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Drainage Strategy for Proposed Residential Development at land off Gatewen Road, Wrexham

for Fifers 11, Hiremade Furbs
and Bloor Homes



Project No 06435 (09347)

Revision B - June 2014

Revision A - June 2010

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1. Report Context

- 1.1. BSP Consulting has been commissioned by Fifers 11, Hiremade Furbs and Bloor Homes to complete a Drainage Strategy report for the proposed residential development at Gatewen Road in Wrexham.
- 1.2. The report is intended to provide a summary of the previously agreed strategy to control the environmental impact of the drainage systems both during construction and following completion.

2. Site Background, Existing Drainage and Geo and Geo-Environmental Technology

- 2.1. Historically a colliery occupied the majority of the proposed site. More recently buildings on the site have been used as workshops, training facilities and accommodation for transport systems. These building recently been now been prior to development commencing at the site.
- 2.2. Areas to the south and west of the site currently exist as green-field and no record of historic development in these areas has been found.
- 2.3. A watercourse flows from north to south at the eastern boundary of the site. This watercourse is approximately 14m below the average site level sitting at the foot of a steep embankment. This watercourse is fed by a fishing lake and itself feeds into a SSSI (Gatewen Marsh).
- 2.4. No public sewers are known to have served the site historically and no public sewers serve the site in the present day.
- 2.5. Full details of the existing ground conditions is contained within reports by Wardell Armstrong and Geodyne Ltd. The site is divided into three main categories:
 - The greenfield areas to the west and north of the site in which top and sub-soils are found to be underlain with permeable strata.
 - The areas to the south and east of the site are former stockpiling areas for the mine arisings, beneath which a reasonable to significant volume of made ground is present but with no apparent sources of contamination.
 - Within the areas in the centre of the site (with the recent use as haulage yards etc.) a number of potential contamination sources have been identified.
- 2.6. During the intrusive investigative works ground water was not encountered.

2.7. Existing Foul Water Drainage

- 2.7.1. No evidence has been found of a positive drainage system to convey foul water from the site to a public sewerage system.
- 2.7.2. Very little evidence has been found of the methods of foul water disposal during the time as a working colliery.
- 2.7.3. The foul water drainage which served the workshops etc. on the site (until their recent demolition) discharged the water to the ground via a septic tank near to the office building.

2.8. Existing Surface Water Drainage

- 2.8.1. No evidence has been found of a positive drainage system which conveys surface water to a public sewerage system.
- 2.8.2. Little is known about the surface water drainage system which existed whilst the Gatewen Colliery was in use. The local watercourse would appear to be the natural receptor for the surface water run-off as well as the water which may have been pumped from the mine itself.
- 2.8.3. Surface water from the site during its recent use as a haulage yard etc. has drained via overland flow to the watercourse. A settlement pond currently exists at low level in the northeast corner of the site. This pond collects the overland surface water flows from a large portion of the site and discharges this water via an outfall pipe to the stream running along the eastern boundary of the site. Figures 1.0, 1.1 and 1.2 show the overland flow rivulets, the existing pond and outfall.



*Figure 1.0 (top left)
Former stockpiling area. Note the significant rivulets which currently convey surface water run-off to the watercourse.*

*Figure 1.1 (top right)
Existing settlement pond into which overland flow from rivulets is discharged.*

*Figure 1.2 (bottom left)
Existing outfall structure from settlement pond to watercourse.*

3. Development Proposals

- 3.1. The overall proposals at the site are for the construction of 236 houses, full planning permission has been granted for this development.
- 3.2. The development will be split into two of phases, initially considered as Phase A and Phase B. See drawing GR/PL-01 in Appendix A.
- 3.3. Construction of the infrastructure associated with Phase A will be undertaken in 2010, independently of that for Phase B which will follow at a later date.
- 3.4. At all stages of the development it is essential that the drainage systems are appropriate to protect the surroundings from pollution and ensure that the site does not pose a risk of flooding to its surroundings.

4. Proposed Permanent Foul Drainage Solution

- 4.1. The Client commissioned a Hydraulic Assessment from Welsh Water in order to ascertain the availability of a suitable foul drainage outfall from the site.
- 4.2. A Hydraulic Assessment was completed in February 2007 and presents several options for the discharge of foul water from the site. The Assessment also discusses any attendant works that may be required to the existing public sewer network to accommodate each option.
- 4.3. Subsequently a revised Hydraulic Assessment has been commissioned to suit the definitive proposals for the foul water drainage at the site.
- 4.4. The potential discharge location in Hall View necessitates the pumping of foul sewage due to the topography of the site and its surroundings. The internal topography of the site requires use of two pumping stations to prevent the need for deep drainage, one per phase.
- 4.5. These pumping stations and pumping mains will be provided as part of section 104 agreements and will be vested with Welsh Water. The location of these features is shown on the plans in Appendix B.
- 4.6. The main 'on site' foul water sewers will be put forward for adoption by Welsh Water and will be located within the proposed public highway network, or under agreed easements.

5. Proposed Permanent Surface Water Drainage Solution

- 5.1. The proposed surface water drainage systems will vary across the site in accordance with the varying geology and topography.
- 5.2. The drainage of Phase A will be achieved via discharge of all highway and dwelling surface water to a network of infiltration devices which will be placed within the green-field areas to the south of the site.
- 5.3. To ensure that the water discharged to the ground does not create any contamination issues a series of environmental protection measures will be used, these are:
 - Trapped gullies/sumps will be used for the drainage inlets.
 - Oil separators will be provided for any car parking areas with greater than 40 spaces, in accordance with PPG3.
 - Soakaways will be constructed beneath infiltration basins which will allow the separation and treatment of any remaining hydrocarbons prior to discharge to the soakaway.
 - The infiltration basins will be owned and maintained by Welsh Water to ensure that they remain in good condition at all times.
- 5.4. The drainage for Phase B will discharge directly to the watercourse in a manner equivalent to the existing drainage of the site.
- 5.5. Discussions have been undertaken with the Environment Agency in respect of the above strategy and formal comment obtained. The Environment Agency has confirmed an acceptable discharge rate of 215 l/s into the stream in the northeastern part of the site
- 5.6. The above restriction of flow rates will be achieved by the use of a 'wet' pond which will be constructed at a high level to the north of Phase B. Constructed in accordance with CIRIA guidelines the pond will include a forebay and suitable side slopes and benching to allow appropriate planting to be used to create treatment of the water and also to achieve improved amenity value.
- 5.7. Prior to discharge to the pond surface waters will receive treatment at source via trapped gullies and separators as with Phases A.
- 5.8. Following the improvement in water quality offered by the wet pond and trapping the surface water will be conveyed down the banks of the watercourse where it will be discharged in to the low level pond. This pond will be cleaned, re-worked and re-planted, again in accordance with CIRIA guidelines to allow final treatment of the water prior to its discharge to the watercourse.
- 5.9. Through the treatment and control measures described for all Phases the permanent surface water drainage systems will provide appropriate protection to the site's surroundings, both from pollution and flooding.
- 5.10. The permanent control measures described have been approved by all parties. See EA letter dated 13-3-2009 and 10-03-2010 in Appendix C.

- 5.11. The main 'on site' surface water sewers will be put forward for adoption by Welsh Water and will be located within the proposed public highway network, where possible. All attenuation ponds will be owned and maintained by Welsh Water.

6. Proposed Temporary Foul Water Drainage Solution

- 6.1. During the construction of Phase A foul water discharge from the site will not be permitted. All foul water generated by the Contractor and his subsidiaries will be stored within appropriate tanks and removed from the site at regular intervals.
- 6.2. During the construction of Phase B of the development a connection may be possible to the public system constructed during Phase A. This is dependent upon the timing of the Phases and must be agreed with Welsh Water. Notwithstanding this the Contractor will not be permitted to dispose of any oils, chemicals or other liquids resulting from his activities in this manner. This must be stored in appropriate bunded areas on site and disposed of to suitably licensed disposal site.

7. Proposed Temporary Surface Water Drainage Solution

- 7.1. During the construction of Phase A surface water run-off from the phase will drain overland to the southern part of the site and is to be directed towards the infiltration basins. The basins themselves will be constructed at an early stage with arisings stockpiled or used on site as appropriate.
- 7.2. Based upon current construction proposals the Phase A works will not require any construction activities in the Phase B area.
- 7.3. Should any access to Phase B areas be required it is likely that this would include the excavating, placing and processing of materials. This would have the potential for generating surface water run-off with significant silt volumes.
- 7.4. If access to Phase B areas is required measures should be put in place to treat the possibly run-off from the disturbed area. The surface water with high silt volume should pass through a series of temporary drainage features which will settle this silt out from the water and allow it to discharge into the watercourse in its current manner without the silt volume. These features are shown on drawing 06435-282 and include:
- Introducing check dams within the existing high level flow channel to the east of the Phase B area. This is the low part of the site and overland flows are intercepted by this before reaching the top of the watercourse banks.
 - The creation of a high level pond with both primary and secondary silt depths to allow the water to be further slowed and settled prior to discharging via a re-worked spill route to the existing low level pond.
 - The low level pond and its outfall will be cleared of debris and will provide a final settlement of the silt prior to the water reaching the watercourse.
- 7.5. Via these stages of control and settlement the potential for silt affecting the watercourse during the temporary works is minimised. In addition to the settlement of the silt these features will also allow for the evaporation and removal of minor volumes of hydrocarbons which may be generated by the use of plant on the site.

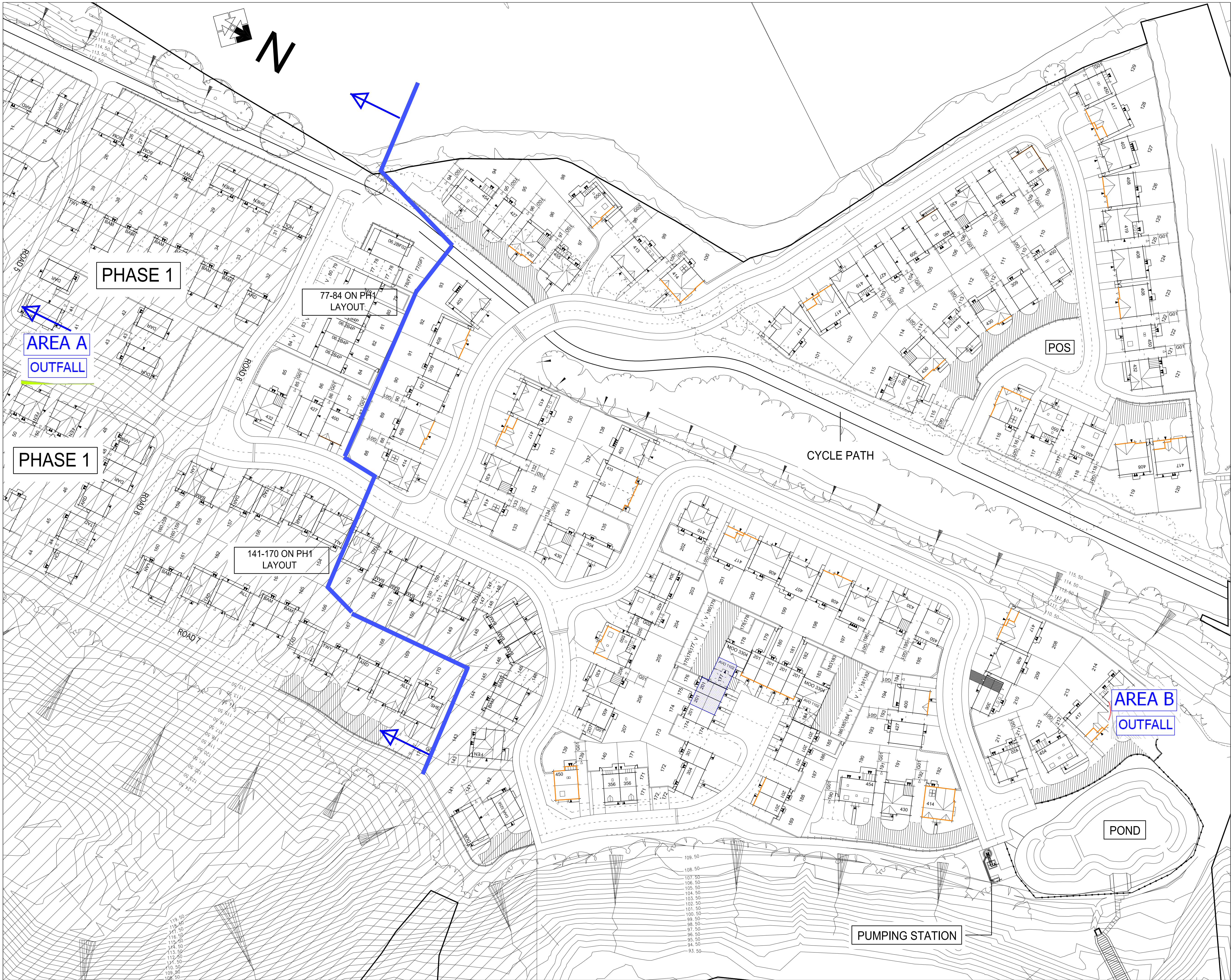
- 7.6. Should any major spillage occur on the site and coincide with heavy rainfall such that it reaches the cut-off channel spill kits will be available to deal with the liquids whilst they are held within the channel or within the primary settlement pond.
- 7.7. All materials on site with the potential for creating contamination will be stored within appropriate containers and where required will be placed within bunded areas such that a spillage would be isolated from the watercourse and ground water.
- 7.8. During the construction of Phase B works the methods of temporary surface water control and treatment will be installed and remain in place during all bulk earthworks exercises and will be replaced by the permanent drainage system when appropriate.
- 7.9. The temporary control measures described have been approved by all parties. See EA letter dated 13-3-2009 and 10-03-2010 in Appendix C.

8. Conclusions/Recommendations

- 8.1. The measures described in sections 6 and 7 address the risks of contamination to the watercourse and groundwater from construction activities and the post-developed site uses.
- 8.2. Details of the necessary measures to be taken during remediation of the potential contamination sources (described in 2.5) are discussed in the Remediation Method Statement prepared by Geodyne Ltd. for this area.
- 8.3. Appropriate licences will be required for working in and near the watercourse.

APPENDIX A

DRAWING No. BR/PL_01



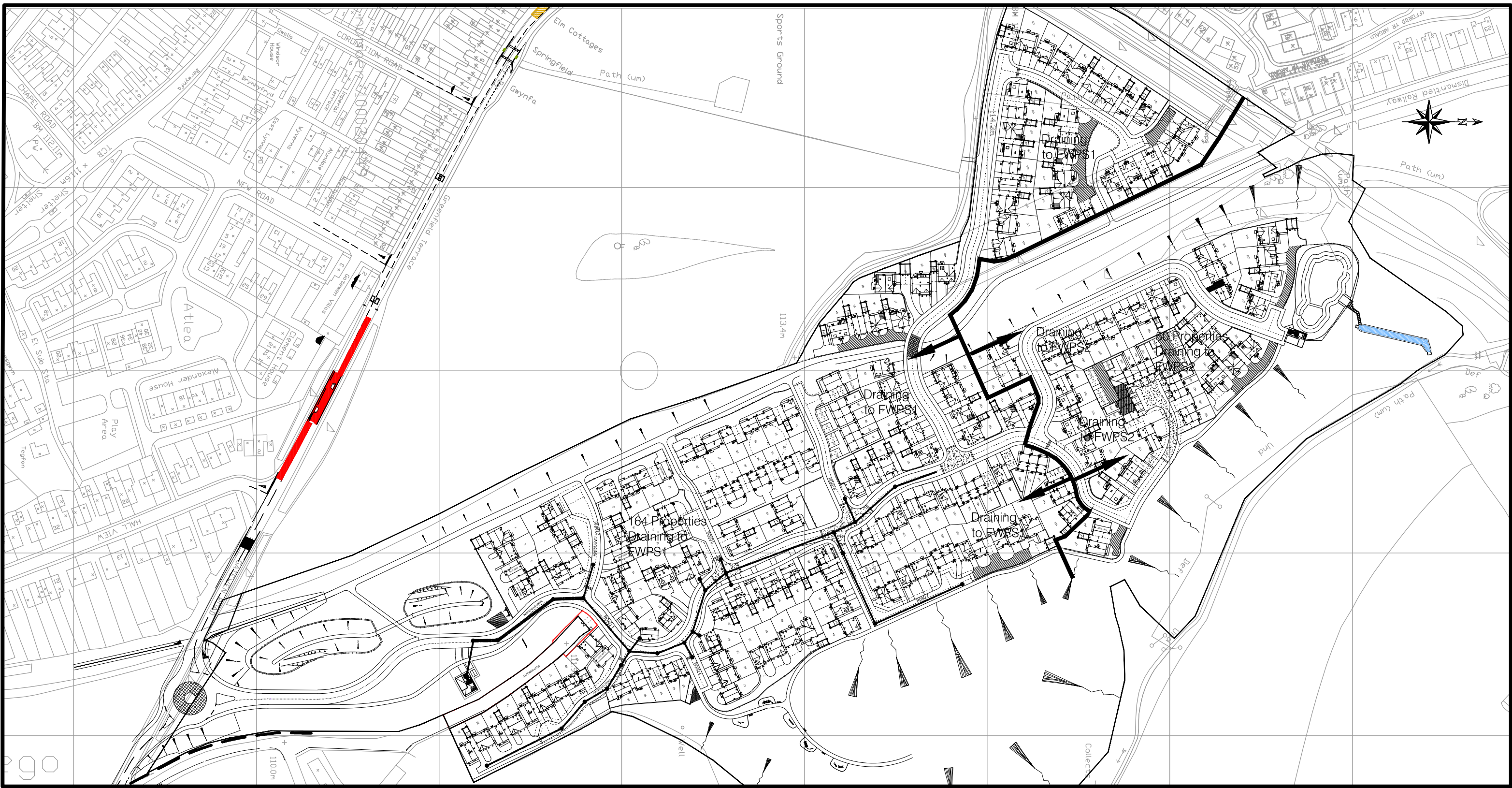
- LEGEND
- INDICATES EXISTING TREES/ HEDGEROWS TO BE RETAINED
 - INDICATES EXISTING TREES TO BE REMOVED
 - INDICATES ALTERNATIVE ROAD SURFACE TREATMENT
 - INDICATES SHARED DRIVEWAY
 - DENOTES BANK/ SLOPED LAND
 - DENOTES 1.8M HIGH CLOSE BOARD FENCING
 - DENOTES 1.8M HIGH GREEN SCREEN
 - DENOTES 0.45M HIGH TIMBER KNEE RAIL FENCE
 - DENOTES REMINDER TO ELEVATION AS PER PLANNING DRAWING
 - DENOTES 1.2M HIGH TIMBER POST & 3 RAIL FENCE
 - INDICATES AFFORDABLE HOUSING PLOT (REDUCED OMV)

ACCOMMODATION SCHEDULE - 85-140, 171-214 INC

PRIVATE HOUSING			
House type Reference	House type Name	Sqft	No.
250		1920	5
Bed Detached 2.5 Storey			5
Bed TOTAL			5
403		1009	5
403		1150	4
403		1200	1
408		1200	9
413		1318	1
413		1400	2
414		1405	5
417		1450	8
419		1500	3
427		1160	1
430		1280	9
432		1280	2
435	Dunham	1033	2
Bed Detached 2 Storey			54
450		1454	9
454		1500	3
456		1626	2
Bed Detached 2.5 Storey			16
Bed TOTAL			68
304		884	3
305		884	6
309		860	4
Bed Detached			8
311	Maletort	750	2
3304		809	2
Bed Detached Maletort 2 Storey			2
355		862	2
Bed Detached Maletort 2.5 Storey			2
356			11
201		820	11
Bed Detached Maletort 2 Storey			11
Bed TOTAL			11
WHOLE SITE PRIVATE			
			87

APPENDIX B

**06435 (09347)-150
Proposed Foul Drainage Strategy**



Foul Water Split Scale 1:2000

General Notes

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings.
3. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the contractor commence site work prior to such approval being given, it is entirely at his own risk.
5. All dimensions are in metres unless otherwise stated.
6. The BSP Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.
7. It is the responsibility of the Contractor to locate any service apparatus in the vicinity of the works. The Client will accept no claims whatsoever in respect of losses or damage caused in respect of such apparatus, however caused.
8. The Contractor shall check all tie-ins for line and level with existing before commencing any works. The Engineer should be notified immediately in writing, should any errors be found.
9. The Contractor is responsible for ensuring that all works are to the satisfaction of the Engineer, and shall be deemed to have included within his rates for any necessary testing.
10. All adopted highway works are to be constructed in accordance with Wrexham County Borough Councils design guidance "Residential Roads and Footpaths".
11. Sewers shall be constructed in accordance with the W.R.C publication "Sewers For Adoption", 6th Edition.
12. All buried concrete products and mortar shall be made using sulphate resisting cement.
13. No deep rooted trees or shrubs to be planted within 5m of a public or prospective public sewer.
14. All levels are related to Ordnance datum.
15. The layout of pipelines, manholes etc. is designed to suit the permanent case. Additional loads over & above those designed for may arise during the construction process. The Contractor shall provide any necessary temporary protection to ensure that pipelines, manholes etc. are not damaged as a result of his method of working.
16. Pipe sizes are based upon contributing area and are subject to detailed design.
17. Drainage systems are based upon 60% impermeable development.



APPENDIX C

Correspondence

Wrexham County Borough Council
Planning Control
Lampit Street
Wrexham
LL11 1AR

Our ref: NT/2008/107320/07-L01
Your ref: P/2008/1066
Date: 13 March 2009

Dear Sir/Madam

**APPLICATION FOR ACCESS ROADS, FOUL AND STORM WATER SEWERS,
FOUL WATER PUMPING STATION, GROUND REMEDIATION AND GENERAL
ACCOMMODATION WORKS TO ALLOW RESIDENTIAL DEVELOPMENT TO
COMMENCE IN A PHASED PROGRAMME. FORMER GATEWEN COLLIERY
SITE GATEWEN ROAD, NEW BROUGHTON WREXHAM**

I refer to additional information (Drawing 06435-180 – Proposed Attenuation System) which was received on 02 March 2009.

Based upon the information submitted, we can confirm that our concerns regarding the scheme for the provision of surface water drainage works have now been satisfied.

Yours faithfully

Mrs DEBORAH HEMSWORTH
Planning Liaison Officer

Direct dial 01248 484068
Direct fax 01248 670561
Direct e-mail debbie.hemsworth@environment-agency.gov.uk

cc BSP Consulting

Environment Agency
Llwyn Brain, Ffordd Penlan, Parc Menai, Gwynedd, Bangor, LL57 4DE.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk
End

Wrexham County Borough Council
Planning Control
Lambpit Street
Wrexham
LL11 1AR

Our ref: NT/2009/109580/02-L01
Your ref: MP/P/2009/0735
Date: 10 March 2010

Dear Sir/Madam

SUBMISSION OF RESERVED MATTERS PURSUANT TO OUTLINE PLANNING PERMISSION NO P/2007/0700 (ACCESS, APPEARANCE, LAYOUT, SCALE). RESIDENTIAL DEVELOPMENT CONSISTING OF 246 DWELLINGS TOGETHER WITH ASSOCIATED ROAD AND SEWERS FORMER GATEWEN COLLIERY GATEWEN ROAD, NEW BROUGHTON WREXHAM

I refer to the letter from Mr Matthew Viggars of bsp consulting dated 19th February 2009 expressing concern regarding a statement made in our letter of 25th September 2009 to the above consultation. In this letter we advised that the applicant would need to agree surface water management proposals with ourselves prior to construction.

I can confirm that we agreed the drainage proposals for this site in an earlier planning permission (your reference P/2009/0735) in our letter dated 13th March 2009. We note that, owing to slight changes in construction timing, the implementation of the strategy may require slight amendment from that set down in the December 2008 strategy. Providing however that the strategy is adhered to, we have no objection to these alterations.

Our Environment Management officers also visited the site on 9th March 2010. The developer informed them that the clean water drainage (from phase 1 and road infrastructure) will discharge to the non-contaminated area. Agreement was made that our Environment Management team would be kept updated on site works and immediately notified if any new contaminated hot spots are discovered. We are therefore satisfied with the information provided.

Yours faithfully

Mrs DEBORAH HEMSWORTH
Planning Liaison Officer

Direct dial 01248 484068
Direct fax 01248 670561
Direct e-mail debbie.hemsworth@environment-agency.gov.uk

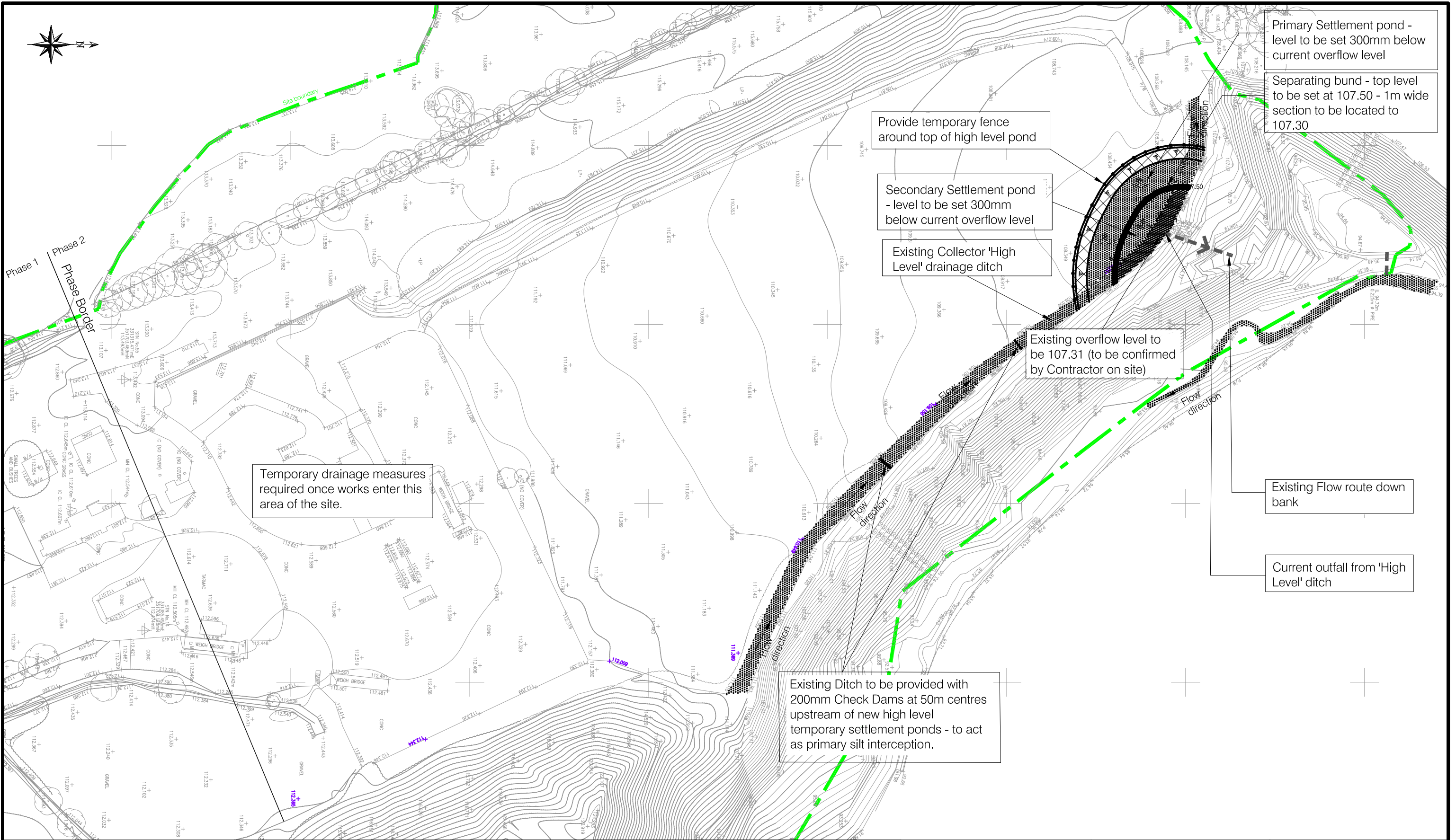
cc B S P Consulting

Environment Agency
Llwyn Brain, Ffordd Penlan, Parc Menai, Gwynedd, Bangor, LL57 4DE.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk
End

APPENDIX D

Drawing No. 06435-282

“Temporary Drainage Works”



General Notes

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings.
3. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the contractor commence site work prior to such approval being given, it is entirely at his own risk.
5. All dimensions are in millimetres unless otherwise stated.
6. The BSP Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site

Key

	Proposed levels		Approximate Location of Newt Barrier
	Proposed battered slopes		Existing Surface: Clay and Stones Phase 2
	Site boundary		Existing Surface: Gravel Phase 2
	Existing Surface: Concrete Phase 2		Existing Surface: Tarmac Phase 2

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Rev.	Description	Date	Drawn	Appr.
Drawing Status				
FOR APPROVAL				
Client: BLOOR HOMES				

Project Title Gatewen Road Wrexham				
Drawing Title Temporary Drainage Works				
Job Number: 09347				
Drawn By: PK	Checked By: MV	Scale: 1:1000 (A3)		
Project Engineer: MV	Approved By: MV	Date: Dec 2008		
Drawing Number: 06435-282	Revision:			