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Quattro UK Ltd

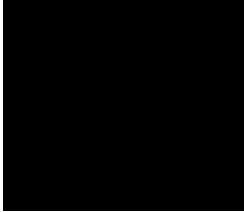
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WASTE RECYCLING FACILITY AND CONCRETE BATCH PLANT, SOUTHALL LANE, HAYES FLOOD RISK ASSESSMENT

**WASTE RECYCLING FACILITY AND CONCRETE BATCH
PLANT, SOUTHALL LANE, HAYES
FLOOD RISK ASSESSMENT**

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Date **06/07/2020**
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CONTENTS

1.	INTRODUCTION	1
1.1	Background	1
1.2	Scope and Objectives	1
1.3	Limitations	2
2.	ASSESSMENT METHODOLOGY	3
2.1	National Policy	3
3.	DATA REVIEW	5
3.1	Site Location	5
3.2	Site Surrounds	6
3.3	Site Description	7
3.4	Geological Setting	7
3.5	Hydrological Setting	7
3.6	Hydrogeological Setting	7
3.7	Existing Surface Water Runoff and Drainage Regime	8
3.8	Tidal/Fluvial Flood Risk	8
3.9	Surface Water Flood Risk	9
3.10	Groundwater Flood Risk	10
3.11	Artificial Water Bodies	10
4.	FLOOD RISK ASSESSMENT	12
4.1	Proposed Development	12
4.2	Suitability of Development	12
4.3	Surface Water Management	12
4.4	SuDS Maintenance	13
5.	CONCLUSIONS	14

APPENDICES

Appendix 1

Proposed Layout

Appendix 2

SuDS Feasibility Assessment

Appendix 3

Surface Water Drainage Strategy

1. INTRODUCTION

1.1 Background

Ramboll UK Limited ('Ramboll') have been appointed by Quattro UK Ltd ('the Applicant') to undertake a Flood Risk Assessment (FRA) to accompany a new retrospective planning application for erection of a Waste Recycling Facility and Concrete Batching Plant (CBP) ('the proposed development') at land forming part of the former Western International Market, Southall Lane, Hayes, UB2 5XJ ('the application site'). The Applicant will seek planning permission for temporary use of the application site until 21 December 2027.

Planning permission was previously granted in January 2018 under application reference 01032/E/P44 for a construction and waste recycling facility, concrete batching plant and associated facilities. The previous planning application was accompanied by an FRA which demonstrated that the site was acceptable in flood risk terms.

The site has subsequently been built out, but not fully in accordance with the approved plans, so a retrospective application is being made for the revised proposals. The proposed development remains largely as previously approved in terms of quantum and form of development but with some relocation/ re-siting of structures / plant. Therefore, there is no material change to the flood risk status of the site when compared to the previously consented development.

This FRA is supported by a Surface Water Drainage Strategy (SWDS) developed by Marks Heeley Ltd in April 2020. The SWDS provides details of the surface water drainage network which has previously been approved for the consented development and has been constructed.

1.2 Scope and Objectives

This document considers the risks of various sources of flooding to the proposed development and the consequent risk of flooding to downstream receptors (such as people, property, habitats, infrastructure and statutory sites) from the proposed development, as a result of surface water runoff. This document also considers a surface water drainage strategy for the proposed development involving a comparison with the pre-development baseline situation. It must be reiterated that, as the current proposed development remains largely as previously approved in terms of quantum and form of development, with only some relocation/ re-siting of structures / plant. Therefore, the FRA is considered consistent with that produced to accompany the previously consented planning application.

This FRA has been carried out in accordance with the National Planning Policy Framework (NPPF). It is to be used to assist the London Borough of Hounslow (LBH) and the Environment Agency (EA), when considering the flooding issues of the proposed development, as part of a planning application. The application is located entirely within Flood Zone 1 according to the EA online flood mapping; however, an FRA is required for the application site as it covers an area greater than 1 hectare (ha).

This report provides the following information:

- An assessment of the flood risk to the proposed development based upon flood data and the flood maps provided by the EA and the Local Authority's Strategic Flood Risk Assessment (SFRA);
- An assessment of the impact of the new development in terms of surface runoff;
- Proposals for measures to mitigate the generation of surface water runoff from the proposed development;
- Proposals to mitigate any residual flood risks to the proposed development (if any); and

- An assessment of various options for foul and surface water drainage for the proposed development.

The information used to prepare this report comprises:

- A topographical site survey by Meridian Surveys Limited (Drawings Reference 0121_01, June 2016);
- 'As-built' drawings and 'As-built with improvements' drawings;
- Surface Water Drainage Strategy produced by Marks Heeley Ltd in April 2020 (Ref: H11930);
- West London SFRA (2018)¹;
- LBH Level 1 SFRA (August 2015)²;
- British Geological Survey (BGS) maps³;
- NPPF: Flood Risk⁴; and
- The EA's⁵ online database of indicative floodplain and hydrogeological maps.

Ramboll cannot accept liability for the accuracy or otherwise of any information derived from third party sources.

1.3 Limitations

This report has been prepared for the Applicant and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

The findings and opinions in the report are based upon information derived from a variety of information sources. Ramboll considers these information sources to be reliable but cannot accept liability for the accuracy or otherwise of any information derived from third party sources.

This report has been prepared on the basis of the proposed end land use defined by the Applicant. If this proposed end land use is altered or changed then it will be necessary to review the findings of this report.

¹ West London Councils 2018, West London Strategic Flood Risk Assessment 2018

² LBH 2015, London Borough of Hounslow Level 1 Strategic Flood Risk Assessment August 2015.

³ British Geological Survey (BGS), 2020. Geology of Britain Viewer [online]. Available at: <http://mapapps.bgs.ac.uk/geologyofbritain3d/>

⁴ Ministry of Housing, Communities & Local Government. National Planning Policy Framework, February 2019.

⁵ UK Government, 2019. Flood Map for Planning [online]. Available at: <https://flood-map-for-planning.service.gov.uk/> and UK Government, 2019. Long term flood risk assessment for locations in England [online]. Available at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

2. ASSESSMENT METHODOLOGY

This FRA has been completed in accordance with the guidance presented in the NPPF with reference to Planning Practice Guidance (PPG)⁶ and Local Policies. A summary of this guidance and policy is provided below.

2.1 National Policy

2.1.1 National Planning Policy Framework 2019

The 2012 National Planning Policy Framework (NPPF)⁷ was most recently updated in February 2019⁸, with flood risk still remaining primarily regulated through planning policy. It sets out the Government's planning policies for England. It provides within a single document the greater part of national planning policy advice and articulates the Government's vision for delivering sustainable development. The NPPF is, therefore, a material planning consideration.

The NPPF requires that an FRA should be submitted with planning applications for all development sites within Flood Zones 2 and 3; and all development sites over one ha to determine the risks of flooding from all sources including rivers, the sea, sewers and groundwater.

The NPPF sets out that flood risk should be defined according to Flood Zone 3 (High Probability), Flood Zone 2 (Medium Probability) and Flood Zone 1 (Low Probability). Flood Zone 3 represents land that the EA considers could be affected by flooding:

- from the sea by an event with a 0.5% (1 in 200) or greater chance of occurring each year; or
- from a river by an event with a 1% (1 in 100) or greater chance of occurring each year.

Flood Zone 2 represents land that the EA considers could be affected by flooding, from rivers or the sea with up to a 0.1% (1 in 1,000) chance of occurring each year. Flood Zone 1 represents land assessed as having less than a 1 in 1,000 (0.1 %) annual probability of flooding from rivers or the sea.

In terms of flood risk, the NPPF classifies land uses according to vulnerability as follows:

- Essential infrastructure;
- Highly vulnerable;
- More vulnerable;
- Less vulnerable; and
- Water-compatible development.

⁶ Ministry of Housing, Communities & Local Government (Live Document). Planning Practice Guidance [online]. Available at: <http://planningguidance.communities.gov.uk/>

⁷ Department for Communities and Local Government, 2012. National Planning Policy Framework, March 2012.

⁸ Ministry of Housing, Communities & Local Government. National Planning Policy Framework, February 2019.

2.1.2 Planning Practice Guidance

The 'Flood Risk and coastal change' part of the PPG, provides further information on the requirements for sustainable drainage systems (SuDS). It is set out that surface water drainage for a proposed development should aim to discharge as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration);
- into a surface water body;
- to a surface water sewer, highway drain, or another drainage system; and
- to a combined sewer.

The PPG also sets out that clear arrangements should be put in place for ongoing maintenance of any SuDS and drainage measures. However, it is acknowledged in the PPG that it is unlikely to be reasonably practical to expect compliance with the technical standards if these are more expensive than complying with building regulations.

2.1.3 The Town and Country Planning (Development Management Procedure) Order, 2015

The Government has strengthened planning policy on the provision of sustainable drainage for 'major' planning applications as from 6 April 2015. Decisions about the suitability of sustainable drainage provision are made by the local planning authority (i.e. the LBH in this case); however, under The Town and Country Planning (Development Management Procedure) Order 2015⁹, Lead Local Flood Authorities (LLFA) are now statutory consultees for all major applications.

⁹ Her Majesty's Stationery Office (HMSO), 2015. Statutory Instruments 2015, No. 596, Town and Country Planning, England, The Town and Country Planning (General Permitted Development) (England) Order 2015.

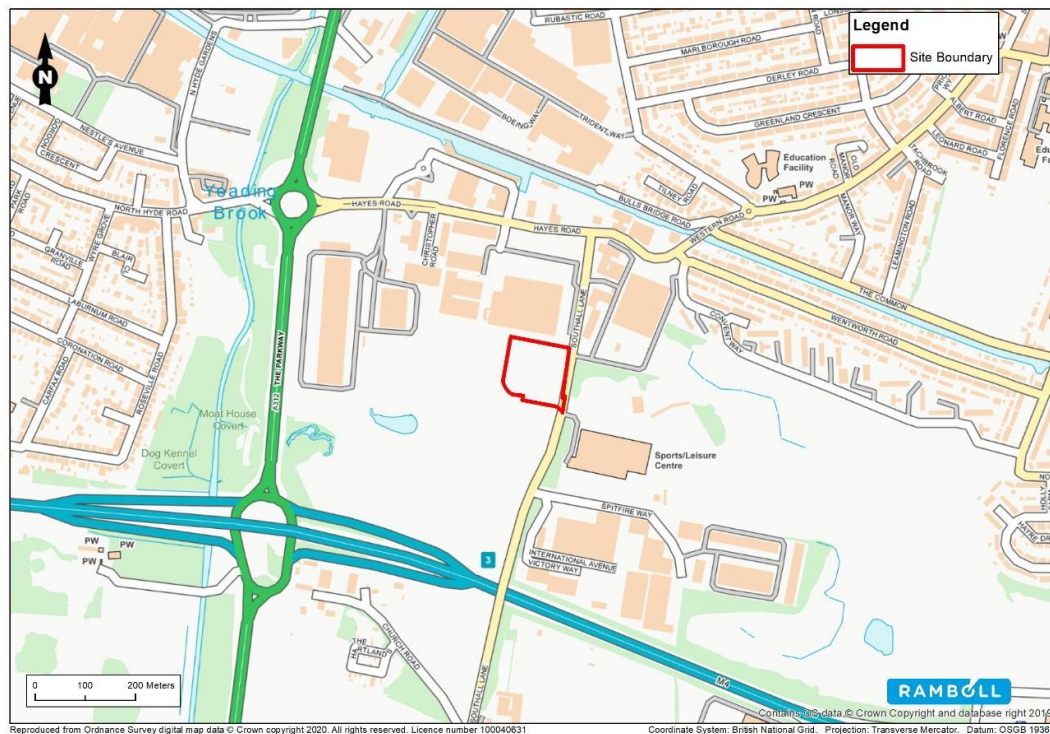
3. BASELINE DATA REVIEW

As set out previously, planning permission was previously granted in January 2018 for a construction and waste recycling facility, concrete batching plant and associated facilities. The site has subsequently been built out, but not fully in accordance with the approved plans, so a retrospective application is being made for the revised proposals. The proposed development remains largely as previously approved in terms of quantum and form of development but with some relocation/ re-siting of structures / plant. This baseline data review considers the pre-development site setting.

3.1 Site Location

As presented in Figure 3.1 the site is situated off Southall Lane, Hayes, UB2 5XJ at National Grid Reference (NGR) 511009, 178561

Figure 3.1: Application Site Location



3.2 Site Surrounds

The application site previously formed part of the Western International Market, in the north-west of the LBH. It is bound to the:

- north by Costco Wholesale, with associated car parking facilities, beyond which lies Hayes Road;
- east by Southall Lane, beyond which lies Airlinks Golf Club and the David Lloyd Sports Centre;
- south by open space which comprises grassland and scrub with a pond, beyond which lies the M4; and
- west by the recently constructed Hounslow Household Waste Depot (planning application reference: P/2016/0685), beyond which lies commercial buildings, car parking areas and the A312 Parkway.

The land uses surrounding the application site are detailed in Table 3.1. All distances are as measured from the red line boundary.

Table 3.1: Adjacent and Surrounding Land Uses		
North	Costco Wholesale Warehouse and associated car parking	0 - 195 m
	Hayes Road	60 m
	Commercial and industrial uses, including Dhillon of London, a Timber and Builders Merchant, an Accident repair centre, A1 Gb Tyres, Firmenich Food Products Supplier and associated car and HGV parking.	220 – 300 m
	Grand Union Canal	300 m
	Residential properties, comprising predominantly two storey terraces	
North east	Commercial and industrial use within Locally Significant Industrial Sites 37 and 38, including Muirhead Avionics and Allport Cargo services, with associated car and HGV parking.	0 – 270 m
	Residential properties, comprising predominantly two storey terraces	250 – 430 m
	Grand Union Canal	350 m
East	Southall Lane	0 - 40 m
	Airlinks Gold Club with associated car park and commercial buildings	40 - 800 m
South east	Commercial and industrial uses within Locally Significant Industrial Sites 30, 31 and 32, including David Lloyd Heston Gym, Middlesex Tennis Club, associated car parking and Aneel Sports retail shop	50 - 250 m
South and South west	Designated MOL, Green Belt and Archaeological Priority Zone	0 - 360 m
	M4 Motorway	360 - 410 m
West	Waste depot site	0 - 140 m
	Western International Market and associated car parking	140 - 390 m
North west	Costco Wholesale warehouse	0 m
	Brentford Fountain Western International Market Grade II Listed structure	120 m

Table 3.1: Adjacent and Surrounding Land Uses

	Commercial and industrial use, including Virtus Data Centre building and further free standing commercial/retail units fronting Hayes Road.	50 - 280 m
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3.3 Site Description

The application site is roughly rectangular in shape and covers an area of approximately 1.5 ha. Ground levels across the application site prior to development varied between approximately 29.5 and 30 mAOD (metres Above Ordnance Datum), with a very slight fall towards the south-west. However, the application site is approximately 1.5 m lower than Southall Lane such that the eastern boundary forms a sloped embankment. Ground remain as prior to development.

The application site was previously occupied by part of the Western International open-air market and associated buildings, which have since been demolished. The site has now been built out to provide the existing Quattro operated concrete batching plant and waste recycling facility following planning permission being granted in 2018 (ref: 01032/E/P44) as detailed further in the accompanying planning statement (Firstplan). The site including access road is predominantly hard surfaced with a surface water drainage strategy in operation. Land within the application site beyond the operational area to the eastern and northern boundaries comprises bare ground / gravel and a treed embankment.

3.4 Geological Setting

The BGS geological map for the area shows the application site to be underlain by superficial deposits of Lynch Hill Gravel Member (Sand and Gravel). Worked ground is also recorded to be present at the application site. The underlying solid geology at the application site comprises London Clay Formation (Clay and Silt), further underlain by the Lambeth Group, with Upper Chalk present at depth.

A BGS historic borehole record (ref: TQ17NW115) is located approximately 145 m north-east of the application site. This confirms the presence of London Clay, Woolwich and Reading Beds (Lambeth Group) and Upper Chalk geology. The borehole record does not contain information in relation to water levels encountered at the application site.

3.5 Hydrological Setting

There are no watercourses present within the application site boundary. The closest watercourses to the application site are two drainage ditches situated approximately 170 m and 300 m to the south respectively. These join with Yeading Brook which is situated approximately 500 m west of the application site. The Grand Union Canal is situated approximately 300 m to the north of the application site.

3.6 Hydrogeological Setting

The EA has developed Groundwater Source Protection Zones to assist in assessing the risk to groundwater supplies taken from an abstraction point. The application site is not situated within a Groundwater Source Protection Zone.

There is one licensed groundwater abstraction (classified as medium size) located approximately 1 km south of the application site and one licensed surface water abstraction (also of medium size) located approximately 1 km north-west of the application site.

3.7 Pre-Development Surface Water Runoff and Drainage Regime

The site has subsequently been built out and is served by a surface water drainage network which has been designed and constructed in accordance with previously consented principles. The current retrospective application is being made for revised proposals which remain largely as previously approved in terms of quantum and form of development but with some relocation/ re-siting of structures / plant. Therefore, the surface water drainage strategy is considered to remain acceptable for the revised proposals. This FRA, however, seeks to demonstrate that the proposed development would remain acceptable if considered independently of the previously consented scheme. Therefore, the pre-development baseline has been considered.

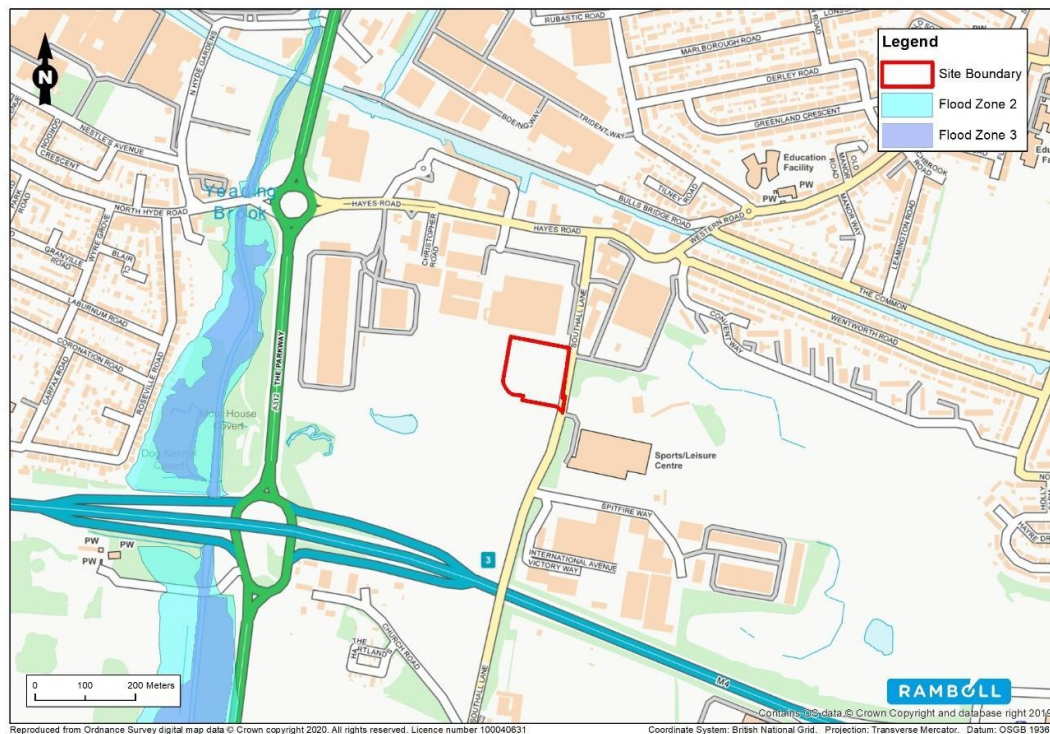
As discussed previously, aside from an access road and small area of concrete hardstanding, the application site prior to development was unsurfaced, with some areas of unbound gravel / hard core. There were no known formal surface water drainage infrastructure present at the application site and the small areas of hardstanding were considered most likely to drain to adjacent permeable surfaces and infiltrate to ground. There is an existing surface water sewer beneath Southall Lane immediately east of the site.

On the basis that the application site prior to development comprised largely impermeable surfacing, greenfield runoff rates for the application site have been estimated using the Institute of Hydrology Report No. 124 Methodology for various return periods, as an estimate of existing peak runoff rates. Table 3.2 summarises the peak runoff rates for various return periods.

Table 3.2: Application Site Greenfield Runoff rates				
Return Period (years)	1-in-2	1-in-10	1-in-30	1-in-100
Peak Runoff (L/s)	2.36	4.34	6.07	8.55

3.8 Tidal/Fluvial Flood Risk

The EA's online indicative flood map for planning identifies areas in England at risk of tidal or fluvial flooding by allocating them into flood risk zones. as defined in the Technical Guidance to the NPPF. The EA's online flood mapping (reproduced in Figure 3.2) shows the application site to be entirely situated within Flood Zone 1, at less than a 1 in 1,000 year probability of flooding from rivers and sea. Therefore, overall tidal and fluvial flood risk is considered to be low.

Figure 3.2: Flood Zone Designation

3.9 Surface Water Flood Risk

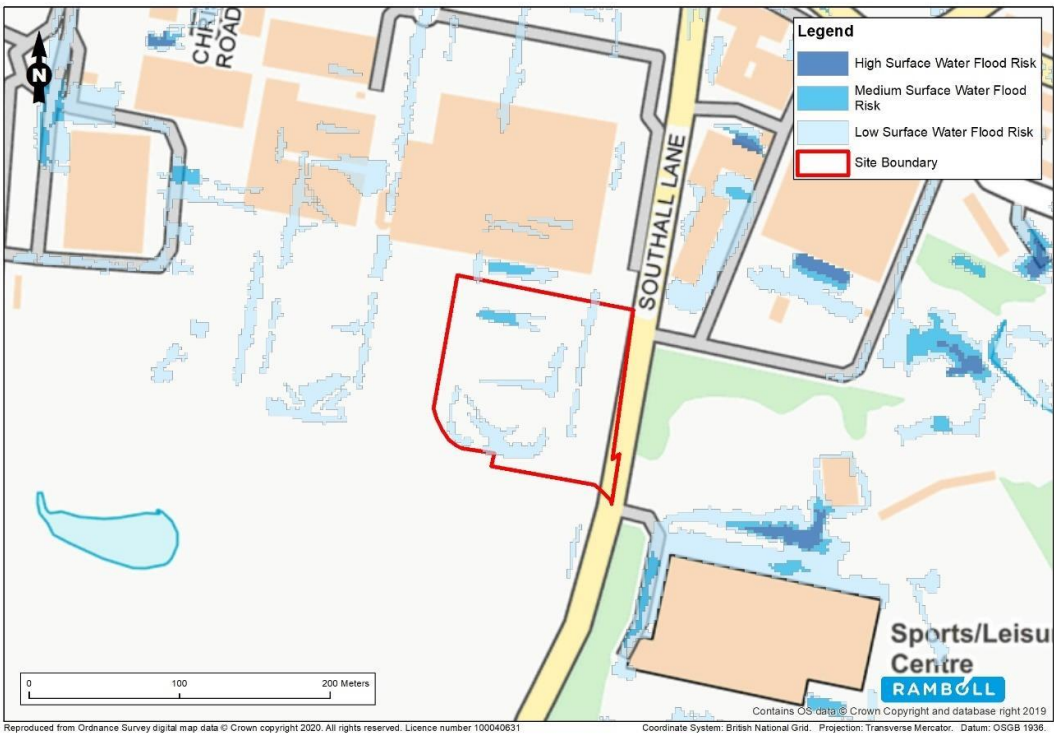
The EA's indicative surface water flood risk mapping identifies areas in England and Wales at potential risk of surface water flooding according to the following risk categories:

- High Risk - Considered to have a greater than 1 in 30 annual probability of surface water flooding in any year ($>3.3\%$).
- Medium Risk - Considered to have between a 1 in 30 and 1 in 100 annual probability of surface water flooding in any year (between 3.3% and 1%).
- Low Risk - Considered to have between a 1 in 100 and 1 in 1,000 annual probability of surface water flooding in any year (between 1% and 0.1%).
- Very Low Risk - Considered to have a less than 1 in 1,000 annual probability surface water flooding in any year ($<0.1\%$).

The majority of the application site to be at Very Low risk of surface water flooding. There are some very small localised areas shown to be at Low or Medium risk of surface water flooding. However, the areas of potential surface water flood risk correspond broadly with locations where lower ground levels are present within the current application site. There are no records of previous surface water flooding at the application site and the proposed surface water drainage measures would be expected to mitigate against such risk.

Mapping within the SFRA also shows the application site to be at low risk of surface water flooding. Therefore, overall flood risk to the application site from surface water is considered to be low.

Figure 3.3: EA Surface Water Flood Map



3.10 Groundwater Flood Risk

The SFRA does not state any specific areas within the LBH that have a high susceptibility to groundwater flooding; however, it does state that sites with basements constructed on superficial deposits may have increased susceptibility. Given there was no existing development (and therefore no basement) at the application site prior to development, groundwater emergence is not considered to be likely to have occurred at the application site prior to development. In addition, there are no known high groundwater levels in the area and no records of previous groundwater flooding at the application site. Flood risk to the application site from groundwater is considered to be low.

3.11 Artificial Water Bodies

There are no artificial water bodies within the application site. The EA’s indicative reservoir flood risk maps show that the application site is not at residual risk of reservoir flooding and there are no known artificial waterbodies within or adjacent to the application site. Accordingly, the flood risk to the application site from artificial sources is considered to be low.

Flood Risk Summary

Based on the assessment of flooding sources above, the flood risk summary for the application site is presented in Table 3.3:

Table 3.3: Application Site Flooding Sources Prior to Development				
Flood Risk	High	Medium	Low	Comments
Tidal/ Fluvial			X	Application site located within Flood Zone 1.

Table 3.3: Application Site Flooding Sources Prior to Development

Surface Water and Drainage Flood Risk			X	Very small localised areas of the application site at low or medium risk of flooding. No records of previous sewer or surface water flooding. SFRA shows flood risk to be low.
Groundwater			X	No known records of groundwater flooding.
Reservoirs, canals and other artificial sources			X	Application site not at risk of reservoir flooding and there are no artificial water bodies within the application site.

4. FLOOD RISK ASSESSMENT

4.1 Proposed Development

It is proposed to build a construction and demolition Waste Recycling Facility, concrete batching plant and associated weighbridge; weighbridge office, site office and welfare facilities; storage bays; substation; car and HGV parking and ancillary structures, and use of land for fleet parking (all works, applied for retrospectively) at the application site. Consent is sought for a temporary period ending 21 December 2027. The proposed development layout is presented in Appendix 1.

4.2 Suitability of Development

As defined by the PPG, the proposed development is 'less vulnerable'. The Technical Guidance to the NPPF Table 3 (Flood Risk Vulnerability and Flood Zone 'Compatibility') states that 'less vulnerable' development is appropriate in Flood Zones 1, 2 and 3a; however, for development within Flood Zone 3b the exception test must be passed. As the application site is located in Flood Zone 1, all forms of development are appropriate in this Flood Zone. Therefore, the Sequential Test is passed and the Exception Test is not required.

4.3 Surface Water Management

As detailed previously, prior to development the application site was currently broadly unsurfaced. However, a surface water drainage network was designed by Marks Heeley Ltd in accordance with the principles set out in the previous FRA and has been installed to serve the as-built out scheme.

In accordance with planning policy and best practice, new development would need to ensure peak surface water discharge rates do not exceed existing rates and must also take into account increases in rainfall intensity over the lifetime of the development due to the predicted effects of climate change. Therefore, runoff from the development has been throttled and attenuation storage provided to ensure that there is no increase in flood risk to downstream receptors following development.

Prior to design of the new surface water drainage network consideration was given to the use of SuDS. Appendix 2 outlines various SuDS options which were considered and sets out their suitability for use as part of the development.

The surface water drainage strategy (SWDS) has been updated to reflect the new proposed development as presented in Appendix 3. The SWDS confirms that, due to the nature of the proposed development and the resultant high potential for sediments and contaminants within runoff from on-site (due to the concrete batching process), infiltration to ground is not a feasible option. Therefore, providing attenuation in the form of an underground storage tank was deemed the most practical option for the application site, prior to discharge to the public sewer network. This accords with the SuDS feasibility assessment made by Ramboll.

The proposed network would ensure that the proposed development does not create additional runoff that could affect surrounding areas or put additional load on the existing sewer system which could cause surcharging in peak storm events. Following the hierarchy of disposal methods, Marks Heeley Ltd determined the most suitable method of providing surface water drainage to the proposed development would be the use of rainwater harvesting and below-ground attenuation.

Specifically, re-use of rainwater is a key functional element of the concrete batching plant and waste recycling facility process, as significant volumes of water would be needed for dust suppression and process on site. A proportion of the attenuation volume is provided through the proposed water re-use strategy. Grey water from the concrete batching plant is collected into a wedge pit and recycled in the process via stirrer tanks. Likewise, general surface water on-site is collected in settlement pits to supply water for dust suppression activities as part of the waste recycling facility operation. Any additional attenuation storage is provided in an underground storage tank, prior to controlled discharge to the public sewer network at an equivalent greenfield rate of 3 L/sec which has already been agreed with Thames Water.

The surface water drainage network, as designed by Marks Heeley Ltd has already been installed on-site given that the site has already been built out with the current application being made retrospectively for the revised proposals. Thames Water approval for the connection to the surface water drainage sewer has been obtained and the connection has been made.

4.4 SuDS Maintenance

Table 4.1 describes the typical maintenance requirements of the SuDS components proposed within the drainage strategy in line with CIRIA C753: The SuDS Manual.

Table 4.1: Suds Components and Maintenance Requirements.			
SuDS Components:	Underground Attenuation Tank		Responsible Party
Regular Maintenance	Inspect and identify any areas that are not operating correctly. Remove debris from catchment surface and remove any sediment build up from pre-treatment structures.	Monthly	Quattro UK Ltd
Occasional Tasks	Repair/rehabilitation of inlets, outlets, overflows and vents	As required	
Remedial Work	Inspect all inlets, outlets vents and overflows to ensure that they are in good condition are operating as designed	As required	

5. CONCLUSIONS

Ramboll UK Limited were commissioned by Quattro UK Ltd to provide an FRA to accompany a retrospective planning application for the redevelopment of the land forming part of the former Western International Market, Southall Lane, Hayes, UB2 5XJ. The application will allow for continued occupation and operation of the site as a concrete batching plant and C&D waste recycling facility.. This would include associated structures and facilities such as a weighbridge, weighbridge office, site office and welfare facilities, car and HGV parking and other ancillary structures. Access to the application site would remain via Southall Lane. The planning application seeks temporary planning permission for temporary use of the application site until 21 December 2027.

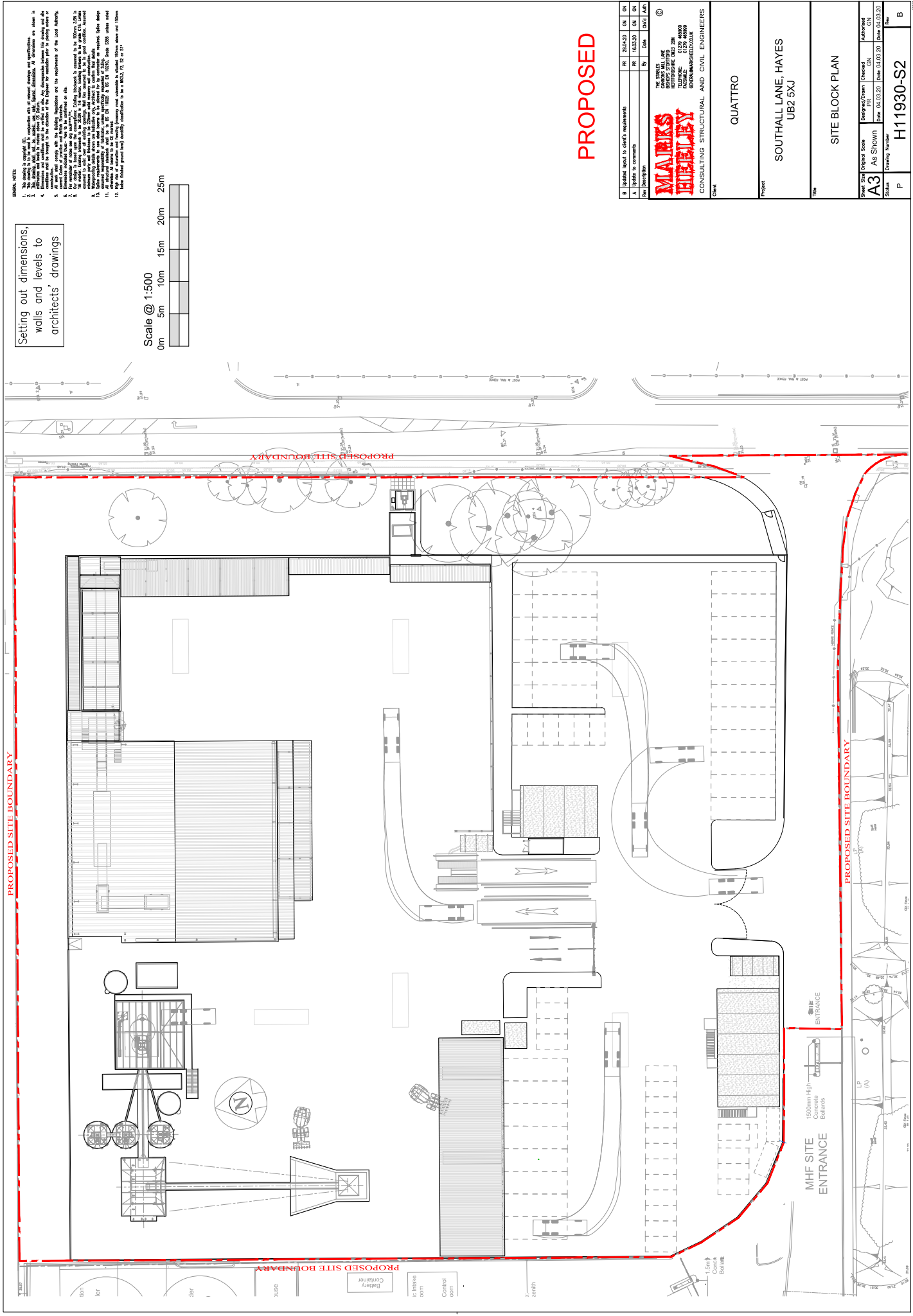
The EA flood maps show the application site to be situated within the Flood Zone 1, at low risk of tidal/fluviat flooding. All other sources of flooding to the application site are considered to also be low risk. The proposed developed is classified in the NPPF as 'less vulnerable' which is appropriate for development in Flood Zone 1 and therefore the sequential test is deemed to be passed and the exception test is not required.

A surface water drainage strategy was developed for the site in accordance with the previously consented planning permission granted in January 2018 (01032/E/P44). The drainage strategy has been updated to reflect the currently proposed development. The principles of the surface water drainage strategy remain as previously consented and the drainage network has already been installed on-site given that the site has already been built out with the current application being made retrospectively for the revised proposals. Thames Water approval for the connection to the surface water drainage sewer has been obtained and the connection has been made.

It is proposed to store surface water below ground on-site for reuse as part of the on-site activities, in particular for dust suppression within the application site and for use in the concrete batching plant, which has a high water demand, with any excess flows discharged at an equivalent greenfield rate of 3 L/sec which has been agreed with Thames Water.

Based on the findings of this report, flood risk does not pose a constraint to the proposed development and the proposed development would not adversely affect flood risk downstream. An appropriate drainage strategy has been designed and installed following consent from Thames Water.

APPENDIX 1 PROPOSED LAYOUT



Setting out dimensions,
walls and levels to
architects' drawings

Scale @ 1:500
0m 5m 10m 15m 20m 25m

PROPOSED

B Updated layout to client's requirements		PR	25/04/20	OK	OK
A Update to comments		PR	16/03/20	OK	OK
New Description		#	2046	OK	OK
MAJORS THE STABLES LANE BROOKLYN STATION SYDNEY NSW 1570 42000 TEL: 02 9550 1234 FAX: 02 9550 1235 WWW.MAJORS.COM.AU					
CONSULTING STRUCTURAL AND CIVIL ENGINEERS					
Client					
Project					
Title					
SITE BLOCK PLAN					
SOUTHALL LANE, HAYES UB2 5XJ					
Sheet Size Original Scale					
A3 As Shown					
Drawing Number					
H11930-S2					
P					

APPENDIX 2

SUDS FEASIBILITY ASSESSMENT

SUDS Group	Technique	Description	Advantages	Disadvantages	Suitable for Use at Application Site?
Retention	Balancing pond 	Provides both storm water attenuation and treatment. Run-off from each rain event is detained and treated in the pool. The retention time promotes pollutant removal through sedimentation.	Good removal of pollutants, can be used where groundwater is vulnerable, good community acceptability, high ecological and amenity benefits.	No reduction in run-off volume, land take may limit use in high density sites.	✗ This is not a feasible option due to the limited extent of the application site, the land take requirements of the proposed development, as well as the operational requirements of the proposed development.
	Sub-surface storage 	Oversized pipes, tank systems and modular geocellular systems that create a below ground storage structure.	Modular and flexible, dual usage (infiltration/storage, high void ratios). Can be installed beneath trafficked and soft landscaped areas.	No water quality treatment.	✓ This may be a feasible option for the proposed development.

SUDS Group	Technique	Description	Advantages	Disadvantages	Suitable for Use at Application Site?
Wetland	Shallow wetland	Provide stormwater attenuation and treatment.	Good pollutant removal and if lined can be used where groundwater is vulnerable.	Land take is high, requires baseflow, little reduction in run-off volume, not suitable for steep Application Sites.	✗ This is not a feasible option due to the limited extent of the application site, the land take requirements of the proposed development, as well as the operational requirements of the proposed development.
	Extended detention wetland	Comprise shallow ponds and marshy areas, covered in aquatic vegetation.	Good community acceptability, ecological and amenity benefits.		
	Pond wetland				
	Pocket wetland	Detain flows for an extended period to allow sediments to settle and to remove contaminants.			
	Submerged gravel wetland	Provide significant ecological benefits.			
Infiltration	Wetland channel				✗ This is not a feasible option for the proposed development site. Due to the nature of the proposed development and the resultant high potential for sediments and contaminants within runoff from on-site (due to the concrete batching process),
	Infiltration trench	Enables direct discharge of surface water run-off to ground.	Reduces volume of run-off, effective at pollutant removal, contributes to groundwater recharge, simple and cost-effective, easy performance observation.	Requires appropriate pre-treatment, basins require a large flat area, offset from foundations.	
	Infiltration basin	Both groundwater and ground conditions have to be appropriate to receive the quality and quantity of water generated.			
	Soakaway				
					
	Porous paving	Allows run-off to infiltrate through to sub base layer. Water can then be infiltrated into ground or conveyed into storage or drainage systems.	Reduces volume of run-off. If designed for infiltration contributes towards groundwater recharge. Easy to install and retrofit, simple to manage. If lined can be used where groundwater is sensitive.	Not suitable for heavily trafficked areas or adoptable roads. Requires regular sweeping to prevent clogging with dirt.	✓ A lined system may be a feasible option for paved areas but given the nature of development proposed, the loading may be too heavy for the use of permeable paving.
	Permeable paving				

SUDS Group	Technique	Description	Advantages	Disadvantages	Suitable for Use at Application Site?
Filtration	Surface sand filter	Structures designed to treat surface water run-off through filtration using a sand bed filter medium.	Flexibility of design, efficient in removing pollutants, suitable for retrofits and in tightly constrained urban locations.	Not suitable for high sediment content, detention times can support algae growth, minimum hydraulic head of 1.2 m required.	✓ This may be a feasible option for the proposed development as a water treatment process prior to sewer discharge.
	Sub-surface sand filter	Filters can be designed with or without infiltration. Temporary storage of run-off is achieved through ponding above the filter layer. Used where particularly high pollutant removal is required.		Possible odour problems, high capital and maintenance cost.	
	Perimeter sand filter 				
	Bioretention /filter swale 	Vegetated strips of land designed to accept run-off as overland sheet flow between a hard-surfaced area and a receiving system.	Landscaping features, effective in removing pollutants. Flexible layout to fit into landscape, suited for highly impervious areas, good retrofit capability. Effective pre-treatment option.	Requires landscaping and management. Large land requirement, not suitable for steep sites. Limited attenuation or reduction of flows.	✗ This is unlikely to be a feasible option for the proposed development due to land-take and the proposed end-use.
	Filter trench /drain 	Shallow excavations filled with rubble or stone that create temporary subsurface storage for filtration of storm water run-off. Receive lateral inflow from an adjacent impermeable surface.	Hydraulic benefits achieved with filter trenches. Can be incorporated into landscaping and fit well beside roads and car parks.	High clogging potential without effective pre-treatment. Limited to small catchments. High cost of replacing filter material.	✓ This may be a feasible option for the proposed development as a water treatment process prior to sewer discharge. However, due to the high clogging potential and the potential for sediments in the runoff from the site, the effectiveness of such measures is likely to be limited.

SUDS Group	Technique	Description	Advantages	Disadvantages	Suitable for Use at Application Site?
Detention	Detention basin	Surface storage basins that provide flow control through attenuation. Normally dry and in certain situations the land may also function as a recreational facility.	Cater for a wide range of rainfall events, can be used where groundwater is vulnerable, potential for dual land use, easy to maintain.	Land take requirements. Little reduction in run-off volume. Detention depths constrained by levels.	✗ This is unlikely to be a feasible option due to land take.
	Enhanced dry swale	Linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate.	Incorporate into landscaping, good removal of pollutants, reduces run-off rates and volumes, low cost.	Not suitable for steep areas, significant land take, not suitable in areas with roadside parking.	✗ This is unlikely to be a feasible option due to land take.
	Enhanced wet swale				
Conveyance	Conveyance swales	Linear drainage features in which surface water can be stored or conveyed. Can be incorporated with water features such as ponds or waterfalls where appropriate.	Negate the need for underground pipework. Can provide some attenuation. Possible reduction in run-off volume via plant uptake and infiltration.	Potential trip/wheel hazard, disabled access issues.	✗ Unlikely to be a feasible option for the proposed development due to required vehicle movements.
	Rills				

SUDS Group	Technique	Description	Advantages	Disadvantages	Suitable for Use at Application Site?
Source control	Green/brown roof 	Multi-layered system that covers the roof of a building with vegetation cover/landscaping over a drainage layer. Designed to intercept and retain precipitation, reducing the volume of run-off and attenuating peak flows.	Mimics Greenfield state of building footprint for high density developments, good removal of pollutants, ecological benefits, insulates buildings, sound absorption.	Additional weight, not appropriate for steep roofs, maintenance of roof vegetation.	✗ This is not a suitable option for the site given the nature of the proposed building construction.
	Rainwater harvesting 	Uses rainwater coming from roofs to supply toilets, washing machines and irrigation systems. Harvested rainwater is stored underground and is substituted for potable water mains supply, reducing both site discharge and water consumption.	Can provide source control of storm water runoff, reduces demand on mains water.	Use is dependent on demand requirements, contributing surface area, and seasonal rainfall characteristics.	✓ This is feasible option for the application site and the proposed development will seek to use rainwater harvesting to supply water for dust suppressant activities.

APPENDIX 3

SURFACE WATER DRAINAGE STRATEGY

H11930

MARKS HEELEY LTD

**SURFACE WATER DRAINAGE STRATEGY FOR
PROPOSED:**

**WASTE RECYCLING FACILITY AND CONCRETE
BATCHING PLANT,**

**QUATTRO SITE,
SOUTHALL LANE, HAYES, UB2 5XJ**



April 2020

The Stables, Cannons Mill Lane, Bishop's Stortford, Herts CM23 2BN
Tel: 01279 465999

MARKS HEELEY

1.0 PROPOSED DRAINAGE STRATEGY

- 1.1 Planning permission was granted in January 2018 under application reference 01032/E/P44 for a construction and waste recycling facility, concrete batching plant and associated facilities.
- 1.2 The site has subsequently been built out, but not in accordance with the approved plans, so a retrospective application is being made for the revised proposals.
- 1.3 The proposed development remains largely as previously approved in terms of quantum and form of development but with some relocation/ re-siting of structures/ plant.

2.0 BACKGROUND INFORMATION

- 2.1 The original application submission provided a preliminary drainage scheme and comprises of approved Marks Heeley Ltd drawing H11930/ 01revA (24.03.17), and the approved Flood Risk Assessment (Ramboll December 2016).
- 2.2 The original planning permission had Condition 11 attached which required: *'that plans and details of drainage arrangements shall be submitted to and approved in writing by the Local Planning Authority.'* Details to satisfy that condition were submitted in March 2018 but not determined.

3.0 PROPOSED DRAINAGE STRATEGY

- 3.1 This drainage strategy updates information previously provided in light of the amendments to the scheme.
- 3.2 A copy of the latest drainage plan is attached to this report, reference H11930/ 01revF.
- 3.3 The full operational area of the application site is laid to hardstanding.
- 3.4 Due to the nature of the proposed development and the resultant high potential for sediments and contaminants within runoff from on site (due to the concrete batching process), it was previously agreed that infiltration to ground is not a feasible option.
- 3.5 Therefore, it was agreed that providing attenuation in the form of an underground storage tank was the most practical option for the application site, prior to discharge to the public sewer network.
- 3.6 This ensures the proposed development does not create additional runoff that could affect surrounding sites, or put additional load on the existing sewer system which could cause surcharging in peak storm events.
- 3.7 Following the hierarchy of disposal methods, we previously determined the most suitable method of providing surface water drainage to the proposed development.

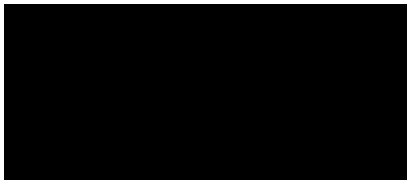
HIERARCHY OF DISPOSAL METHODS	
METHOD	COMMENTS
A. Store rainwater for later use	Proportion of attenuation volume to be re-used
B. Use infiltration techniques	Not allowed
C. Attenuate rainwater in open water features for gradual release	Not allowed
D. Attenuate rainwater by storing in tanks for gradual release	Proposed
E. Discharge rainwater direct to a watercourse	Not possible
F. Discharge rainwater to a surface water sewer	Controlled discharge proposed for volume of water that has not been re-used
☐ G. Discharge rainwater to a combined sewer	Not required
☐ H. Discharge rainwater to a foul sewer	Not required

- 3.8 Re-use of rainwater is a key functional element of the concrete batching plant and waste recycling facility process, as significant volumes of water would be needed for dust suppression and process on site.

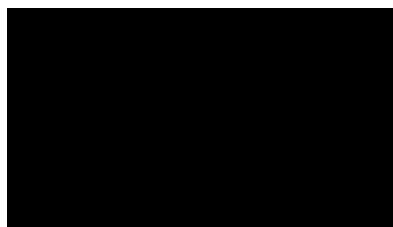
- 3.9 A proportion of the attenuation volume is provided through the proposed water re-use strategy. Grey water from the concrete batching plant is collected into a wedge pit and recycled in the process via stirrer tanks. Likewise general surface water on-site is collected in settlement pits to supply water for dust suppression activities as part of the waste recycling facility operation.
- 3.10 Any additional attenuation storage is provided as necessary in an underground storage tank, prior to controlled discharge to the public sewer network.
- 3.11 The drainage as shown on the attached drawing is installed on site.
- 3.12 Thames Water approval for the connection to the surface water drainage sewer has been obtained and the connection has been made.

4.0 CONCLUSION

- 4.1 The drainage strategy follows the principles established by the approved scheme from January 2018.
- 4.2 Drainage drawing H11930/ 01revF provides full details of the site wide drainage proposals that have been constructed on site.
- 4.3 Considering the hierarchy of disposal methods, the best option available to us is to install surface water attenuation with a controlled discharge to the surface water sewer, with a proportion of water collected in this volume of attenuation being re-used on site for dust suppression and process on site.
- 4.4 Permission for the connection to the Thames Water sewer has been obtained for the agreed rate of 3.0 l/sec. The site drainage system and attenuation has been designed considering this allowable discharge rate.
- 4.5 The scheme as implemented on site is considered acceptable from a surface water flooding and SUDs point of view.



Adam Flack BSc (*Eng*).

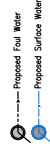


Graham Newman
IEng AMIStructE

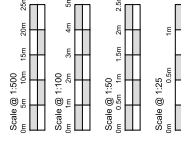
Petrol Interceptor Data

Product code	Flow rate (l/s)	Storage Capacity (litre)	Length (mm)	Access Diameter (mm)	Base to Outer Diameter (mm)	Standard Access (mm)	Min. Invert (mm)
NSBC30	30	300	14870	800	425	1420	750
NSBC40	40	400	19870	800	425	1420	1000
NSBC50	50	500	24870	800	425	1420	1200
NSBC60	60	600	29870	800	425	1420	1400
NSBC70	70	700	34870	800	425	1420	1600
NSBC80	80	800	39870	800	425	1420	1800
NSBC90	90	900	44870	800	425	1420	2000
NSBC100	100	1000	49870	800	425	1420	2200

- GENERAL NOTES:
- This drawing is complete (C).
 - The drawing is to be used in conjunction with all relevant drawings and specifications.
 - This drawing shall not be used for any other purpose. All dimensions are shown in millimetres and unless stated otherwise, all dimensions are to be rounded up to the nearest millimetre.
 - At any and every stage of construction, the contractor shall ensure that the building regulations and the requirements of the relevant authorities are fully complied with.
 - At any and every stage of construction, the contractor shall ensure that the building regulations and the requirements of the relevant authorities are fully complied with.
 - Dimensions indicated here - are to be confirmed on site.
 - For remainder of notes see drawings H11930-01, H11930-02, H11930-03, H11930-04, H11930-05, H11930-06, H11930-07, H11930-08, H11930-09, H11930-10, H11930-11, H11930-12, H11930-13, H11930-14, H11930-15, H11930-16, H11930-17, H11930-18, H11930-19, H11930-20, H11930-21, H11930-22, H11930-23, H11930-24, H11930-25, H11930-26, H11930-27, H11930-28, H11930-29, H11930-30, H11930-31, H11930-32, H11930-33, H11930-34, H11930-35, H11930-36, H11930-37, H11930-38, H11930-39, H11930-40, H11930-41, H11930-42, H11930-43, H11930-44, H11930-45, H11930-46, H11930-47, H11930-48, H11930-49, H11930-50, H11930-51, H11930-52, H11930-53, H11930-54, H11930-55, H11930-56, H11930-57, H11930-58, H11930-59, H11930-60, H11930-61, H11930-62, H11930-63, H11930-64, H11930-65, H11930-66, H11930-67, H11930-68, H11930-69, H11930-70, H11930-71, H11930-72, H11930-73, H11930-74, H11930-75, H11930-76, H11930-77, H11930-78, H11930-79, H11930-80, H11930-81, H11930-82, H11930-83, H11930-84, H11930-85, H11930-86, H11930-87, H11930-88, H11930-89, H11930-90, H11930-91, H11930-92, H11930-93, H11930-94, H11930-95, H11930-96, H11930-97, H11930-98, H11930-99, H11930-100.
 - For remainder of notes see drawings H11930-01, H11930-02, H11930-03, H11930-04, H11930-05, H11930-06, H11930-07, H11930-08, H11930-09, H11930-10, H11930-11, H11930-12, H11930-13, H11930-14, H11930-15, H11930-16, H11930-17, H11930-18, H11930-19, H11930-20, H11930-21, H11930-22, H11930-23, H11930-24, H11930-25, H11930-26, H11930-27, H11930-28, H11930-29, H11930-30, H11930-31, H11930-32, H11930-33, H11930-34, H11930-35, H11930-36, H11930-37, H11930-38, H11930-39, H11930-40, H11930-41, H11930-42, H11930-43, H11930-44, H11930-45, H11930-46, H11930-47, H11930-48, H11930-49, H11930-50, H11930-51, H11930-52, H11930-53, H11930-54, H11930-55, H11930-56, H11930-57, H11930-58, H11930-59, H11930-60, H11930-61, H11930-62, H11930-63, H11930-64, H11930-65, H11930-66, H11930-67, H11930-68, H11930-69, H11930-70, H11930-71, H11930-72, H11930-73, H11930-74, H11930-75, H11930-76, H11930-77, H11930-78, H11930-79, H11930-80, H11930-81, H11930-82, H11930-83, H11930-84, H11930-85, H11930-86, H11930-87, H11930-88, H11930-89, H11930-90, H11930-91, H11930-92, H11930-93, H11930-94, H11930-95, H11930-96, H11930-97, H11930-98, H11930-99, H11930-100.



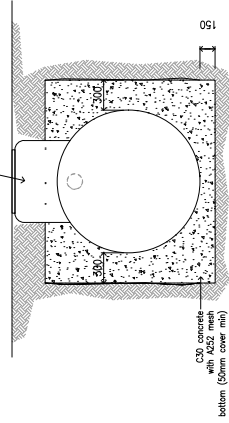
Setting out dimensions, walls and levels to architects' drawings



Use shallow concrete encased manholes for depths under 450mm

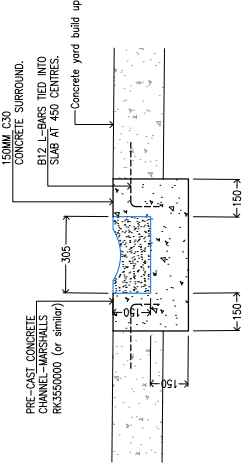
TYPICAL ATTENUATION TANK DETAIL

1:50



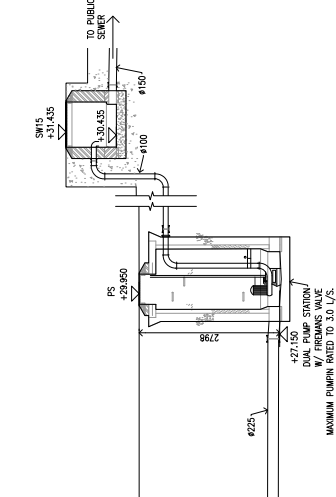
TYPICAL PETROL INTERCEPTOR DETAIL

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PRE-CAST CONCRETE CHANNEL DETAIL

1:25



PROPOSED

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FU	Update to comments	PR	05/03/20	DN	DN
FV	Update to comments	PR	05/03/20	DN	DN
FW	Update to comments	PR	05/03/20	DN	DN
FX	Update to comments	PR	05/03/20	DN	DN
FY	Update to comments	PR	05/03/20	DN	DN
FZ	Update to comments	PR	05/03/20	DN	DN
GA	Update to comments	PR	05/03/20	DN	DN
GB	Update to comments	PR	05/03/20	DN	DN
GC	Update to comments	PR	05/03/20	DN	DN
GD	Update to comments	PR	05/03/20	DN	DN
GE	Update to comments	PR	05/03/20	DN	DN
GF	Update to comments	PR	05/03/20	DN	DN
GG	Update to comments	PR	05/03/20	DN	DN
GH	Update to comments	PR	05/03/20	DN	DN
GI	Update to comments	PR	05/03/20	DN	DN
GJ	Update to comments	PR	05/03/20	DN	DN
GK	Update to comments	PR	05/03/20	DN	DN
GL	Update to comments	PR	05/03/20	DN	DN
GM	Update to comments	PR	05/03/20	DN	DN
GN	Update to comments	PR	05/03/20	DN	DN
GO	Update to comments	PR	05/03/20	DN	DN
GP	Update to comments	PR	05/03/20	DN	DN
GQ	Update to comments	PR	05/03/20	DN	DN
GR	Update to comments	PR	05/03/20	DN	DN
GS	Update to comments	PR	05/03/20	DN	DN
GT	Update to comments	PR	05/03/20	DN	DN
GU	Update to comments	PR	05/03/20	DN	DN
GV	Update to comments	PR	05/03/20	DN	DN
GW	Update to comments	PR	05/03/20	DN	DN
GX	Update to comments	PR	05/03/20	DN	DN
GY	Update to comments	PR	05/03/20	DN	DN
GA	Update to comments	PR	05/03/20	DN	DN
GB	Update to comments	PR	05/03/20	DN	DN
GC	Update to comments	PR	05/03/20	DN	DN
GD	Update to comments	PR	05/03/20	DN	DN
GE	Update to comments	PR	05/03/20	DN	DN
GF	Update to comments	PR	05/03/20	DN	DN
GG	Update to comments	PR	05/03/20	DN	DN
GH	Update to comments	PR	05/03/20	DN	DN
GI	Update to comments	PR	05/03/20	DN	DN
GJ	Update to comments	PR	05/03/20	DN	DN
GK	Update to comments	PR	05/03/20	DN	DN
GL	Update to comments	PR	05/03/20	DN	DN
GM	Update to comments	PR	05/03/20	DN	DN
GN	Update to comments	PR	05/03/20	DN	DN
GO	Update to comments	PR	05/03/20	DN	DN
GP	Update to comments	PR	05/03/20	DN	DN
GQ	Update to comments	PR	05/03/20	DN	DN
GR	Update to comments	PR	05/03/20	DN	DN
GS	Update to comments	PR	05/03/20	DN	DN
GT	Update to comments	PR	05/03/20	DN	DN
GU	Update to comments	PR	05/03/20	DN	DN
GV	Update to comments	PR	05/03/20	DN	DN
GW	Update to comments	PR	05/03/20	DN	DN
GX	Update to comments	PR	05/03/20	DN	DN
GY	Update to comments	PR	05/03/20	DN	DN
GA	Update to comments	PR	05/03/20	DN	DN
GB	Update to comments	PR	05/03/20	DN	DN
GC	Update to comments	PR	05/03/20	DN	DN
GD	Update to comments	PR	05/03/20	DN	DN
GE	Update to comments	PR	05/03/20	DN	DN
GF	Update to comments	PR	05/03/20	DN	DN
GG	Update to comments	PR	05/03/20	DN	DN
GH	Update to comments	PR	05/03/20	DN	DN
GI	Update to comments	PR	05/03/20	DN	DN
GJ	Update to comments	PR	05/03/20	DN	DN
GK	Update to comments	PR	05/03/20	DN	DN
GL	Update to comments	PR	05/03/20	DN	DN
GM	Update to comments	PR	05/03/20	DN	DN
GN	Update to comments	PR	05/03/20	DN	DN
GO	Update to comments	PR	05/03/20	DN	DN
GP	Update to comments	PR	05/03/20	DN	DN
GQ	Update to comments	PR	05/03/20	DN	DN
GR	Update to comments	PR	05/03/20	DN	DN
GS	Update to comments	PR	05/03/20	DN	DN
GT	Update to comments	PR	05/03/20	DN	DN
GU	Update to comments	PR	05/03/20	DN	DN
GV	Update to comments	PR	05/03/20	DN	DN
GW	Update to comments	PR	05/03/20	DN	DN
GX	Update to comments	PR	05/03/20	DN	DN
GY	Update to comments	PR	05/03/20	DN	DN
GA	Update to comments	PR	05/03/20	DN	DN