DRAINAGE STRATEGY AND FLOOD RISK ASSESSMENT

Land to the south of King Rudding Lane, Riccall, York YO19 6QL

EBCO Holdings Limited

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1.0	20/05/20	CG		Document issue
1.1	26/05/20	CG		Updated drainage layout plan

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1 Introduction

1.1 General considerations

1.1.1 Oaktree Environmental was commissioned by EBCO Holdings Limited to prepare a Drainage Strategy and Flood Risk Assessment for the waste wood treatment facility at Land to the south of King Rudding Lane, Riccall, York YO19 6QL.

1.1.2 This drainage strategy is prepared in support of an application for an Environmental Permit for the treatment of non-hazardous and hazardous waste wood.

1.1.3 The proposed layout of the revised drainage system is shown on Drawing No. 1133-006-01 which is presented at Appendix I. All hazardous waste wood will be handled and treated within the building, and only non-hazardous materials will be stored or treated outside of the building

1.1.4 The site is located within Flood Zone 1 which is defined in the National Planning Policy Framework (NPPF) and associated technical guidance as land having a less than 1 in 1,000 annual probability of flooding from rivers or the sea. As the area the subject of this planning application is greater than 1 hectare a flood risk assessment consistent with the requirements of the NPPF has been undertaken.

1.1.5 The site is in an area with a very low risk of surface water flooding with the exception of a thin strip of land orientated east to west to the immediate south of the building at the site which comprises a low risk of surface water flooding. The depth of surface water flooding in this area is likely to be significantly less than 300mm. The site is not within the maximum extent of any area which may be at risk due to reservoir flooding.

1.1.6 The site area is approximately 7,742m^2. As the site is located in Flood Zone 1 and there are no other potential sources of flooding a flood risk assessment is not required under the NPPF or associated technical guidance. This document is therefore prepared with the intention only of detailing the design of the proposed surface water drainage system.

1.2 Site hydrological setting

1.2.1 The site drains generally towards the south and west towards and in the direction of flow of the Angram Dike which is approximately 1.2km south west of the site at its closest point. The Angram Dike discharges to the tidal River Aire at a point approximately 2.5km south west of the site.

1.2.2 The superficial deposits underlying the site comprise the Skipwith Sand Member and the bedrock geology comprises the Sherwood Sandstone Group.

2 SuDS strategy

2.1 General principles

2.1.1 The following destinations for surface water runoff which can not be re-used as part of the site operations have been considered in order of preference:

i) Re-use of surface water on site for dust suppression, plant cleaning and wood treatment
ii) Discharge into the ground
iii) Discharge to a surface water body
iv) Discharge to a surface water sewer
v) Discharge to a combined sewer.

2.2 Potential sources of flooding other than fluvial

2.2.1 The site is not in an area which is at risk of reservoir flooding.

2.2.2 The site is in an area which generally comprises a very low risk of surface water flooding. As such, there is less than a 1 in 1,000 year annual probability of surface water flooding occurring at the site, hence the risk posed to the site due to surface water flooding currently is not considered further in this assessment.

2.3 Site considerations and objectives of the drainage system

2.3.1 The consumptive demand for water as part of the proposed operations dust suppression, plant cleaning and wood treatment will be generally between approximately 15m^3 and 25m^3 per day depending primarily on the temperature and precipitation.

2.3.2 The standard annual average rainfall at the site is 595mm. On this basis, the volume of rainfall incident to the site during the course of a year is calculated as approximately 4,046m^3. This is the equivalent of approximately 16.5m^3 over the course of a 280 working day year. On this basis it is calculated that there will be sufficient water

demand on the site to consume the incident rainfall to the site, hence it is proposed that the site surface is sealed and is drained to a harvesting tank for collection and use.

2.3.3 Any supplementary water demand will be met by using an unlicensed groundwater abstraction to the west of the site from which a maximum of 20m^3 per day will be abstracted.

2.3.4 It is therefore considered that the discharge of surface water runoff incident to the site to ground, surface watercourse, surface water sewer or combined sewer is not necessary.

3 SuDS measures to be incorporated at the site and design parameters

3.1 Runoff generation

3.1.1 The Flood Estimation Handbook data providing rainfall depths for a range of rainfall return periods and durations are presented at Appendix II.

3.1.2 It is proposed that the site drainage system drains to an impermeable concrete surface which drains to a below ground storage tank. In order to accommodate 1 month's rainfall, the storage volume in the tank is calculated as 337m^3.

3.1.3 The tank will therefore be constructed using soakaway crates with an individual width and length of 1,000m and an individual height of 400mm. Assuming a porosity within the crates of 0.9575, it is calculated that approximately 880 crates will be required, in a configuration 17m x 17m x 1.2m, with a further 13 crates at the base to provide a sump. A perforated pipe will run from the base of the tank to an access chamber at the surface with a sufficient diameter to allow a hose to reach the bottom of the tank so that the water can be abstracted to a vacuum tank at the surface.

3.1.4 The soakaway crates comprising the tank will be surrounded by two layers of welded low density polyethylene or other suitable impermeable membrane. The impermeable membrane will be surrounded and protected by a geotextile wrap. The Skipworth member underlying the tank will compacted in order to form a suitable base. A suitable thickness and type of cover material will be placed between the top of the tank and the base of the impermeable concrete surface consistent with the manufacturer's instructions.

3.1.5 Water will drain from the concrete surface to a 1,200mm diameter circular sump which will comprise a silt trap, thence to a 2,000L capacity Class 1 interceptor before discharging to the tank, in order to minimise the potential for the entry of hydrocarbons and suspended solids to the tank.

3.2 Attenuation of the 1 in 100 year rainfall event plus climate change

3.2.1 The impermeable concrete surface at the site will comprise an area of approximately 4,369m^2, and will be surrounded completely by a kerb with a height of at least 150mm, to provide containment for a volume of at least 655m^3. The runoff generated during the 1 in 100 year plus 40% climate change rainfall event is calculated at Appendix III. Based on the calculations, it is considered that there will be sufficient storage to accommodate within the site surface the 1 in 100 year plus 40% six hour rainfall event, assuming conservatively that the below ground harvesting tank is full.

3.2.2 As discussed above, there will be a significant consumptive demand for water throughout the year which will exceed the rainfall incident to the drainage system at the site. Therefore it is extremely unlikely that the below ground storage tank will be at full capacity at the start of an extreme rainfall event.

3.3 Fire water containment

3.3.1 As the site will contain combustible wastes, there will be a 500,000L capacity above ground fire water tank to the north west of the sealed drainage system. A Penstock shut-off valve will therefore be placed between the silt trap and the interceptor in order to prevent the ingress of fire water into the interceptor or tank. As calculated above there will be sufficient capacity within the concrete surface to contain the volume of the 500,000L or 500m^3 fire water tank.

3.4 Contingency procedures

3.4.1 In the event of a fire or extreme rainfall event, any water accumulating on the impermeable concrete surface will be removed by tanker as necessary and transported to a suitably permitted facility for further treatment.

4 SuDS maintenance procedures

4.1.1 The drainage system will be maintained as follows:

- The above ground fire water tank, concrete surface and kerbing around the concrete surface will be inspected daily in order to verify that they are in good condition. An leaks or defects will be repaired immediately.
- The silt trap will be inspected daily in order to verify that the inlet pipe to the interceptor is clear and that the chamber is free from excessive suspended solids, floating debris or sheens. Silt will be removed from the chamber as necessary and taken to a suitably authorised facility.
- The interceptor will be inspected on a monthly basis and emptied as necessary. Oil collected in the interceptor will be removed from site and taken to a suitably permitted facility as necessary.
- The penstock valve will be tested on a monthly basis to verify it is in working order.

4.1.2 The above proposals are consistent with the recommendation set out in the SuDS Manual[1].

[1] Woods Ballard, B., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. 2015. The SuDS Manual. CIRIA. London.

5 Topography and exceedance routes

5.1.1 Any water which overtops the kerbing surrounding the concrete surfacing discharge overland flowing generally south west towards and in the direction of flow of Angram Dike.

5.1.2 Should water ever be conveyed by the exceedance route, it is considered that the total volume and peak flow rate discharged to the catchment of Angram Dike both will be significantly less than those which would arise from the site in its current condition, as there is sufficient capacity to contain at least the 1 in 100 year six hour plus 40% rainfall event. The design of the surface water drainage system will therefore provide a significant betterment in respect of runoff generation in the catchment of Angram Dike during extreme rainfall events, and eliminate altogether any discharge from the site during rainfall events generating a lower runoff volume than the 1 in 100 year six hour plus 40% rainfall event.

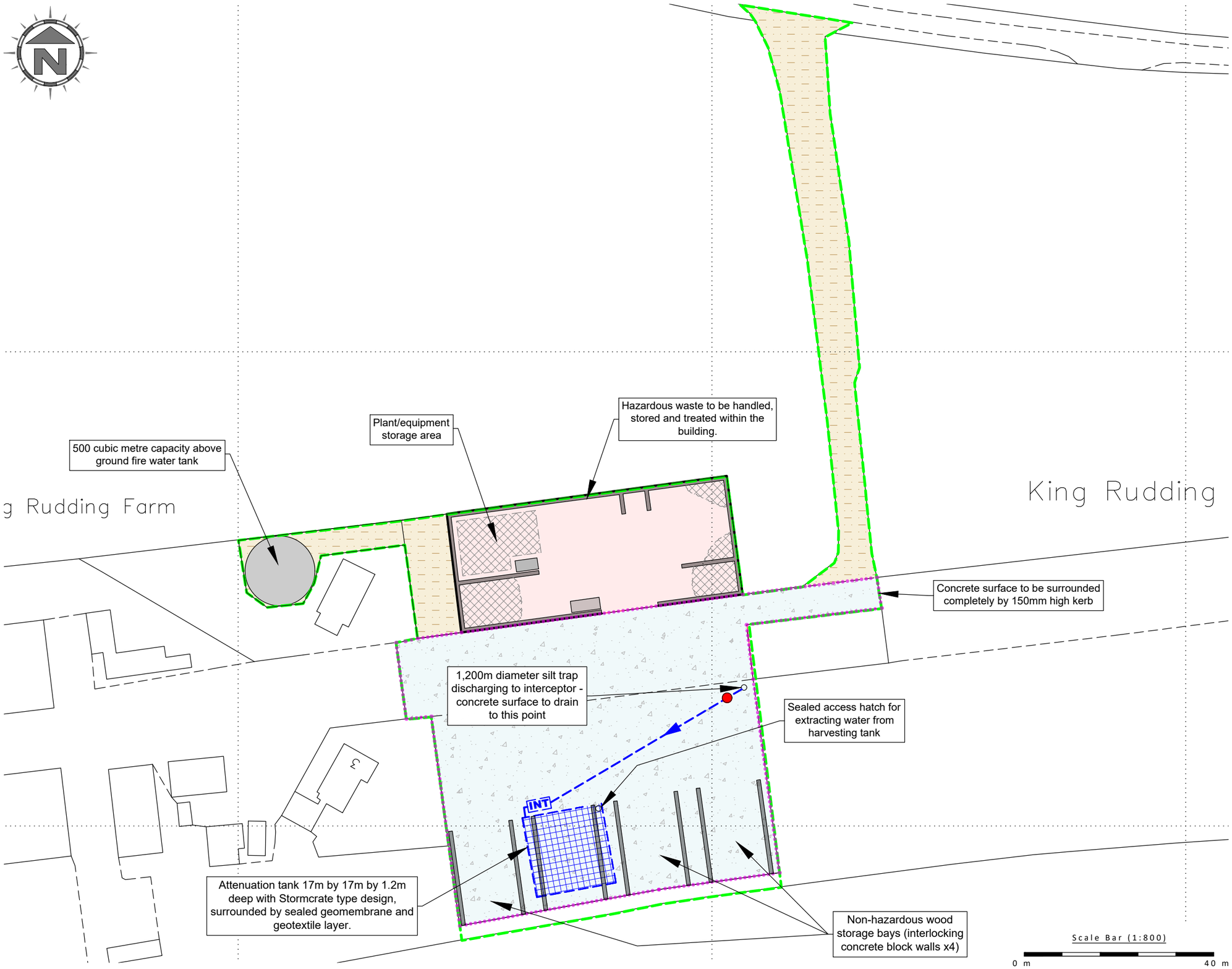
6 Conclusion

6.1.1 The proposed drainage system will be suitable for the proposed use of the site as a waste wood treatment facility.

6.1.2 The design of the surface water drainage system will provide a significant betterment in respect of runoff generation in the catchment of Angram Dike during extreme rainfall events, and eliminate altogether any discharge from the site during rainfall events generating a lower runoff volume than the 1 in 100 year six hour plus 40% rainfall event.

Appendix I

Drawings



NOTES

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	17.05.21	CG	Initial drawing
A	20.05.21	CG	Layout amended
B	26.05.21	CG	Silt trap moved

KEY:

- Permit boundary
- Surface water drainage (300mm internal diameter HDPE surface water drainage pipe)
- 150mm kerb surrounding edge of concrete surface
- INT — NSBE020 Type 2,000 litre capacity bypass oil/water interceptor with integral silt-removal chamber
- Attenuation tank (337m³)
- New concreted area (4,370m² approx.)
- Stone surface (free-draining)
- Penstock shut-off valve to provide surface water containment in the event of a fire

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DRAWING TITLE
SITE DRAINAGE AND FIRE PLAN

CLIENT
EBCO Holdings Ltd

PROJECT/SITE
Riccall Poultry Farm

SCALE @ A3	CLIENT NO	JOB NO
1:800	1133	006

DRAWING NUMBER	REV	STATUS
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Appendix II

Electronic copy of Flood Estimation Handbook data

Appendix III

Rainfall runoff calculations

Appendix III

Calculation of storm water containment for a 1 in 100 year storm event plus an appropriate allowance for climate change as presented in the National Coal Board handbook (reference 1)

Parameter	Value	Units	Reference
Hardstanding area	0.77	ha	Area drainaing to harvesting system
Existing and post-development runoff coefficient	0.95	Dimensionless	Conservatively high runoff coefficient making a minimal allowance for evaporative loss
Climate change factor	0.4	unitless	Conservative allowance for climate change assuming a worst case increase in rainfall and lifetime of the development extending to 2115

Storm Duration (hr)	Rainfall for the site derived from reference 3 (mm)	Rainfall Intensity corrected for climate change (mm/hr)	Volume of rainfall run off in time period (m^3)
0.25	26.82	150.19	276.16
0.5	35.27	98.76	363.17
0.75	40.38	75.38	415.79
1	44.12	61.77	454.30
1.25	46.52	52.10	479.01
1.5	48.34	45.12	497.75
1.75	49.84	39.87	513.20
2	51.11	35.78	526.27
2.25	52.29	32.54	538.42
2.5	53.35	29.88	549.34
2.75	54.31	27.65	559.22
3	55.18	25.75	568.18
3.25	55.99	24.12	576.52
3.5	56.74	22.70	584.24
3.75	57.44	21.44	591.45
4	58.09	20.33	598.14
4.25	58.71	19.34	604.53
4.5	59.29	18.45	610.50
4.75	59.84	17.64	616.16
5	60.37	16.90	621.62
5.25	60.87	16.23	626.77
5.5	61.35	15.62	631.71
5.75	61.81	15.05	636.45
6	62.25	14.53	640.98
12	69.75	8.14	718.21
24	78.57	4.58	809.02
48	90.18	2.63	928.57
72	99.18	1.93	1021.24
96	106.95	1.56	1101.25

References

Reference 1. National Coal Board, 1982. Technical Management of Water in the Coal Mining Industry.
Reference 2. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
Reference 3. Flood Estimation Handbook 2013 data. https://fehweb.ceh.ac.uk/