MOLD INVESTMENTS LIMITED

PARRYS QUARRY
SURFACE WATER MANAGEMENT AND MONITORING PLAN
REF: SWMP/MIL/PQ/1.00/2020

Carried out for: Mold Investments Limited

White Rock Geo-Environmental Limited
597 Walsall Road
Great Wyrley
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PARRYS QUARRY

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SURFACE WATER MANAGEMENT AND MONITORING PLAN

1. INTRODUCTION

This document sets out a detailed surface water management and monitoring programme for the Parrys Quarry Landfill to account for surface water control on site and surface water discharge from the site.

Surface water is controlled during the operational phase and thew post closure phase and is details below.

2 SURFACE WATER MANAGEMENT SYSTEM

2.1 Operational Phase

During the operational phase ,clean surface water which accumulates in the base of the quarry and from the opencast development will be pumped to the surface water settlement lagoon which then allows discharge of surface water along the north western boundary at NGR SJ 2746 6669. The discharge consent is regulated by NRW (EPR/CG0392101). The discharge consent The location of the discharge point is presented at Appendix 1, to the Alltami Brook is shown on Drawing SWMP1.

Due to the inert nature of the waste to be deposited at the site the water that comes into contact with the inert wastes will be deemed as surface water and not as leachate.

2.2 Post Closure Phase

Once all earthworks are completed, surface water will be directed to surface water ditches that will be present ,with all surface water ultimately falling towards or flowing into the settlement lagoon which is illustrated on Drawing SWMP1

2.3 Surface Water Monitoring

Surface water will be monitored from both upstream and down stream of the discharge consent and in accordance with the requirements of the consent.

3 SURFACE WATER CONTROL

Surface water is directed in ditches to the surface water storage lagoon which has a holding capacity of 5385m^3 as shown on Drawing SWMP1.

All surface water drains modelled using a 800 mm wide x 950 mm deep V-drain with side slopes of 1:2 (vertical : horizontal).Drains are to be lined due to potential high flow velocities and are constructed at various hydraulic grades as accommodated by proposed topography.

Proposed Storage Lagoon
Base Surface Area - 4320 m²
Top Surface Area - 6450 m²
Top Cover Level - 105.0 m OD
Invert Level - 102.7 m OD
Maximum Depth = 1.821 m
Minimum Freeboard = 0.329 m
(for critical storm 4320 min 100 yr + 30% Climate Change)
Storage capacity is therefore 8034.42 with freeboard

Outfall to Pinfold Lane (EPR/CG0392101)
Invert level - 102.1 m AOD
Permitted Discharge Rate - 14 L/s

4 MONITORING

Table 11: Trigger Values for discharge point from landfill activities

Parameter	Trigger Value	Sampling Frequency
pH	>6<9	Monthly*
Oil and Grease	No visible oil or grease	Monthly*
Suspended solids	50mg/l	Monthly*
Chloride	90mg/l	Monthly*
Sulphate	296mg/l	Monthly*
Nitrate	1mg/l	Monthly*
Manganese	0.06mg/l	Monthly*

*If no discharge this is to be reported as to why no sample has been taken in quarterly report

No trigger levels have been set for SW1 as this is influenced by natural runoff and discharge upstream of the site and SW2 is at a significant distance from site.

5 FLOOD RISK REVIEW OF SURFACE WATER MANAGEMENT

The site lies within the catchment of the River Dee which is situated approximately 3.5 km to the north- east. The nearest watercourse to the site is Alltami Brook which flows around the west of the site and then approaches to within 250 m of the northern site boundary. Alltami Brook converges with Wepre Brook approximately 0.9km to the north-east of the site before flowing north-eastwards towards the River Dee about 3.5 km north-east of the site.

A water balance model has been submitted (HRA Appendix 13) in order to determine the potential upper discharge rates that might be required during the lifetime of the proposed landfill at Parry's Quarry. As groundwater inflow volumes are anticipated to have a far greater influence on discharge rates than the volumes arising from surface water run-off, discharge rates are likely to be largest during dewatering operations, i.e. during the construction of the proposed landfill.

The water balance model assumes that surface water runoff from the entire site will report to the balancing pond in the north western corner of the site, either directly or via pumping from a secondary pond in the south of the site, based on monthly average rainfall depths, site area and runoff coefficients for the existing site layout. The storage volume of the balancing pond is 8,034m^3.

The maximum volume of water predicted for the runoff for the site as a whole is 24,060m^3 per annum.

The settlement pond is therefore 1/3 of the total annual rainfall and groundwater pumping.

Surface water inflow volumes are based upon monthly average rainfall depths, site area and runoff coefficients for the existing site layout. Monthly average rainfall depths for Moel y Crio for the period of 1982 to 2000 were adjusted for the site to account for the difference in elevation of the monitoring station (205m AOD) and the site (103m AOD), using the standard average annual rainfall (SAAR) for the Alltami Brook catchment,. The monthly average rainfall, adjusted for the site is presented in Table 2 below.

Table 2- Monthly average rainfall, adjusted for the site

Month	Average rainfall Moel y Crio 1982- 2000 (mm)	Average rainfall at site (adjusted) (mm)
Jan	75.0	66.5
Feb	52.0	46.1
Mar	70.0	62.0
Apr	63.0	55.8
May	61.0	54.1
Jun	75.0	66.5
Jul	51.0	45.2
Aug	78.0	69.1
Sep	83.0	73.6
Oct	98.0	86.8
Nov	95.0	84.2
Dec	95.0	84.2
Average (mm/yr)	896.0	794.0

As shown in Table 2 above, the average rainfall is greater in the winter than the summer. For this reason, model simulation commences in September, prior to the 4 wettest months. This ensures that the worst case scenario is considered whereby the highest rainfall values and thus water levels in the pond are considered.

Site areas and associated run-off coefficients were assigned in accordance with existing ground cover, as observed in recent aerial photography and during walkover visits. A weighted runoff coefficient indicative of 0.47 was determined for the majority of the site, accounting for woodland, grass/scrub and bare earth, with a value of 1 applied for rainfall falling directly into ponds.

A Landmark Envirocheck Report was commissioned for the application. The Envirocheck Report refers to the active discharge consent held by Robin Jones and Sons for dewatering 'contaminated surface water' to

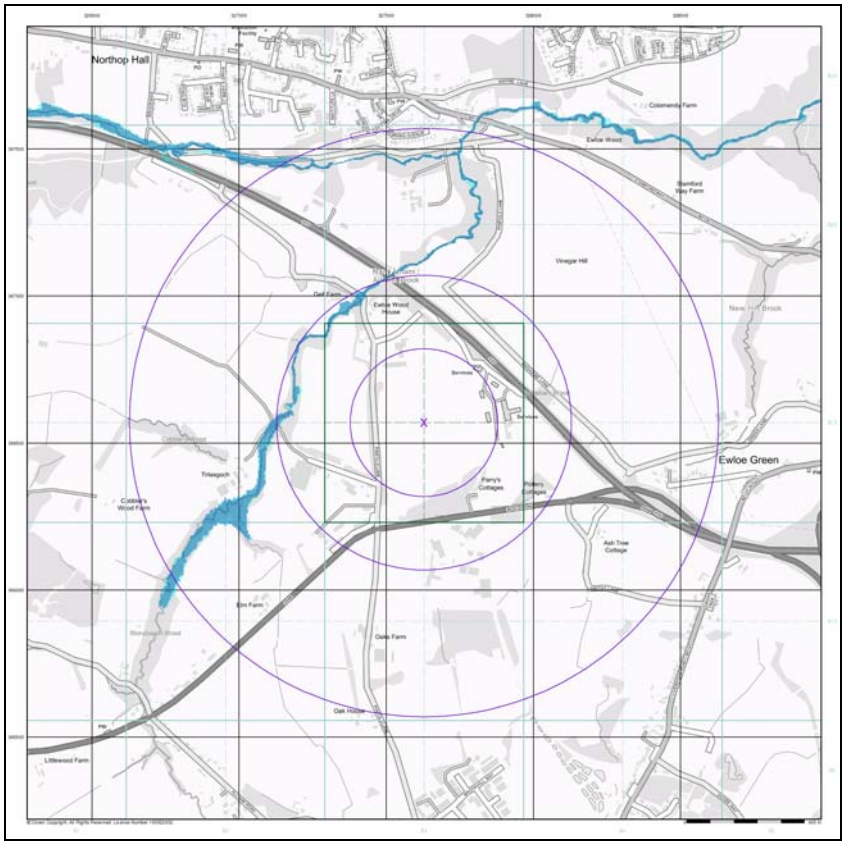
the Alltami Brook via a drain, together with a similar consent from Brock Quarry some 200 m
to the north-west between Pinfold Lane and the Alltami Brook.

The discharge of quarry water from de-watering operations is still active and is undertaken from time to time as operational needs arise. The consented volume is 1,200 cubic metres per day and the maximum rate of discharge is 14 litres per second. There are no surface water abstractions recorded in the vicinity of the site, by the Envirocheck Report. A copy of the consent is presented at Appendix A.

The quarry is outside the vicinity of the Alltami Brook which may be vulnerable to flooding (Envirocheck Report flood map). Ground level at the site is between 100 and 115m AOD, whilst Alltami Brook ranges from 96 to 76mAOD, i.e. significantly lower. The management systems provided with this Surface Water Management Plan will effectively control all surface water runoff within the site and provide for controlled release to the wider water environment thus the site will not contribute to any increase in flood risk outside the site.

A copy of the flood map is presented as Figure 1 below.

Figure 1: Flood Map



NPPF sets out the Government's policies to minimise flood risk to people, property and the environment. NPPF set outs details on the allocation and planning of development in a risk based sequence. The document categorises areas of flood risk in terms of flood zones, and is summarised in Table 3 below:

Table 3: Flood Zones

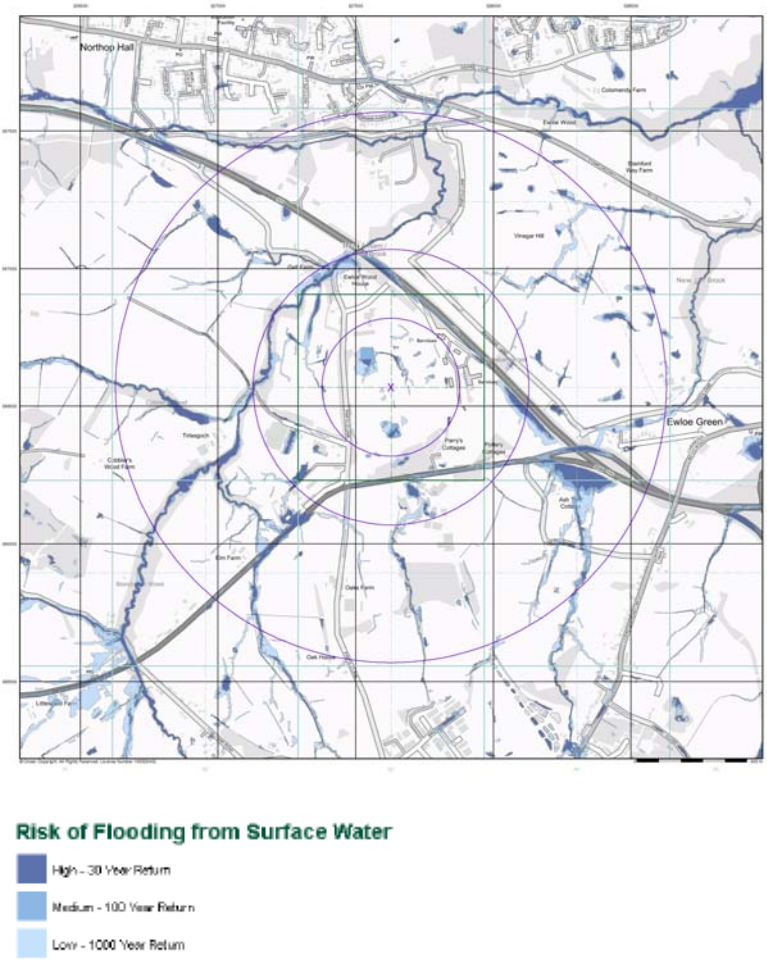
FLOOD ZONE	ANNUAL PROBABILITY OF FLOODING
1. Low Probability	Low probability of flooding
2. Medium Probability	Historical flooding has previously occurred
3 High Probability	Equal than or greater than 0.1% flooding possibility

NPPF requires that a Sequential Test is carried out to determine land uses compatible with the level of flood risk at each development site, with the exception of sites in flood Zones A which requires no further analysis in regards to fluvial and coastal flooding issues.

The quarry is outside the vicinity of the Alltami Brook which may be vulnerable to flooding (Figure 1). Ground level at the site is between 100 and 115m AOD, whilst Alltami Brook ranges from 96 to 76m AOD, i.e. significantly lower.

The flood risk maps indicate that flooding is not particularly sensitive downstream of the site, with Alltami and Wepre Brook flowing within a steep-sided v-shaped valley with few potential receptors at risk. Therefore, flooding is unlikely to present a significant risk to any potential receptors located downstream of the site, either with or without the proposed increase in discharge from the site.

Figure 3: Risk and impact zones for flooding



The Parry's Quarry site is situated in Flood Zone 1 and as such is considered to be at little or no risk of flooding.

According to the Government webs site mapping, there are no flood defence structures around or in close vicinity to the site – designated as Flood Zone 1 and therefore there is no requirement for flood defence.

6 ASSESSING FLOOD RISK

General

A topographic survey was completed over the entire site of Parry's Quarry to allow for accurate mapping to be undertaken. It was also necessary to determine drainage gradients and flows within the piping and culverts draining surface water to its discharge point. As the site

is situated in Flood Zone A, flooding in terms of fluvial and coastal can be considered negligible and are ignored for flood risk issues.

Pluvial

The management systems provided within the submitted Surface Water management plan will effectively control all surface water runoff within the site and provide for controlled release to the wider water environment thus the site will not contribute to any increase in flood risk outside the site.

Groundwater

Groundwater is known to be a limited issue. The greatest risk posed was the full development of the site to a significant depth below the groundwater. However the design of the site is limited with groundwater flows intercepted currently behind the part of the engineered geological barrier and flows are extremely small.

Sewers

It is considered extremely unlikely that flooding from sewers will occur as there is a limited sewer network within the vicinity of the site.

7 DRAINAGE STRATEGY

The drainage strategy is to manage surface water and groundwater within a re-engineered balancing pond situated in the northwest corner of the site. The balancing pond will provide volume and quality control for surface water runoff from developed areas of the site. The discharge will be controlled by means of a managed pumped system using the existing permitted discharge route to a piped surface water sewer in Pinfold Lane which discharges to the Alltami Brook.

Currently, surface water and groundwater from the majority of the site (all the internally draining areas) drains to an area of old quarry workings, in the eastern side of the site, which acts as a balancing pond. This is managed by pumping via the existing permitted discharge which is a 150mm diameter overland pipe to the existing 300mm diameter surface water sewer located in Pinfold Lane to the north west of the site. The Pinfold Lane surface water sewer outfalls to the Alltami Brook, which is approximately 325m to the north of the site. A small area to the south of the site, drains to the south to the surface water drain alongside Mold Road (A449), this area will be unaffected by the development. A small area to the north east corner of the site drains to a

ditch alongside the dismantled railway and then to the Alltami Brook, this area will be unaffected by the development.

During early development, whilst the landfill is operational and engineering and filling takes place below the surrounding groundwater table (approximately 6 months), groundwater management will be required which will entail pumping groundwater to the balancing lagoon before discharge as detailed above.

During later development whilst the landfill is operational but when the landfill is engineered and filled above the surrounding groundwater table levels (approximately year 1 to completion in year 2-3) surface water will be managed as described in the post completion phase. From this point onwards, groundwater will be allowed to recover, and the therefore the majority of the managed volume will no longer occur.

On the completion of the development, surface water run-off from completed / capped areas of the landfill will drain towards a perimeter ditch running around the perimeter of the site, which in turn would drain towards the balancing/settlement pond. Other internally draining areas will be drained to a parallel ditch (on the other side of the landfill perimeter access track) which will also drain to the balancing pond.

The Parry's Quarry site is situated in Flood Zone A and as such is considered to be at little or no risk of flooding.

The discharge of surface water and groundwater from Parry's Quarry is to the Alltami Brook. The entire course of the Alltami Brook is designated within Flood Zone 3ii, no residential, commercial or industrial properties are situated in the Alltami Brook flood zone downstream of the site's discharge point. Approximately 700m further downstream the Alltami Brook joins the Wepre Brook.

Parts of the Wepre Brook are designated as within Zone 3ii or 2 with a very small area as Zone 3i adjacent to High Street (the B5129), Wepre, which is approximately 8km downstream of the discharge point. Approximately 7km downstream of the discharge point, 5 residential properties on Wepre Park are situated within Zone 2, and approximately 7.5km downstream 4 residential properties on Brook Road, Shotton are situated within Zone 2.

With reference to the flood map, and to the incised topography that the Alltami & Wepre Brook flows through, there appears to be very few potential receptors at risk of flooding within Alltami/Wepre Brook's small and narrow floodplain downstream of the site. The few potential receptors are sufficiently distant from the site and the percentage increase to the peak flows under a 1% flood event so

minimal (see effect on predicted peak flow in following paragraph) that any impact would be imperceptible and insignificant and therefore would meet the NPPF criteria of being managed to an acceptable level.

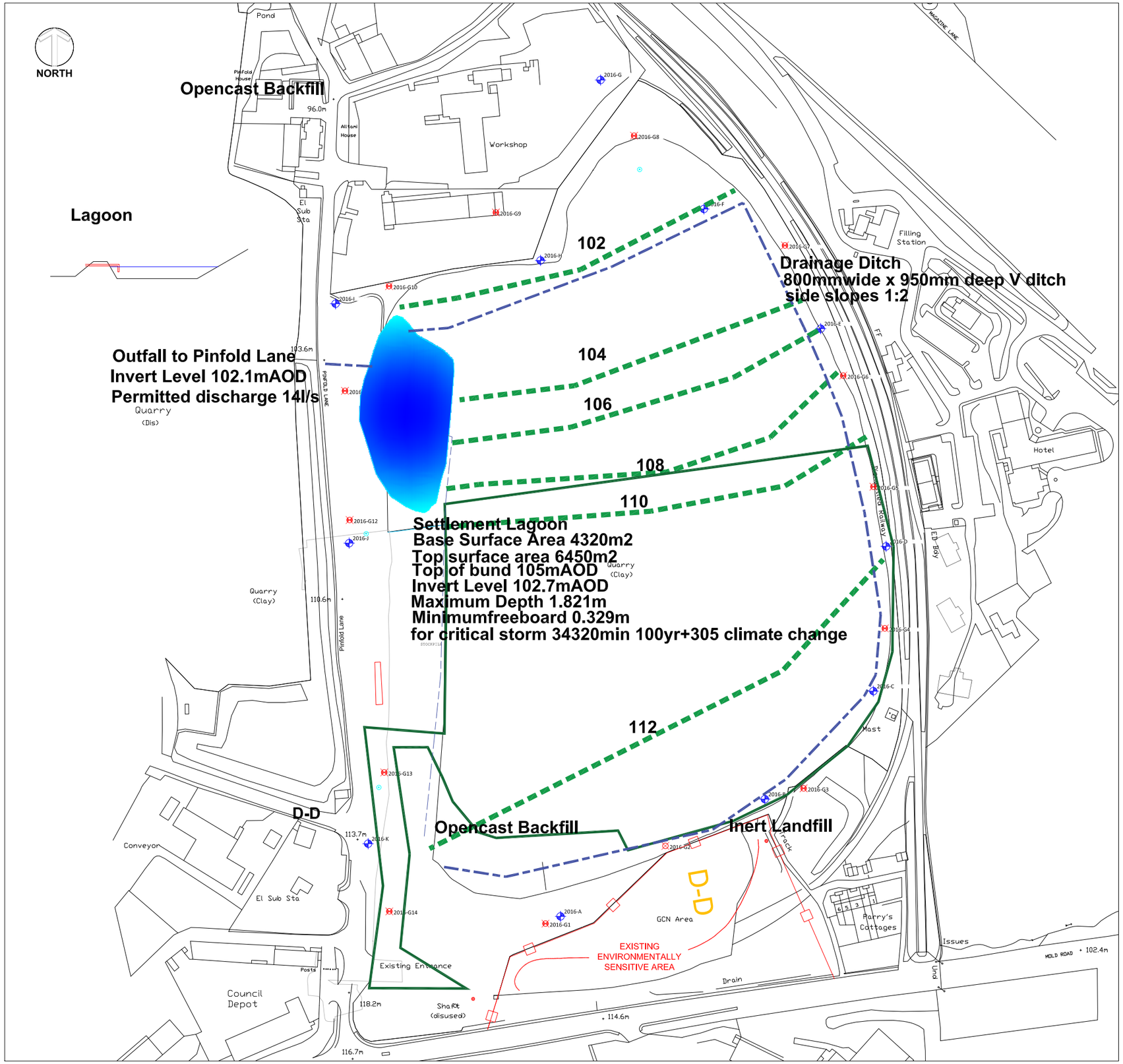
Long term the site is designed to be self draining to the ponds on completion and requires little management and no pumping.

The existing allowable discharge rate (14 l/s) is approximately 0.5% of the predicted peak flow of the mean annual flood (2.33 year event, known as QBAR) of Alltami Brook (3,000 l/s).

To account for climate change, which is applicable to the long term situation, the inputs for both annual average rainfall and the 1% AEP extreme rainfall event were increased by 30% in line with the recommended sensitivity ranges provided in the National Planning Policy Framework. Site discharge during the 1% AEP rainfall event was assumed to continue at the currently consented rate of 14l/s. Previous models supplied to NRW indicates that a discharge rate of approximately 531m^3/day (4.7l/s) would be required in order to provide a balanced system for the completed site. This long term discharge rate is less than the currently consented discharge rate of 14l/s.

The surface water runoff is based on all the entire site area, including ditches, ponds and SSSI although as described above there are 2 small areas (the SSSI and an area in the north eastern corner) which at present naturally drain away from the surface water balancing pond and which will not be disturbed by the development. This therefore protects the SSSI and allows for the natural environment here to be [protected and remain unchanged with no impact on habitat.

Drawing



Legend

- Proposed Permit Boundary
- Pre and Post Settlement Levels
- 104 Level to Ordnance Datum
- Surface Water Drainage Ditch

Client: **Mold Investments Ltd**

Project: **Parrys Quarry**

Title: Surface Water Management Plan

CAD Ref:	Version:	Drawn by:	Scale:	Date:
EL/MQBH/1	1	ARM		August 2020

WHITE ROCK GEO-ENVIRONMENTAL LIMITED

Drawing: **SWMP1**

APPENDIX A:

Discharge Consent

Water Resources Act 1991

as amended by the Environment Act 1995

ASIANTAETH YR AMGYLCHEDD CYMRU
ENVIRONMENT AGENCY WALES

Consents to Discharge

Certificate of Holder

Part A

To : **GREG ROBBINS**
ROBIN JONES & SONS LTD
PLOT 3
TRE MARL INDUSTRIAL ESTATE
FFORDD MAELGWYN LL31 9PN

NB: For a body corporate the job title is a point of contact.

Holder Start Date : **01 November 2003**

The Environment Agency ("the Agency") hereby confirm that the above named person (or organisation) is a / the registered Holder of the Consent : **CG0392101** *Consent Issued :* **14 February 2002**

Nature of Discharge(s) **TSDR Trade effluent**

at **SJ2746066690 PARRYS QUARRY PINFOLD LANE ALLTAMI**

Note : This certificate should be kept with the consent document for future reference. If you transfer responsibility for the discharge to somebody else, you must pass the consent to them and tell the Agency within 21 days. Responsibility for the consent cannot be disclaimed by the Holder but the registration of Holder may be transferred to a successor. To do this, please complete the form below (Part B), then tear it off and return it to the address shown. If you fail to transfer the consent, even though you are no longer on the site, you will still be liable for prosecution for pollution. If you transfer the consent but do not tell us, you will be committing an offence. In case of any queries, please contact your local Environment Agency office, quoting the Consent Reference.

- cut here -

Part B *Please complete in block capitals or type*

To : **Water Resources Act 1991 : Notice of transfer of Consent to Discharge**

Consent Reference : **CG0392101**

Consent Issued : **14 February 2002**

Name : **GREG ROBBINS**

Address : **ROBIN JONES & SONS LTD**
PLOT 3
TRE MARL INDUSTRIAL ESTATE
FFORDD MAELGWYN LL31 9PN

I / We* hereby serve notice on the Agency that I / we* am /are* no longer a / the* Holder of the above consent which will be / was* transferred to :

** delete as appropriate*

Name(s) of the new Holder(s) :

Post Code :

Date of Transfer to new Holder(s) .....

Signed : ..... **Dated :**

Name (block capitals) : **Postion (if appropriate) :**

(to be completed when signing on behalf of corporate bodies)

CONSENT NO. CG0392101

ASIANTAETH YR AMGYLCHEDD CYMRU
ENVIRONMENT AGENCY WALES

WATER RESOURCES ACT 199

SECTION 88 - SCHEDULE 10

(AS AMENDED BY THE ENVIRONMENT ACT 1995)

CONSENT TO DISCHARGE

TO: **Works Manager**
Hanson Brick Limited
Lane End Works
Church Road
Buckley
Flintshire
CH7 3AD

The **ENVIRONMENT AGENCY** ("The Agency") in pursuance of its powers under the Water Resources Act 1991 **HEREBY CONSENTS** to the making of a discharge **OF TRADE EFFLUENT**, as follows: Trade Effluent - Site Drainage
FROM: Parrys Quarry
AT: Pinfold Lane, Alltami, near Mold, Flintshire
TO: the Alltami Brook, via a surface water drain
HEREAFTER SUBJECT TO the conditions set out in the following schedule(s): Trade Effluent (Site Drainage) Schedule No. CG0392101 01
Subject to the provisions of Paragraphs 7 and 8 of Schedule 10 of the Water Resources Act 1991, no notice shall be served by the Agency, which alters the effect of this consent, without the agreement in writing of the discharger, during a period of 4 years from the date this consent is issued.
This consent is issued and takes effect on the 14th day of February 2002 Signed .....Grace S..... Water Quality Consents Team Leader

Asiantaeth yr Amgylchedd
Ffordd Caer, Bwcle, Sir Fflint CH7 3AJ Ffon 01244 550124 Ffacs 01244 550144
Environment Agency
Chester Road, Buckley, Flintshire CH7 3AJ Tel 01244 550124 Fax 01244 550144

CONSENT NO.	CG0392101
SCHEDULE NO.	CG0392101 01
DATE ISSUED	14 th February 2002

ASIANTAETH YR AMGYLCHEDD CYMRU
ENVIRONMENT AGENCY WALES

CONDITIONS OF CONSENT TO DISCHARGE

Trade Effluent - Site Drainage ("the Discharge")

FROM: Hanson Brick Limited, Parrys Quarry, Pinfold Lane, Alltami

1. (a) The Discharge shall not contain any poisonous, noxious or polluting matter or solid waste matter.

(b) Provided that the Discharge hereby consented is made in accordance with the following conditions of this consent, such discharge shall not be taken to be in breach of condition (a) above by reason of containing substances or having properties identified in and controlled by these conditions.

NATURE

2. The Discharge shall consist solely of trade effluent comprising of treated site drainage arising from an area of 95,000 square metres.

LOCATION

3. The Discharge shall be made in the manner and at the place specified as:

(a) discharging via a 100 millimetre diameter pipe;

(b) discharging to the Alltami Brook via a surface water drain;

(c) at National Grid Reference SJ 2746 6669;

(d) shown marked 'Discharge Point' on Plan CG0392101 attached as Annex 1.

SAMPLE POINT

4. The outlet to controlled waters shall be constructed, maintained and appropriately labelled so that a representative sample of the Discharge may be obtained at National Grid Reference SJ 2746 6669 as shown marked 'Discharge Point' on the attached Plan CG0392101.

VOLUME

5. The volume of the Discharge shall not exceed 1,200 cubic metres per day.

6. The rate of discharge shall not exceed 14 litres per second.

FLOW MEASUREMENT

7. At the request of the Agency, the Consent Holder shall install, operate and maintain a means of flow measuring to a specification and at a location required by the Agency, to enable the daily volume and / or instantaneous flow of the discharge to be recorded. The Consent Holder shall calibrate, operate and maintain the flow recorder to a standard agreed or specified by the Agency. The flow and maintenance records shall be provided to the Agency as and when requested.

COMPOSITION

8. The Discharge shall not contain more than:

   (i) 50 milligrammes per litre of suspended solids (measured after drying at 105°C);

   (ii) 90 milligrammes per litre of total Chloride;

   (iii) 296 milligrammes per litre of total Sulphate

   (iv) 1 milligramme per litre of Nitrate (expressed as mg/l N);

   (v) 0.06 milligrammes per litre of dissolved Manganese.

9. The Discharge shall have a pH of between 6 and 9.

10. As far as is reasonably practicable, the works shall be operated so as to prevent the Discharge from containing any significant trace of visible oil or grease

MAINTENANCE

11. As far as is reasonably practicable, the site shall be operated so as to prevent:

   (a) any matter being present in the Discharge, other than matter specifically covered by numerical conditions in this consent, to such an extent as to cause the receiving waters, or any waters of which the receiving waters are a tributary, to be poisonous or injurious to fish in those waters, or to the spawning grounds, spawn or food of fish in those waters, or otherwise cause damage to the ecology of those waters; and

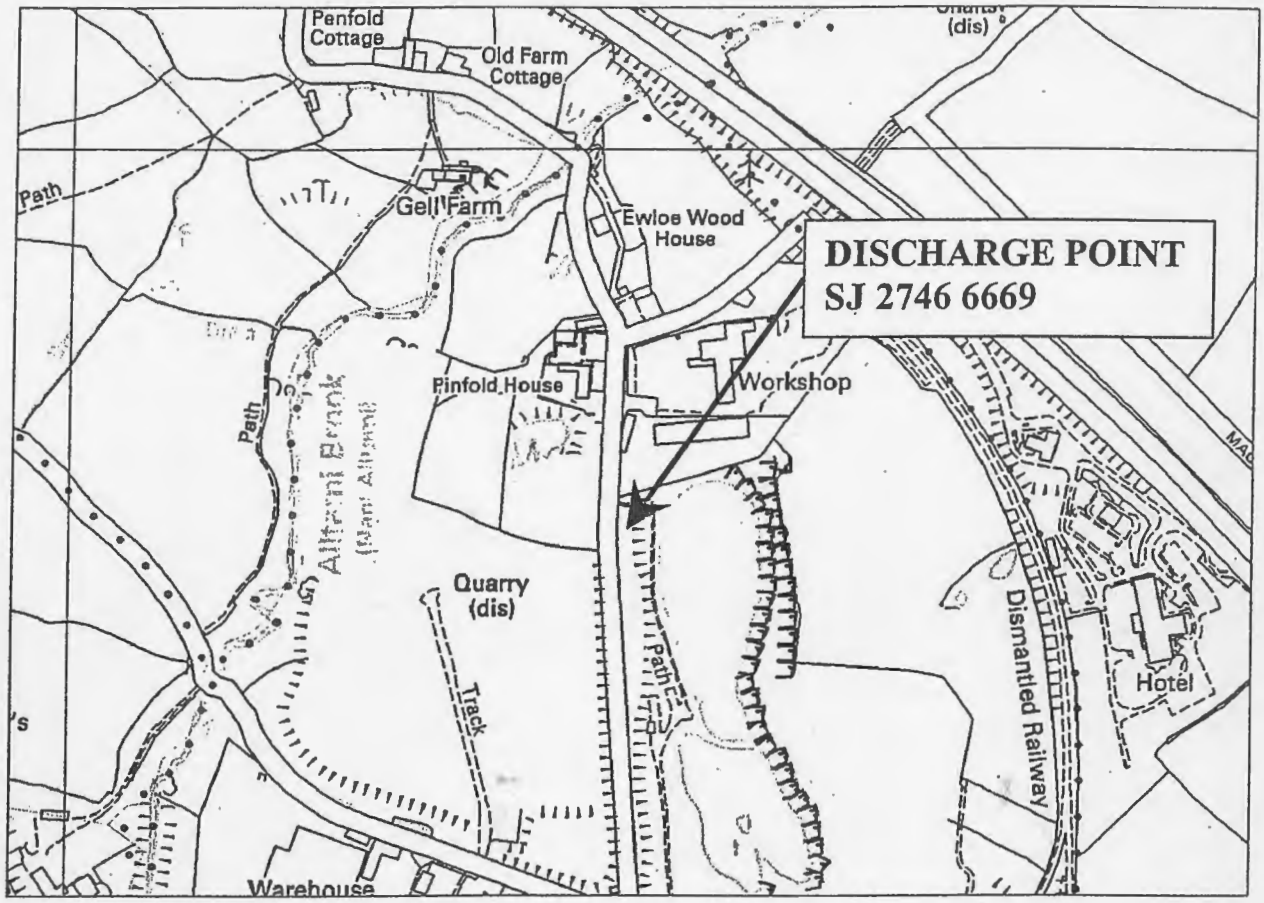
   (b) the Discharge from having any other adverse environmental impact.

CONSENT NO.	CG0392101

ASIANTAETH YR AMGYLCHEDD CYMRU
ENVIRONMENT AGENCY WALES

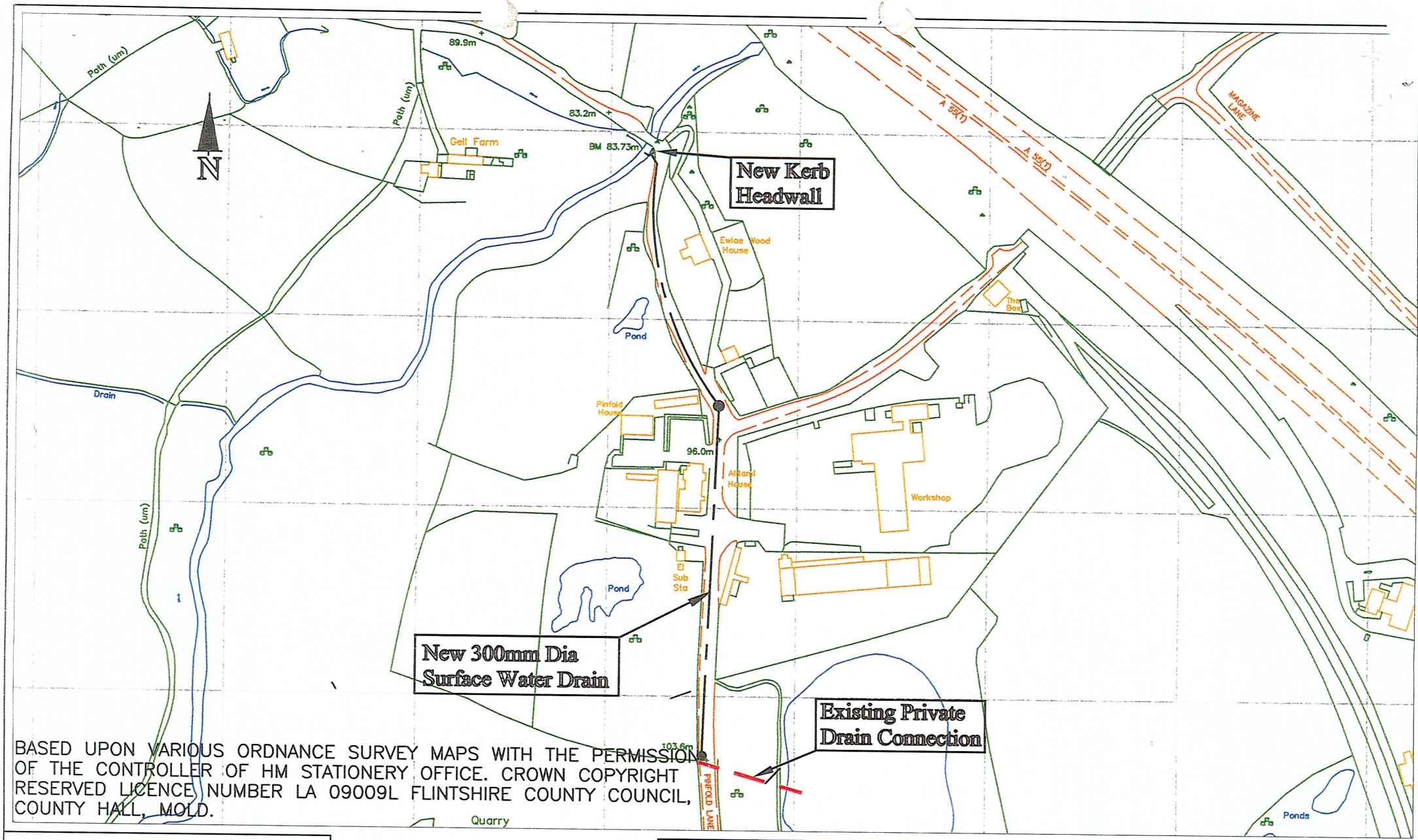
ANNEX 1

Plan CG0392101



APPENDIX B:

Easement Plan



BASED UPON VARIOUS ORDNANCE SURVEY MAPS WITH THE PERMISSION OF THE CONTROLLER OF HM STATIONERY OFFICE. CROWN COPYRIGHT RESERVED LICENCE NUMBER LA 09009L FLINTSHIRE COUNTY COUNCIL, COUNTY HALL, MOLD.

Cyngor Sir y Fflint Flintshire County Council

CHRISTOPHER T. KAY
B.Sc.C.Eng.,M.I.C.E.,F.I.H.T.
Cyfarwyddwr Priffyrdd, Cludiant a Pheirianneg
Director of Highways, Transportation & Engineering.
Neuadd y Sir Wyddgrug. CH7 6NF.
County Hall, Mold, CH7 6NF.

ENGINEERING SERVICES

JOB NUMBER: IB-25-06-03	SCALES: 1:2500	AMENDMENTS:	DATE
DACDIV GROUP: Maintenance		A Original Drawing	25/06/03
DRAWN BY: Ian Bushell	NAT. GRID REF: SJ 2766		
CHECKED BY: M.W.E	STATUS: Drainage Works	LAST EDIT DATE: 25/06/2003	DRAWING NUMBER: IB-25-06-03 01 A

PINFOLD LANE, MOLD

Andrew Loveridge
Solicitor – County Secretary
Cyfreithiwr – Ysgrifennydd y Sir

CYNGOR
Sir y Fflint
Flintshire
COUNTY COUNCIL

06 AUG 2003

Knight & Sons
Solicitors
DX 711120
NEWCASTLE UNDER LYME 7

Your Ref/Eich Cyf ATB/DPR/66359/65

Our Ref/Ein Cyf DMD/AM/T482009

Date/Dyddiad 5 August 2003

Ask for/Gofynner am Mr. D.M. Davies

Direct Dial/Rhif Union (01352) 702325
DX 708590 Mold 4

Dear Sirs,

Pinfold Lane Drainage Pipe

Further in this matter, I await the formal instructions from the Director of Community and Housing Services.

In the meantime, I enclose an amended copy of the drawing proposed to be appended to the Deed of Grant of Easement (drawing No. IB-25-06-03/01/A) which shows the correct location of the surface water sewer out-fall (marked "New Kerb Headwall").

Yours faithfully,

for: County Secretary

Encl.

County Hall, Mold. CH7 6NR
Tel 01352 702400 Fax 01352 700289
DX 708591 Mold 4
www.flintshire.gov.uk
Neuadd y Sir, Yr Wyddgrug. CH7 6NR
Ffôn 01352 702400 Ffacs 01352 700289
DX 708591 Mold 4