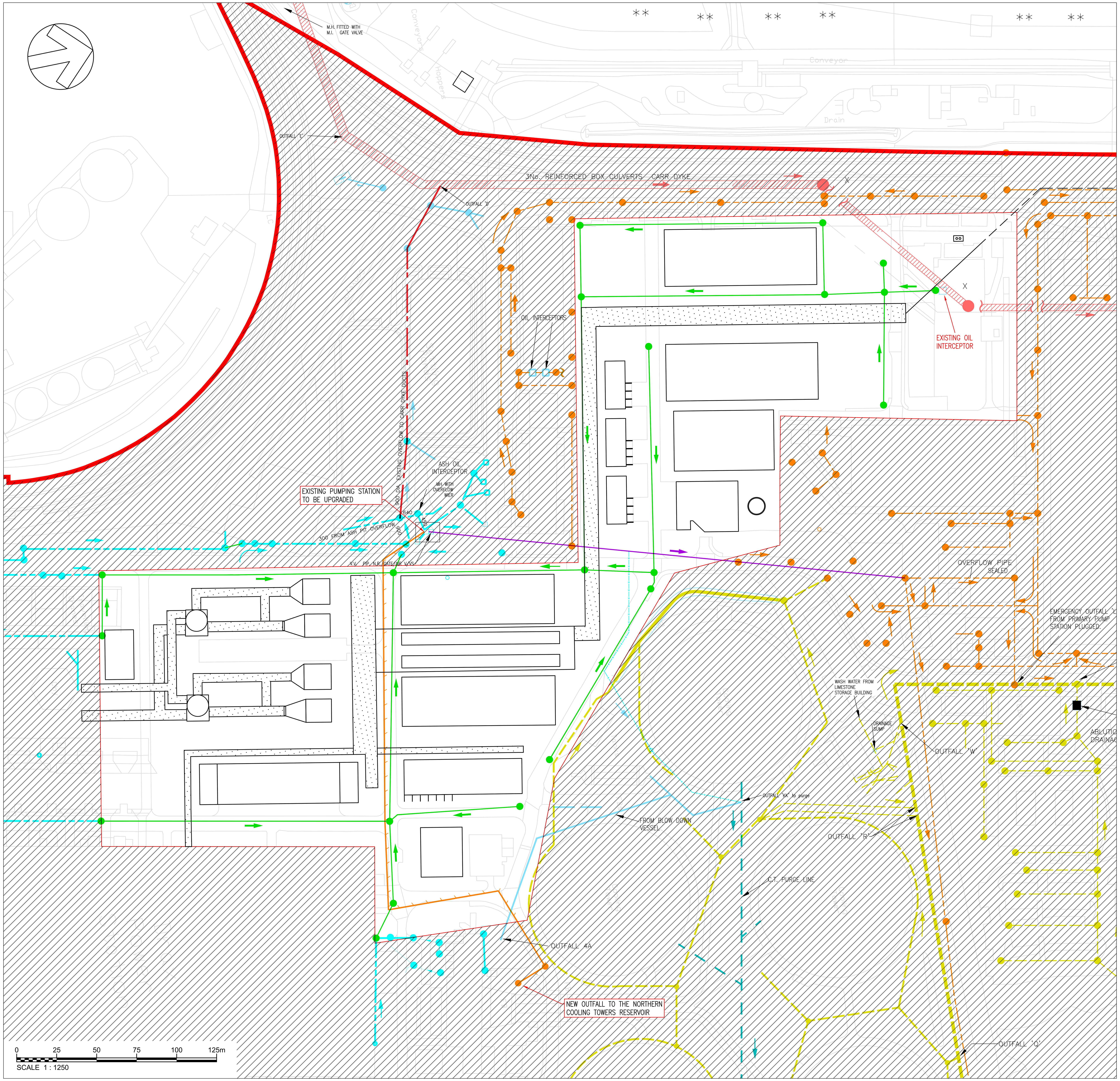
EXISTING DRAX POWER STATION DRAINAGE SYSTEM SUMMARY

THE NORTH SIDE OF THE STATION DISCHARGES SURFACE WATER INTO CARR DYKE VIA CONSENTED OUTFALL 'PP'. THE WATER FROM CARR DYKE FEEDS INTO LENDALL DRAIN AND VIA LENDALL PUMPING STATION & IS DISCHARGED INTO THE RIVER OUSE. THE MAJORITY OF THE SITES' SURFACE WATER DISCHARGES VIA THE PURGE PUMPING STATION NEXT TO NORTH GATE INTO OUTFALL "K" INTO THE RIVER OUSE.
CONTAMINATED WATER FROM THE COAL AND ASH MOUNDS ETC. IS CHANNELED VIA DRAINS TO THE SLUDGE LAGOONS. THE RESULTING 'FILTERED WATER' IS THEN PUMPED TO THE PURGE SYSTEM TO DISCHARGE THROUGH OUTFALL "K", OR TO THE SEDIMENTATION TANKS AND THROUGH TO THE COOLING WATER MAKE-UP PIPELINE TO THE COOLING TOWERS. NOTE THE FILTERED WATER LINE DISCHARGE POINT IN THE PURGE PUMPING STATION BYPASSES THE MONITORING CHAMBER AND CAN ONLY CARRY SURFACE WATER.
THE LENDALL PUMPING STATION IS OWNED AND MAINTAINED BY THE N.R.A. [IDB] & IS LOCATED 274M UPSTREAM OF THE MAKE-UP PUMPHOUSE.
WHERE CONTAMINATION BY OIL IS POSSIBLE (E.G. IN TRANSFORMER OR OIL TANK STORAGE AREAS, CAR PARKS ETC) THE SURFACE WATER IS CHANNELED TO OIL INTERCEPTORS.

OUTFALL DETAILS

OUTFALL 'R'	PUMPED OVERFLOW OF LAND DRAINS FROM NORTH COOLING TOWERS 300MM DIA. 187 M3/HR FLOW TO NORTH PERIMETER DITCH
OUTFALL 'W'	F.G.D PROCESS WATER PUMPHOUSE TO CULVERTED SECTION OF NORTH PERIMETER DITCH.
OUTFALL 'BB'	F.G.D CONTRACTORS AREA THROUGH OIL INTERCEPTOR TO CULVERTED SECTION OF CARR DYKE. 600MM DIA. 893 M3/HR FLOW.
OUTFALL'KK'	OILY WATER SEPARATOR NO.2 CLEAN WATER TO COOLING TOWER 5B PURGE CHAMBER, TO PURGE PUMPHOUSE.
OUTFALL'PP'	CULVERT SECTION CARR DYKE, HEADWALL AT EXIT TO OPEN DITCH SECTION CARR DYKE, F.G.D.
OUTFALL '4A'	NORTH BLOWDOWN TANK. NORTH OILY SEPARATOR & PUMP STN 125A.TO NORTH COOLING TOWER PURGE LINE TO PURGE PUMPHOUSE. CONDENSATE. FILTERED WATER & SURFACE WATER.

THIS DRAWING INDICATES A SURFACE WATER DRAINAGE STRATEGY LAYOUT TO DEMONSTRATE THE POTENTIAL DRAINAGE ROUTES TO THE PURGE AND RESERVOIRS FOR THE BECCS PLANT AREA ONLY (WORKS AREAS 1D AND 2), WHICH DO NOT ADVERSELY IMPACT THE FLOOD RISK OR EXISTING DRAINAGE CAPACITY OF THE EXISTING INFRASTRUCTURE. ALTERNATIVE OPTIONS / ROUTES / LAYOUTS MAY BE CONSIDERED DURING DETAILED DESIGN, WHEN FURTHER DETAIL ON THE PROPOSED SCHEME IS KNOWN.
POLLUTION PREVENTION MEASURES ARE TO BE INCORPORATED IN THE DESIGN OF THE SURFACE WATER SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 6.4 OF THE EXISTING DRAINAGE SYSTEMS AND PROPOSED SURFACE WATER DRAINAGE STRATEGY.



GENERAL ARRANGEMENT

SCALE 1: 1,250 @ A1
SCALE 1: 2,500 @ A3

DO NOT SCALE

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING WAS EXTRACTED FROM A DRAWING PROVIDED BY DRAX POWER LIMITED (DOCUMENT REFERENCE DF3-008).
2. TO BE READ IN CONJUNCTION WITH DRAWING 70072063-EXISTING SURFACE WATER DRAINAGE SYSTEM AND INDICATIVE PLANS AND ELEVATIONS (OD-006).
3. THE ALIGNMENT / DEPTH OF THE CULVERT IS ONLY INDICATIVE AND IT IS SUBJECT TO CONFIRMATION.

KEY:

- ORDER LIMITS
- EXISTING WOODYARD DRAINAGE TO OUTFALL BB CARR DYKE CULVERT
- EXISTING DRAINAGE - FILTERED WATER FROM FGD TO PRIMARY PUMP STATION TO PURGE
- EXISTING DRAINAGE - WEST SIDE OF STATION TO PUMP STATION 125A TO CT
- EXISTING DRAINAGE - SITE AREAS TO OUTFALL PP EAST
- EXISTING PURGE SYSTEM
- INDICATIVE NEW SURFACE WATER DRAINAGE
- CARR DYKE (IDB MAINTAINED WATERCOURSE)
- CULVERTED SECTION OF CARR DYKE (IDB MAINTAINED)
- EXISTING DRAINAGE TO BE ABANDONED
- INDICATIVE FOOTPRINT / ALIGNMENT OF PROPOSED SCHEME
- INDICATIVE AREA OUTSIDE DRAINAGE CHANGES
- NEW RISING MAIN TO NORTHERN COOLING WATER RESERVOIR
- REPLACEMENT CONNECTION TO THE EXISTING PURGE PIPE
- EXISTING DRAINAGE

NEW COMMENTARY BY WSP SURROUNDED BY TEXT FRAME

SHEET 1 SHEET 2

KEY PLAN

REV	DATE	DESCRIPTION OF REVISIONS	DRAWN	CHK	APP

DRAWING STATUS: S2 - FOR INFORMATION

CONTRACTOR (S):

wsp

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T+ 44 (0) 1179 306 200
wsp.com

PROJECT: DRAX BECCS

DRAWING TITLE: DRAX BECCS CONCEPTUAL SURFACE WATER DRAINAGE STRATEGY SHEET 1

DESIGNED	ANDY SMITH / ELZBIETA SZOSTAK	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
DRAWN	P. CLAYSON-LAVELLE / BEN GILES	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
CHECKED	ELZBIETA SZOSTAK	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
APPROVED	ANDY SMITH	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE

SCALE @ A1: 1 : 1250 | ELR & MILEAGE: N/A
PROJECT NO: 70072063 | SHEET: SHEET 1 OF 2
DRAWING No: 70072063-SWDS-0001 | REV: -

File name \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70072XXX\70072063 - DRAX BECCS DCO\03 ENVIRONMENT\09 SURFACE WATER\04 WIP\DRAINAGE STRATEGY\EXISTING AND PROPOSED SW DRAINAGE\PROPOSED SW DRAINAGE STRATEGY\70072063-SWDS-0001_0002.DWG, printed on 17 February 2023 16:06:23, by Giles, Benjamin

NOTES:

EXISTING SITE DRAINAGE SCHEME NOTES & OUTFALL DETAILS FROM DRAWING 038411 REVISION Z9 DATED 05/08/2020

THE MAIN STATION AREA IS FLAT AND HAS BEEN [PREVIOUSLY] RAISED FROM 4.25M TO 6.1M ABOVE ORDNANCE DATUM (OD) TO PROVIDE PROTECTION AGAINST FLOODING. A PERIMETER DITCH WHICH SURROUNDS THE STATION IS ARRANGED TO COLLECT THE ON & OFF SITE DRAINAGE AND CHANNEL THE WATER INTO CARR DYKE LOCATED TO THE NORTH WEST OF THE STATION. WHERE NECESSARY THE PERIMETER DITCH IS CULVERTED.

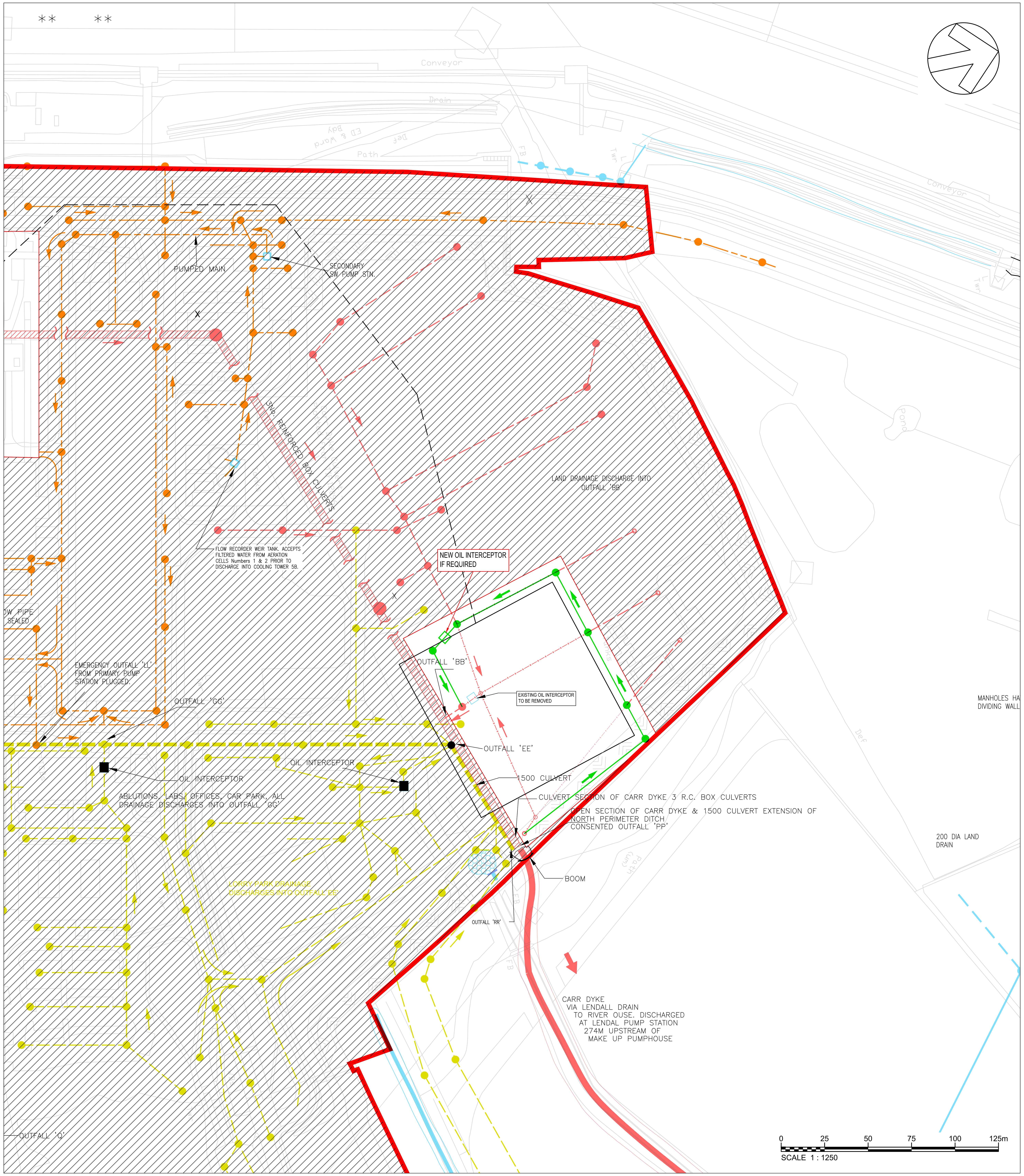
EXISTING DRAX POWER STATION DRAINAGE SYSTEM SUMMARY
THE NORTH SIDE OF THE STATION DISCHARGES SURFACE WATER INTO CARR DYKE VIA CONSENTED OUTFALL 'PP'. THE WATER FROM CARR DYKE FEEDS INTO LENDALL DRAIN AND VIA LENDALL PUMPING STATION & IS DISCHARGED INTO THE RIVER OUSE. THE MAJORITY OF THE SITES' SURFACE WATER DISCHARGES VIA THE PURGE PUMPING STATION NEXT TO NORTH GATE INTO OUTFALL "K" INTO THE RIVER OUSE.
CONTAMINATED WATER FROM THE COAL AND ASH MOUNDS ETC. IS CHANNELED VIA DRAINS TO THE SLUDGE LAGOONS. THE RESULTING 'FILTERED WATER' IS THEN PUMPED TO THE PURGE SYSTEM TO DISCHARGE THROUGH OUTFALL "K", OR TO THE SEDIMENTATION TANKS AND THROUGH TO THE COOLING WATER MAKE-UP PIPELINE TO THE COOLING TOWERS. NOTE THE FILTERED WATER LINE DISCHARGE POINT IN THE PURGE PUMPING STATION BYPASSES THE MONITORING CHAMBER AND CAN ONLY CARRY SURFACE WATER.
THE LENDALL PUMPING STATION IS OWNED AND MAINTAINED BY THE N.R.A. [IDB] & IS LOCATED 274M UPSTREAM OF THE MAKE-UP PUMPHOUSE.
WHERE CONTAMINATION BY OIL IS POSSIBLE (E.G. IN TRANSFORMER OR OIL TANK STORAGE AREAS, CAR PARKS ETC) THE SURFACE WATER IS CHANNELED TO OIL INTERCEPTORS.

OUTFALL DETAILS

OUTFALL 'R'	PUMPED OVERFLOW OF LAND DRAINS FROM NORTH COOLING TOWERS 300MM DIA. 187 M3/HR FLOW TO NORTH PERIMETER DITCH
OUTFALL 'W'	F.G.D PROCESS WATER PUMPHOUSE TO CULVERTED SECTION OF NORTH PERIMETER DITCH.
OUTFALL 'BB'	F.G.D CONTRACTORS AREA THROUGH OIL INTERCEPTOR TO CULVERTED SECTION OF CARR DYKE. 600MM DIA. 893 M3/HR FLOW.
OUTFALL'KK'	OILY WATER SEPARATOR NO.2 CLEAN WATER TO COOLING TOWER 5B PURGE CHAMBER, TO PURGE PUMPHOUSE.
OUTFALL'PP'	CULVERT SECTION CARR DYKE, HEADWALL AT EXIT TO OPEN DITCH SECTION CARR DYKE, F.G.D.
OUTFALL '4A'	NORTH BLOWDOWN TANK. NORTH OILY SEPARATOR & PUMP STN 125A.TO NORTH COOLING TOWER PURGE LINE TO PURGE PUMPHOUSE. CONDENSATE. FILTERED WATER & SURFACE WATER.

THIS DRAWING INDICATES A SURFACE WATER DRAINAGE STRATEGY LAYOUT TO DEMONSTRATE THE POTENTIAL DRAINAGE ROUTES TO THE PURGE AND RESERVOIRS FOR THE BECCS PLANT AREA ONLY (WORKS AREAS 1D AND 2), WHICH DO NOT ADVERSELY IMPACT THE FLOOD RISK OR EXISTING DRAINAGE CAPACITY OF THE EXISTING INFRASTRUCTURE. ALTERNATIVE OPTIONS / ROUTES / LAYOUTS MAY BE CONSIDERED DURING DETAILED DESIGN, WHEN FURTHER DETAIL ON THE PROPOSED SCHEME IS KNOWN.
POLLUTION PREVENTION MEASURES ARE TO BE INCORPORATED IN THE DESIGN OF THE SURFACE WATER SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 6.4 OF THE EXISTING DRAINAGE SYSTEMS AND PROPOSED SURFACE WATER DRAINAGE STRATEGY.

File name \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70072XXX\70072063 - DRAX BECCS DCO\03 ENVIRONMENT\09 SURFACE WATER\04 WIP\DRAINAGE STRATEGY\EXISTING AND PROPOSED SW DRAINAGE\PROPOSED SW DRAINAGE STRATEGY\70072063-SWDS-0001_0002.DWG, printed on 17 February 2023 16:06:46, by Giles, Benjamin



GENERAL ARRANGEMENT

SCALE 1: 1,250 @ A1
SCALE 1: 2,500 @ A3

DO NOT SCALE

NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING WAS EXTRACTED FROM A DRAWING PROVIDED BY DRAX POWER LIMITED (DOCUMENT REFERENCE DF3-008).
2. TO BE READ IN CONJUNCTION WITH DRAWING 70072063-EXISTING SURFACE WATER DRAINAGE SYSTEM AND INDICATIVE PLANS AND ELEVATIONS (OD-006).
3. THE ALIGNMENT / DEPTH OF THE CULVERT IS ONLY INDICATIVE AND IT IS SUBJECT TO CONFIRMATION.

KEY:

- ORDER LIMITS
- EXISTING WOODYARD DRAINAGE TO OUTFALL BB CARR DYKE CULVERT
- EXISTING DRAINAGE - FILTERED WATER FROM FGD TO PRIMARY PUMP STATION TO PURGE
- EXISTING DRAINAGE - WEST SIDE OF STATION TO PUMP STATION 125A TO CT
- EXISTING DRAINAGE - SITE AREAS TO OUTFALL PP EAST
- EXISTING PURGE SYSTEM
- INDICATIVE NEW SURFACE WATER DRAINAGE
- CARR DYKE (IDB MAINTAINED WATERCOURSE)
- CULVERTED SECTION OF CARR DYKE (IDB MAINTAINED)
- EXISTING DRAINAGE TO BE ABANDONED
- INDICATIVE FOOTPRINT / ALIGNMENT OF PROPOSED SCHEME
- INDICATIVE AREA OUTSIDE DRAINAGE CHANGES
- NEW RISING MAIN TO NORTHERN COOLING WATER RESERVOIR
- REPLACEMENT CONNECTION TO THE EXISTING PURGE PIPE
- EXISTING DRAINAGE

NEW COMMENTARY BY WSP SURROUNDED BY TEXT FRAME

SHEET 1 | SHEET 2

KEY PLAN

REV	DATE	DESCRIPTION OF REVISIONS	DRAWN	CHK	APP

DRAWING STATUS: S2 - FOR INFORMATION

CONTRACTOR (S):

wsp

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PROJECT: DRAX BECCS

DRAWING TITLE: DRAX BECCS CONCEPTUAL SURFACE WATER DRAINAGE STRATEGY SHEET 2

DESIGNED	ELZBIETA SZOSTAK	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
DRAWN	PHOEBE CLAYSON-LAVELLE	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
CHECKED	ELZBIETA SZOSTAK	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE
APPROVED	ANDY SMITH	SIGNED		DATE	AS PER ELECTRONIC SIGNATURE

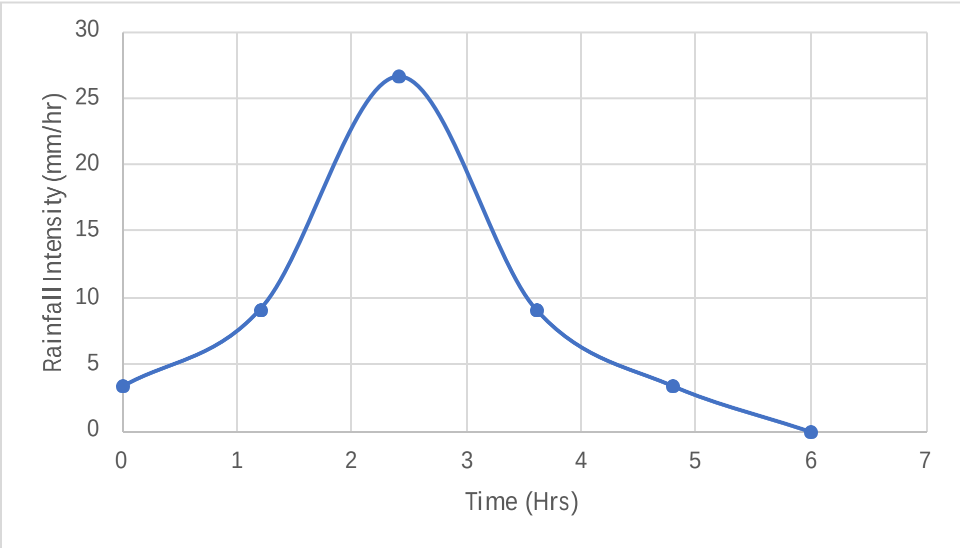
SCALE @ A1: 1 : 1250	ELR & MILEAGE: N/A
PROJECT NO: 70072063	SHEET: SHEET 2 OF 2
DRAWING No: 70072063-SWDS-0002	REV: -

APPENDIX G – PEAK RUNOFF RATES

Drax BECCS
6hr 100 year Hyetograph

Time	100 year design rainfall - FEH 2013 model(mm)
00:00:00	4.116543388
01:12:00	11.02315576
02:24:00	31.96427832
03:36:00	11.02315576
04:48:00	4.116543388
06:00:00	0

T(hrs)	Rainfall Intensity mm/hr
0	3.430
1.2	9.186
2.4	26.637
3.6	9.186
4.8	3.430
6	0



Drax BECCS
6hrs storm 100-year ReFH2 Outputs

Time	100 year design rainfall - FEH 2013 model	Urban net rain mm (100 year) - urbanised model	Rural net rain mm (100 year) urbanised model	Sewer loss m3/s (100 year) urbanised model	Total net rain mm (100 year) urbanised model	Direct runoff m3/s (100 year) - urbanised model	Baseflow m3/s (100 year) - urbanised model	Total flow m3/s (100 year)- urbanised model
00:00:00	4.1165	0	1.45	0	1.45	0	0.0239	0.0239
01:12:00	11.0232	0	4.1684	0	4.1684	0.0138	0.0234	0.0372
02:24:00	31.9643	0	14.4403	0	14.4403	0.081	0.0245	0.1055
03:36:00	11.0232	0	5.7913	0	5.7913	0.3243	0.0316	0.356
04:48:00	4.1165	0	2.2695	0	2.2695	0.7293	0.0512	0.7805
06:00:00	0	0	0	0	0	1.107	0.0853	1.1923
07:12:00	0	0	0	0	0	1.1785	0.1271	1.3056
08:24:00	0	0	0	0	0	0.9996	0.1654	1.1649
09:36:00	0	0	0	0	0	0.7452	0.194	0.9393
10:48:00	0	0	0	0	0	0.5414	0.2128	0.7542
12:00:00	0	0	0	0	0	0.3824	0.224	0.6064
13:12:00	0	0	0	0	0	0.2435	0.2289	0.4724
14:24:00	0	0	0	0	0	0.1197	0.2287	0.3484
15:36:00	0	0	0	0	0	0.0362	0.2244	0.2606
16:48:00	0	0	0	0	0	0.0071	0.218	0.2251
18:00:00	0	0	0	0	0	0.0001	0.2111	0.2112
19:12:00	0	0	0	0	0	0	0.2044	0.2044
20:24:00	0	0	0	0	0	0	0.1978	0.1978
21:36:00	0	0	0	0	0	0	0.1915	0.1915
22:48:00	0	0	0	0	0	0	0.1853	0.1853
24:00:00	0	0	0	0	0	0	0.1794	0.1794
25:12:00	0	0	0	0	0	0	0.1736	0.1736
26:24:00	0	0	0	0	0	0	0.168	0.168
27:36:00	0	0	0	0	0	0	0.1627	0.1627
28:48:00	0	0	0	0	0	0	0.1574	0.1574
30:00:00	0	0	0	0	0	0	0.1524	0.1524
31:12:00	0	0	0	0	0	0	0.1475	0.1475
32:24:00	0	0	0	0	0	0	0.1428	0.1428
33:36:00	0	0	0	0	0	0	0.1382	0.1382
34:48:00	0	0	0	0	0	0	0.1338	0.1338
36:00:00	0	0	0	0	0	0	0.1295	0.1295
37:12:00	0	0	0	0	0	0	0.1253	0.1253
38:24:00	0	0	0	0	0	0	0.1213	0.1213
39:36:00	0	0	0	0	0	0	0.1174	0.1174
40:48:00	0	0	0	0	0	0	0.1136	0.1136
42:00:00	0	0	0	0	0	0	0.11	0.11
43:12:00	0	0	0	0	0	0	0.1065	0.1065
44:24:00	0	0	0	0	0	0	0.103	0.103
45:36:00	0	0	0	0	0	0	0.0997	0.0997
46:48:00	0	0	0	0	0	0	0.0965	0.0965
48:00:00	0	0	0	0	0	0	0.0934	0.0934
49:12:00	0	0	0	0	0	0	0.0904	0.0904

50:24:00	0	0	0	0	0	0	0.0875	0.0875
51:36:00	0	0	0	0	0	0	0.0847	0.0847
52:48:00	0	0	0	0	0	0	0.082	0.082
54:00:00	0	0	0	0	0	0	0.0794	0.0794
55:12:00	0	0	0	0	0	0	0.0768	0.0768
56:24:00	0	0	0	0	0	0	0.0744	0.0744
57:36:00	0	0	0	0	0	0	0.072	0.072
58:48:00	0	0	0	0	0	0	0.0697	0.0697
60:00:00	0	0	0	0	0	0	0.0674	0.0674
61:12:00	0	0	0	0	0	0	0.0653	0.0653
62:24:00	0	0	0	0	0	0	0.0632	0.0632
63:36:00	0	0	0	0	0	0	0.0612	0.0612
64:48:00	0	0	0	0	0	0	0.0592	0.0592
66:00:00	0	0	0	0	0	0	0.0573	0.0573

Drax BECCS
SW runoff generated in the proposed impermeable area - Rational Method

Q = 2.78 x C x i x A

i - intensity (mm/hr)
A - area (ha)
Q - peak flow (l/s)
C - runoff coefficient

C	=	1	unitless			
I peak intensity for 6hrs 100 year event*	=	26.637	mm/hr			
climate change allowance	=	40%				
i for 6hrs 100 year event* with CC	=	37.29	mm/hr			
New impermeable area**	=	18613.1	m2	=	1.86	ha

*obtained from 6hrs 100yr hyetograph based on FEH rainfall point data (Intensity - Duration - Frequency data) and ReFH2
**very conservative approach, received from Drax on 20/12/2021

Q =	192.96 l/s	=	694.6713	m3/hr

APPENDIX H – MINUTES FROM THE MEETING WITH THE LLFA

AGENDA & MEETING NOTES

PROJECT NUMBER	EN010120	MEETING DATE	17 December 2021
PROJECT NAME	Drax BECCS DCO	VENUE	Virtual - Teams
CLIENT	Drax Power Limited	RECORDED BY	ES
MEETING SUBJECT	Existing and Proposed Surface Water Drainage Strategy		

PRESENT	Meirion Jones (LLFA) Jim Doyle (Drax) Chris Summers (Drax) Teresa Crampton (Drax) Andy Smith (WSP) Maria Marsh (WSP) Elzbieta Szostak (WSP)
APOLOGIES	Jenny Blyth (Drax) Nicola Ashworth (WSP) Louise Markose (WSP)
DISTRIBUTION	As above
CONFIDENTIALITY	**Confidential**

ITEM	SUBJECT	ACTION	DUE
	Everyone on the call introduced themselves. Andy Smith (AS) showed the existing and proposed site layout and explain the Proposed Development. AS explained that currently surface water runoff generated within the power station boundary is collected by complex drainage system and eventually pumped out of the site to the River Ouse. AS/ Chris Summers (CS) also explained the proposed surface water drainage strategy which consists of redirection of surface water runoff from the entire site, including the new impermeable areas, to the existing cooling system. The proposed approach will reduce the amount of water which needs to be abstracted from the River Ouse for the cooling process. Meirion Jones (MJ) asked whether there is sufficient storage in the existing cooling system to manage the additional runoff flows. MJ stated that evidence that existing cooling system is of sufficient capacity to manage severe/prolonged storm events needs to be provided to the LLFA.		

	CS provided details on the existing abstraction and discharge rates. CS stated that there are losses due to evaporation from the cooling towers. MJ advised that it is likely that the existing drainage/cooling systems are likely to be constructed in the 70s, and the LLFA requires evidence that the existing systems are able to manage the current rainfalls. MJ stated that potentially Microdrainage model of the existing drainage system may be required to check if there is any flooding from the existing system, and whether the flooded water can be kept within the site boundary. Teresa Crampton (TC) advised that new drainage system will be appropriately sized to the current standards. TC also advised that Drax Ltd is very keen to reuse surface water runoff generated in the power station site as it will reduce the amount of water abstracted from the River Ouse. MJ stated that the LLFA expects to see indicative figures, evidence, information on approximate new impermeable areas, exceedance flows etc to support Drax statements so they can make appropriate decision. AS stated, that ideally Drax Ltd would like to achieve Agreement in Principle (AiP) in terms of surface water drainage strategy in January 2022, so less work is required at the DCO stage. MJ advised that it needs to be ensured that the proposed drainage strategy is enforceable and complement the narrative. TC stated that no detailed drainage design is available at this stage of the project. TC advised that more detailed information on the proposed drainage strategy will be available during DCO examination period at the end of 2022. TC also advised that final drainage layouts will be available at the later stage of the project, and only drainage statement is available at the current stage. Jim Doyle (JD) stated that it needs to be clear what information and when is required by the LLFA. MJ stated that the following information is expected to support DCO: • Information on the management of the surface water runoff for up to and including the 1 in 100 year rainfall event; • Information how the exceedance flows will be managed; • Indicative drawings; and • Supported calculations. WSP / Drax will submit further information on the surface water drainage strategy, to aid MJ in being in a position to support the Scheme.		

	ES stated that no such detailed information on the drainage strategy was provided and accepted for a DCO for the Drax Repower project in 2018. MJ stated that the NPPF was revised since the Repower project and in his view more robust drainage information is now required to be provided. Post Meeting Note – For Repower DCO the information submitted was limited to drawings showing the proposed new buildings and the existing drainage which neds to be abandoned/diverted, as well as new pipelines which connects to the existing drainage system. No substantial consultation was required with the LLFA.		

NEXT MEETING

An invitation will be issued if an additional meeting is required.

APPENDIX I – LLFA APPROVAL IN PRINCIPLE

Szostak, Elzbieta

From:	[redacted]
Sent:	08 March 2022 18:11
To:	Szostak, Elzbieta
Cc:	Smith, Andy; Marsh, Maria; Markose, Louise; Ashworth, Nicola; Wilks Daly, Aidan; Jim Doyle; Jenny Blyth; Christopher Summers; Stocks, Matt; Emily Mellalieu
Subject:	RE: Drax BECCS - additional drainage information
Filed:	-1
Filed Location:	[redacted]
[redacted]	

Dear Elzbieta,

Thank you for the additional information that you sent through.

I agree that the document demonstrates a reasonable approach to the management of surface water and is in line with what we discussed and as such the LLFA would give its agreement in principle to the strategy.

I am concerned however that the document does not fully cover off the requirements of Paragraph 169 of the NPPF and it leaves a lot to be covered in the DCO examination period. Having discussed with others at the authority post meeting, I confirm the LLFA would still comment on any DCO examination based on the NPPF requirements and local SuDS design guide. I have added comments in red where further information would be needed in relation to the NPPF and where our local design guide fits in this process.

169. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:
(a) take account of advice from the lead local flood authority;
Submission must follow North Yorkshire County Council SuDS design guide 2018 – there would need to be a requirement to submit information as set out in point 8.2 i.e drainage layout and calculations.
(b) have appropriate proposed minimum operational standards;
More detailed drainage calculations specific to proposal would need to be submitted to demonstrate any proposed operational standard. There is a note in the minutes of the meeting the new drainage system will be appropriately sized to the current standards. The current standards are set out in the DEFRA Non-Statutory Technical Standards for sustainable drainage systems and also set out in our SuDS design guide, i.e. no flooding in 1 in 30 and any flooding from 1 in 100+CC contained on site. This needs to be evidenced as part of the DCO submission.
(c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
(d) where possible, provide multifunctional benefits

I trust the above is of assistance in that we can agree in principle that there is a reasonable approach to the management of surface water that does not increase flood risk elsewhere, but further information is still necessary before we would be comfortable recommending that the proposal meets NPPF requirements and local design guide for the purpose of the DCO examination.

Kind Regards
Meirion

Meirion Jones
Senior Flood Risk Management Engineer

Mr Meirion Jones FdSc BSc (Hons) | Senior Flood Risk Management Engineer | Development Management Team | Business and Environmental Services | North Yorkshire County Council | East Block | County Hall | Racecourse Lane | Northallerton | DL7 8AH | Tel: [redacted] | Email:Floodriskmanagement@northyorks.gov.uk

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From: [redacted]@wsp.com>
Sent: 07 March 2022 10:25
To: [redacted]northyorks.gov.uk>
Cc: [redacted]
Subject: RE: Drax BECCS - additional drainage information

Good morning Meirion,

I hope my email finds you well.
Can you please advise when we can expect a response from you on the additional information sent to you in February – as per my email below.

Thank you!
I look forward to hearing from you.

Regards

Ela

Elzbieta Szostak
MSc, MCIWEM
Engineer
Water Risk Management and Engineering, WEI

[redacted]

Kings Orchard, 1 Queen Street,
Bristol, BS2 0HQ

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From: Szostak, Elzbieta
Sent: 28 February 2022 12:00
To: [redacted]
Subject: RE: Drax BECCS - additional drainage information

Good morning Meirion,

I was wondering whether you had time to check the additional information we have provided in relation to the existing and proposed surface water drainage systems, and whether you have any comments.

I look forward to hearing from you.

Regards

Ela

From: Szostak, Elzbieta
Sent: 17 February 2022 17:52
To: [redacted]
Subject: Drax BECCS - additional drainage information

Good afternoon Meirion,

Following up our meeting in December 2021, please find attached additional information on the existing and proposed surface water drainage systems as agreed.
I also attached the Minutes from the meeting in December for your records.

We hope that the attached information provide further clarification and sufficient evidence to allow you to accept the proposed surface water drainage strategy.

If you would like to discuss it or require any further information, please do not hesitate to contact me.

I look forward to hearing from you.

Regards

Ela

Elzbieta Szostak

MSc, MCIWEM
Engineer
Water Risk Management and Engineering, WEI

[redacted]

Kings Orchard, 1 Queen Street,
Bristol, BS2 0HQ

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https://www.northyorks.gov.uk/coronavirus-advice-and-information

Access your county council services online 24 hours a day, 7 days a week at www.northyorks.gov.uk.

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