

Project:	Lower Berse Farm, Ruthin Road, Wrexham	Scheme No:	13840
Subject:	Response to LLFA Comments	Revision:	01
Client:	Redrow Homes Ltd	Date:	23/06/2026
Doc Ref:	13840-Response to LLFA Comments - 03		
Author:	Aled Williams BSc (Hons) MCIWEM C.WEM		

Introduction

Waterco have received additional comments dated 1st May 2026 from Pell Frischmann acting as Lead Local Flood Authority (LLFA) for Wrexham County Borough Council in relation to an outline planning application (P2024/1466) for 1450 dwellings and provision of land for a Primary School at Lower Berse Farm, Ruthin Road, Wrexham, LL14 4HP.

The LLFA comments are provided as Appendix A. This document should be read in conjunction with the following documents:

- Waterco Flood Consequences Assessment and Drainage Strategy dated August 2024 (document reference 13840-FCA & Drainage Strategy-09).
- Waterco Hydraulic Modelling Report dated May 2024 (document reference 13840-25319-HMR-03).
- Waterco Response to LLFA Comments December 2025 (document reference 13840-Response to LLFA Comments – 01).
- Waterco Response to LLFA Comments April 2026 (document reference 13840-Response to LLFA Comments – 02).

The LLFA comments are summarised below:

- 1) Clarification on areas used for calculation of greenfield runoff rates.
- 2) Clarification of climate change allowances used (40% vs 45%).
- 3) For Parcel A (north-eastern extent of the site), a contour/heat map type drawing is required showing the interaction between the attenuation pond perimeter/footprint and the 93.89m AOD flood level.
- 4) For Parcel H (north-western extent of the site), a contour/heat map type drawing is required showing the interaction between the attenuation pond perimeter/footprint and the watercourse, showing that the flood extent does not impact upon the pond.
- 5) Further details of the flood storage area in the north-eastern extent of the site are required showing levels. Further details of the proposed access road level changes and culverting are required (at the proposed site access off Ruthin Road).
- 6) Further details of the drainage arrangements / levels on the main distributor / spine roads are required.

The LLFA comments are addressed below.

- 1) In absence of a detailed site layout (owing to the outline nature of the application), existing greenfield runoff rates have been based on the area of the individual development parcels. Waterco can confirm that at reserved matters / SAB application stage, the greenfield runoff rates will be reviewed and will be calculated to exclude any areas of significant green space.
- 2) A 40% climate change allowance has been applied to rainfall when sizing drainage features such as attenuation ponds. This is in accordance with Table 2 of the Welsh Government 'Flood Consequences Assessments: Climate change allowances' guidance. Reference to 45% climate change is made in respect to assessment of fluvial flooding from the watercourses crossing the site. 45% was the correct 'upper end' climate change allowance for peak river flows at the time of the planning submission. It is acknowledged that the fluvial climate change allowances have been updated by the Welsh Government in March 2026 (post-submission).
- 3) A plan showing maximum water levels during the 1% Annual Exceedance Probability (AEP) plus 45% climate change event overlaid onto the site layout is included in Appendix B and also as Figure 1. As shown in Figure 1, the pond serving Parcel A will be placed on ground above the 1% AEP plus 45% CC flood level of 93.89m AOD (the mapping in Appendix B shows flood levels rounded to 93.9m AOD).



Figure 1 – Parcel A - 1% AEP plus 45% CC Event – Water Level Mapping

- 4) As shown in Figure 2, the pond serving Parcel H will be placed on ground above the 1% AEP plus 45% CC flood level of 104.07m AOD. No out of channel flooding is estimated in this location.

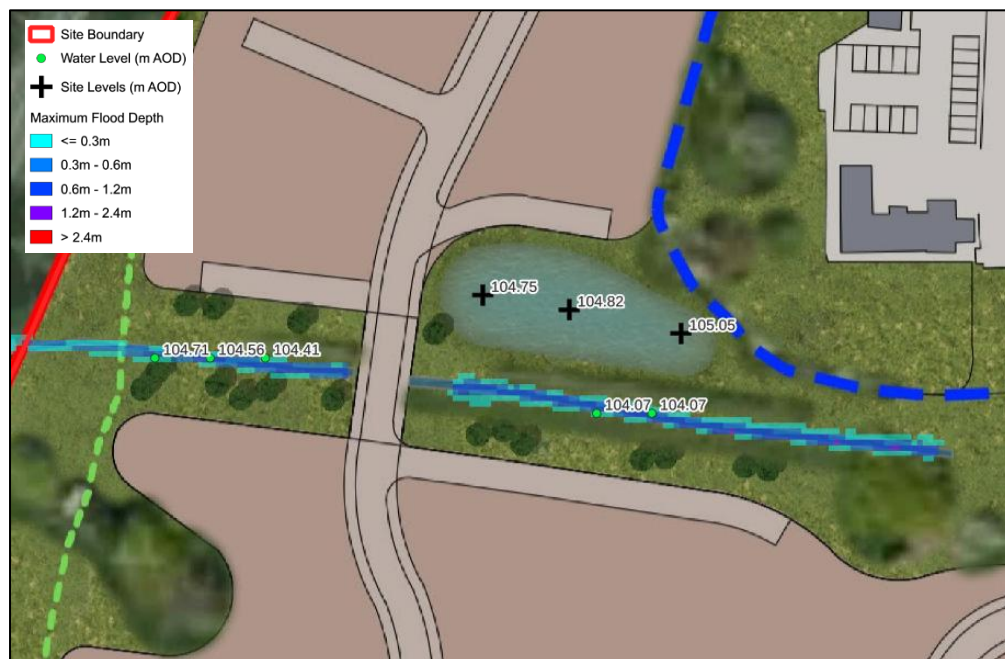


Figure 2 – Parcel H - 1% AEP plus 45% CC Event – Water Level Mapping

- 5) Existing and proposed Digital Elevation Models are included as Appendix C and show the change in elevation in the location of the flood storage area and north-eastern access road. Flood flow routes are also provided on the Digital Elevation Models. The flood storage area is existing, and modifications include lowering higher ground towards the southern extent of the flood storage area by 300mm to create additional storage capacity.

A sketch plan of the proposed access road culverting arrangement is provided as Appendix D. The existing Ruthin Road culvert will be extended southward into the site beneath the access road. A flood relief box culvert will be placed beneath the access road to provide a flow pathway for any out of channel flows to reach the flood storage area east of the access road (replicating existing flow paths).

- 6) The Concept Drainage Sketch plans have been updated to show the drainage and indicative levels of the main spine road through the site. The Concept Drainage Sketches are provided as Appendix E.

Appendix A – LLFA Correspondence

Project	Lower Berse Farm
Document Title	P/2023/0593 - Lower Berse Farm Planning Response.
Document Reference	P_2023_593-PEF-HDG-XX-TN-D-0001
Revision Reference	P02
Date	01/05//26

Our initial response was dated 19 February 2026, detailed below. A meeting took place (March 2026) between Wrexham SAB, Pell Frischmann and Warerco after this response was issued. Waterco has now responded (dated 20 April 2026). Our follow-on response to each pointed is provided in green below.

NB the applicant is required to provide a response to all points raised in the points below to progress this stage/process.

19 February 2026 – P01

TECHNICAL NOTE – FLOOD RISK & DRAINAGE COMMENTS

This Technical Note has been prepared to summarise the additional information required to demonstrate compliance with Technical Advice Note 15 (TAN15) and the Statutory Standards for Sustainable Drainage Systems. The information below is necessary to support assessment by the LLFA.

1. FCA and Drainage Strategy-

The FCA and Drainage Strategy do not currently provide sufficient detail to satisfy TAN15 Sections 4-11 and the table set out in Figure 2 relating to Sources of Flood Risk and Flood Consequence Assessment requirements. Further evidence is required to demonstrate SAB compliance for both drainage and flood risk.

- The ReFH2 method has been used for computing greenfield runoff rates. Table 1 of the FCA and DS lists the total area for a parcel. Presumably this is the overall parcel area and includes spaces which will be permeable/soft landscaped? i.e the impermeable area will be less than the total area used for the runoff rate calculations? Whilst this is acceptable for areas with high impermeable/development, the calculations should not include/capture areas of significant green space. i.e such areas should be removed the runoff rate calculation. Please confirm that is the case or will be the case.

2. Overarching Drainage Strategy

In accordance with TAN15 Sections 4-11, an overarching strategy including drainage layout covering all phases is required, demonstrating compliance with the Statutory Standards for SUDs, including sufficiently detailed sizing and proposed levels for attenuation ponds and the main access road.

- 45% climate change. We can see that 40% was agreed at a meeting between Waterco, Wrexham CBC and Redrow. Is the additional 5% to account for urban creep?

- Preliminary infiltration rates provided for various areas, so the potential is there. This is to be investigated during detailed design. At Reserved Matters it will require more extensive infiltration testing at designed invert levels to prove viability for parcels, or part of parcels.
- Where discharge to the watercourse is the best viable option for a parcel, limiting the discharge rate to the one-year greenfield runoff rate is acceptable.
- The concept strategy indicates viability in terms of parcel levels and drainage via gravity to attenuation ponds/structures. The indicative ponds demonstrate initial viability but are assumed to have the basic minimum geometry. At detailed design the attenuation ponds will need to be modelled to provide suitable access/serviceability space, benches etc so this will probably impact effective parcel and highway space.

3. North-East Attenuation Pond (not confirmed with a clear drainage strategy layout plan only indicated within masterplan)

The pond is adjacent to Flood Zone 3. Under TAN15 Section 9 (Vulnerability & Flood Zone Compatibility) and Section 11 (Acceptability of Flood Consequences), detailed before/after levels and extents must be provided.

- Please provide a contour/heat map type drawing showing the interaction between the pond perimeter/footprint and the 93.89m level/contour.

4. North-West Pond (not confirmed with a clear drainage strategy layout plan)

The same requirements as Item 3 apply. Further detail is required on flood levels, extents and pond function.

- Northwest pond – noted on relative levels, please provide a contour/heat map type drawing with levels/contours on relative to the pond perimeter/footprint and the watercourse. We need to see the impact of the pond on the flood zone in greater detail than the flood model mapping. A cursory view appears to show the pond in/partly in Zone C2. Actual site levels may show this be untrue, hence this request.

5. Flood Storage Area

Further detail to be provided for the compensatory flood storage area, including proposed storage calculations and level/volume information must be provided.

- The flood maps are an important pointer on viability, but we require some more detail as follows:
 - Provide the requested levels/volume information in the form of a contoured and flow route plan (proving connectivity to the watercourse to allow exceedance runoff to reach the flood storage area). Please provide this for the existing and proposed situation, based on topographic levels and proposed levels/surfaces respectively. Please also provide a comparison surface model.
 - Undertake a similar exercise for the new access road/junction area.
 - The above two requests can be combined into one piece of work/model.
 - We are not expecting final/detailed design, but we do require levels/contours models to be developed enough for us to be satisfied that flood risk in this part of the site will not be increased because of the development.
- We require more details of the proposed culverting at the main access point. Again, not detailed design level, but a detailed sketch of what is envisaged in this area is required

- At detailed design take account of the existing (theoretical) surface water flood risk storage areas within the site so that equivalent storage is provided over and above that required for the development (unless actual localised areas coincide with impermeable surfaces anyway - in which case no net change).

6. Hydraulic Model

Full model input/output files must be provided for LLFA review.

- Noted and closed.

7. Access Road Levels and Culverting

In accordance with TAN15 Section 11, existing and proposed levels for the A525 tie in and flood levels must be submitted.

- Please provide as requested. This can be linked/combined with point 5 above.

8. Bryn Coch Properties

TAN15 Section 11 requires demonstration of no increased flood risk elsewhere.

- Closed on the basis that the modelling is based on matching the 1 year greenfield runoff rate and flood risk is not displaced as a result of the levels changes in the northeastern portion of the site, with particular reference to the introduction of the access road.

9. South-West Culvert

Assessment required under TAN15 Sections 4 to 6 for small watercourse flood risk. A more detailed outline drainage strategy is required.

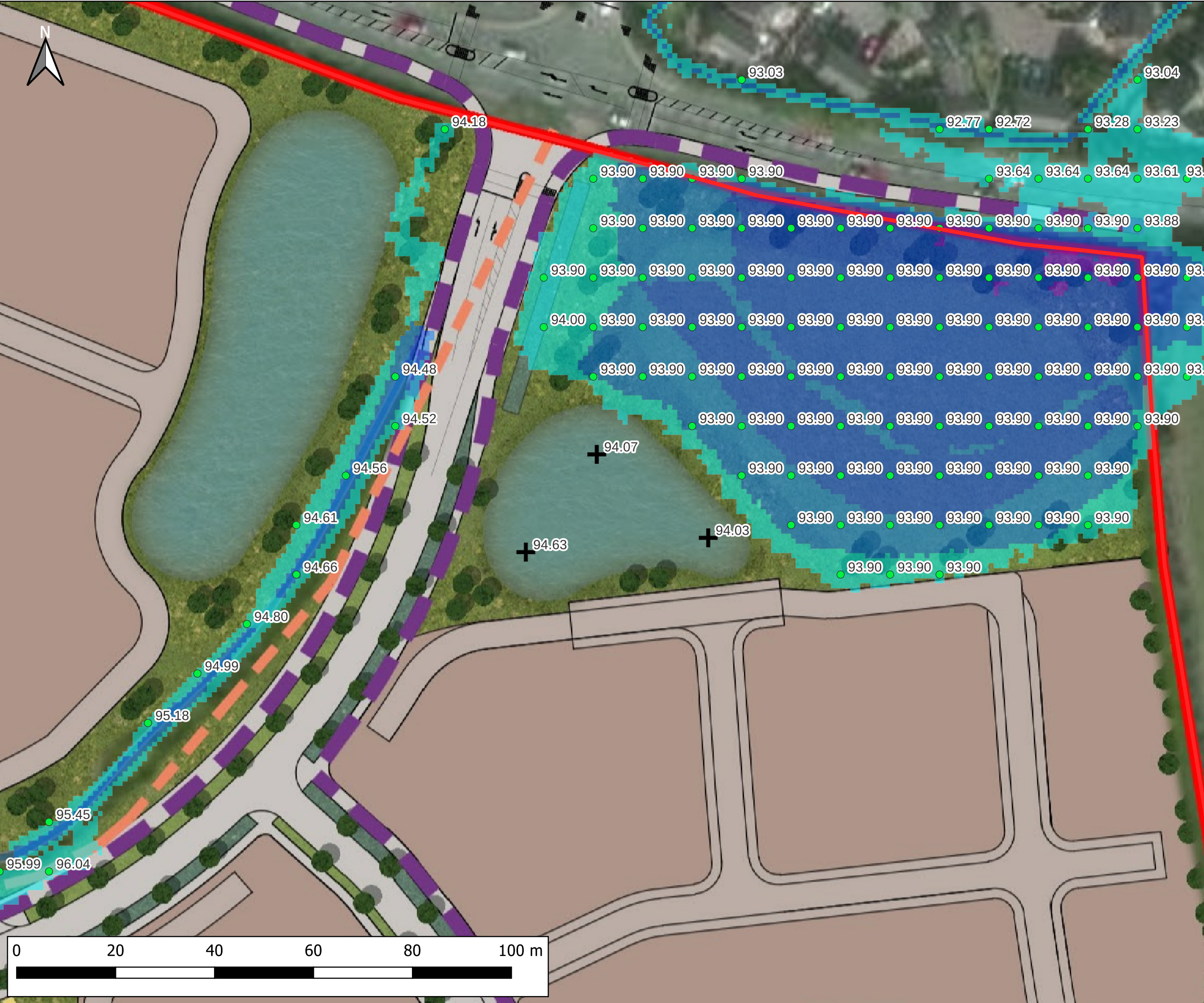
- Not required now/closed. However, details such as flood exceedance routes/plans for all parcels, including this area, will be required at the Reserved Matters stage.

10. Preliminary Site Levels Strategy

A site-wide preliminary levels plan is required prior to Reserved Matters in accordance with TAN15.

- The Concept Drainage Sketch provides many of the level information requested. To close this comment please provide some indicative levels on the main distributor roads/spine roads. We do not require detailed design level of information, but we require sufficient additional levels in the same manner as the key points shown on the parcels.

Appendix B – Water Level Mapping



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Water Level (m AOD)
- Site Levels (m AOD)

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Map Inset:
Coedpoeth, Broughton, Bersham, Rhostyllen, Erddig, A525

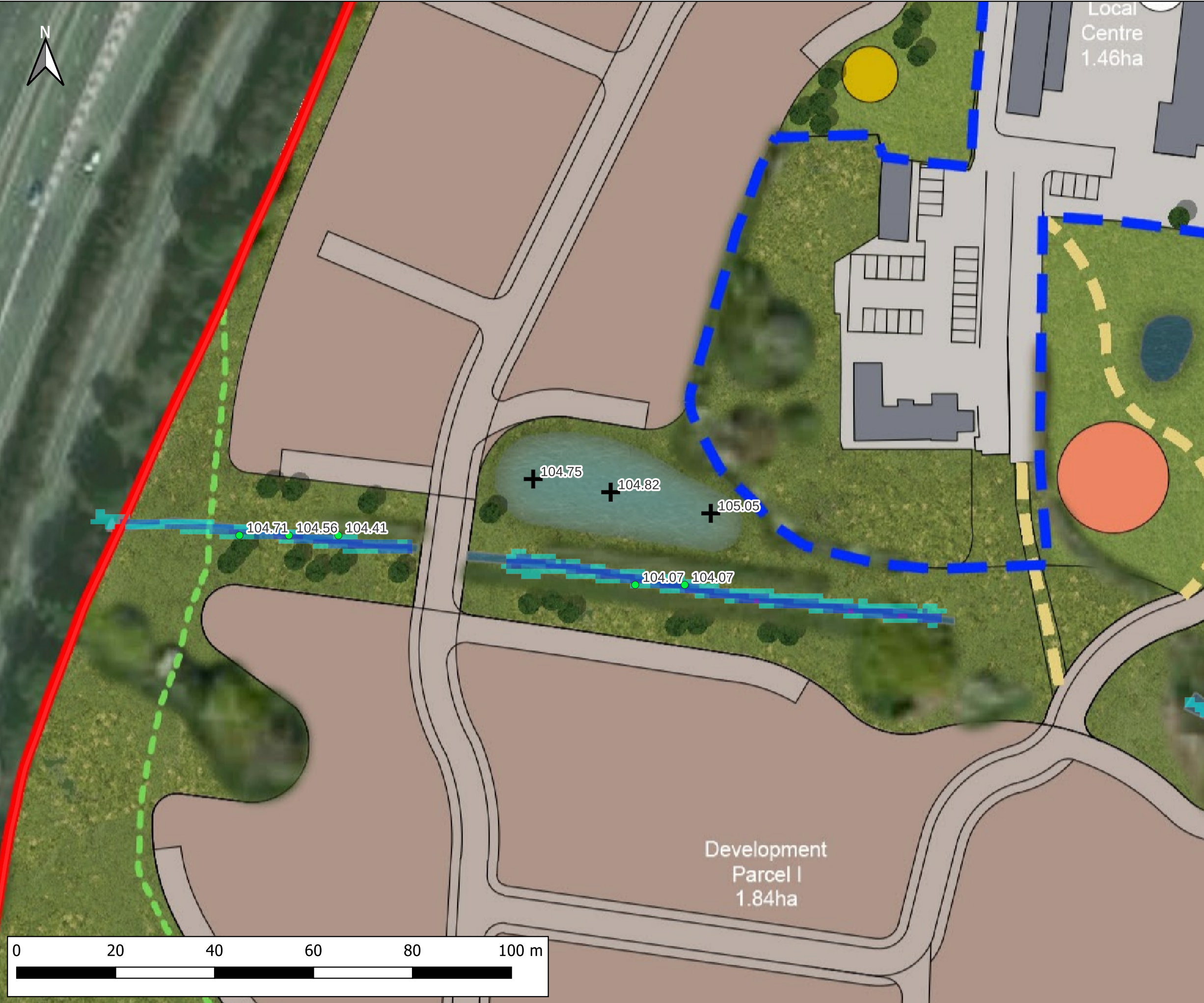
CLIENT: **REDROW**

waterco
www.waterco.co.uk

SCHEME:
Ruthin Road, Wrexham

PLOT TITLE:
MAXIMUM WATER LEVEL
1% AEP PLUS 45% CLIMATE CHANGE FLUVIAL EVENT
PROPOSED DEVELOPMENT SCENARIO (DEV)
NORMAL FLOW CONDITIONS (NC)
PARCEL A

PLOT STATUS: FINAL			DATE: 23-06-2026
DRAWN: RM	CHECKED: AP	APPROVED: MW	PLOT SCALE AT A3: 1:700
PLOT NAME: 13840_BERSE_Q100CC_hMax			REVISION: -



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Water Level (m AOD)
- Site Levels (m AOD)

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m

Inset Map: Shows the location of the site within the local area, including Coedpoeth, Bersham, Rhostyllen, and Erddig. The map is overlaid with a grid and labels for roads and landmarks.

CLIENT: REDROW

waterco
www.waterco.co.uk

SCHEME: Ruthin Road, Wrexham

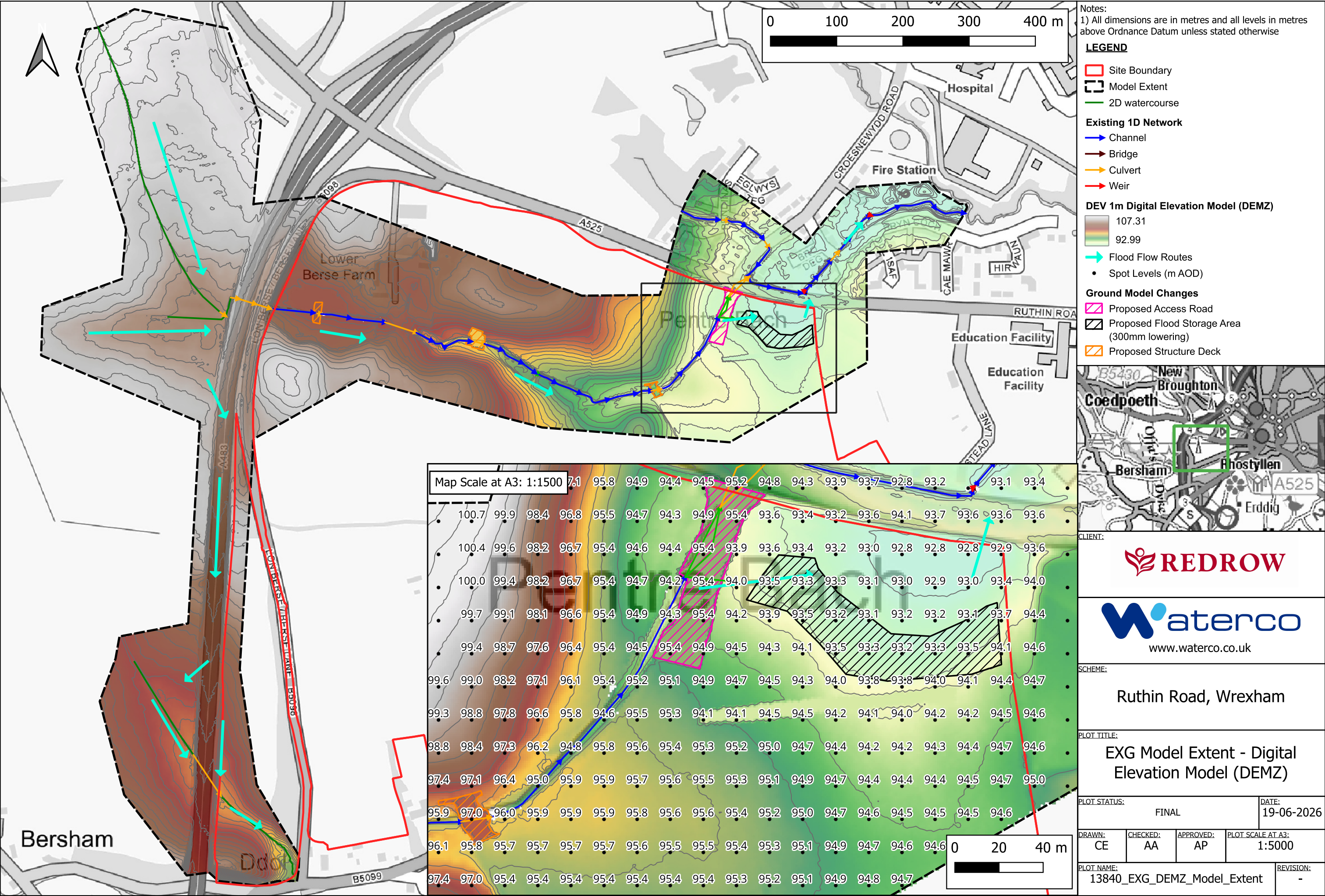
PLOT TITLE: MAXIMUM WATER LEVEL
1% AEP PLUS 45% CLIMATE CHANGE FLUVIAL EVENT
PROPOSED DEVELOPMENT SCENARIO (DEV)
NORMAL FLOW CONDITIONS (NC)
PARCEL H

PLOT STATUS: FINAL **DATE:** 23-06-2026

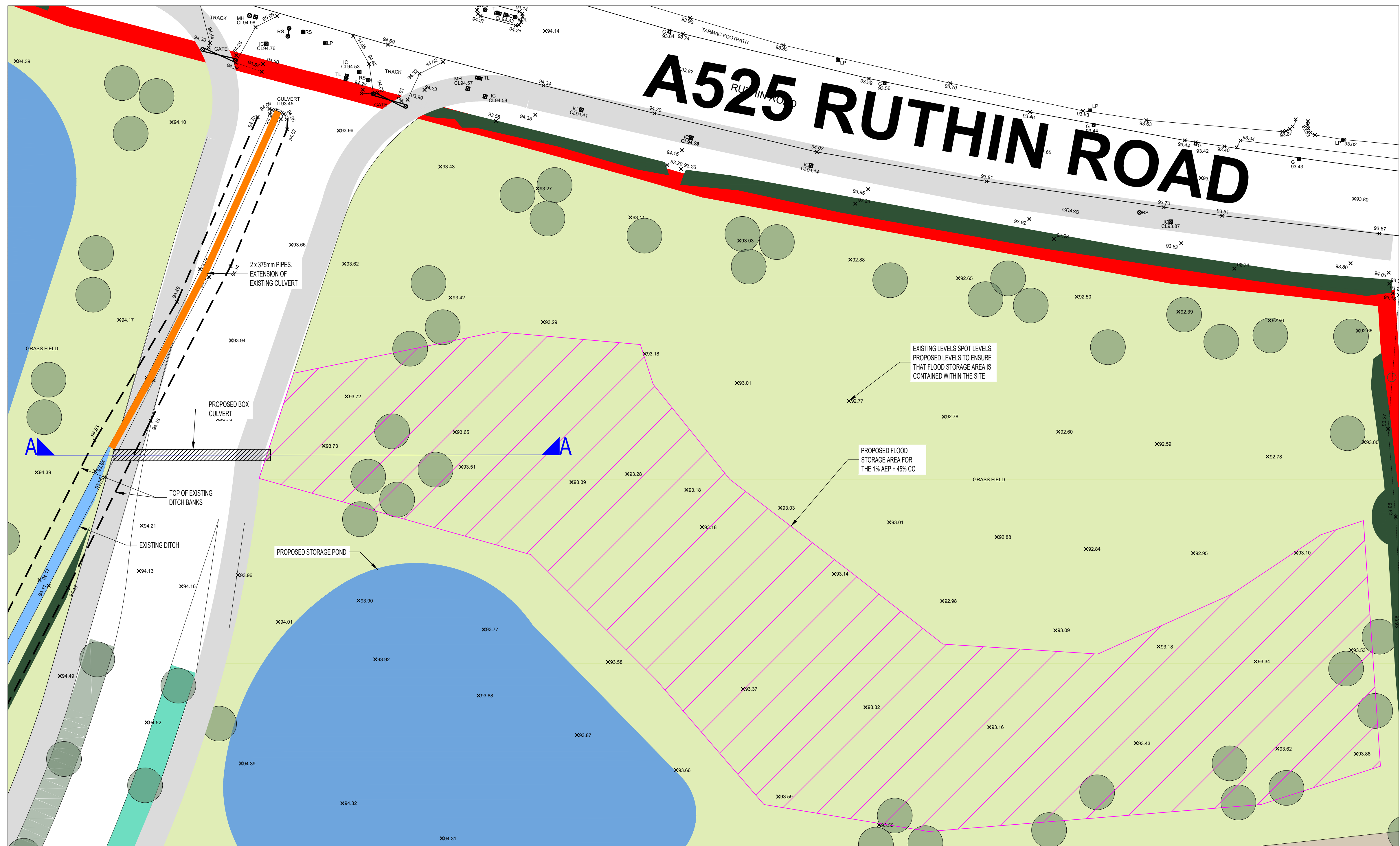
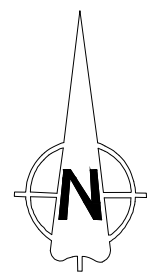
DRAWN: RM	CHECKED: AP	APPROVED: MW	PLOT SCALE AT A3: 1:700
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PLOT NAME: 13840_BERSE_Q100CC_hMax **REVISION:** -

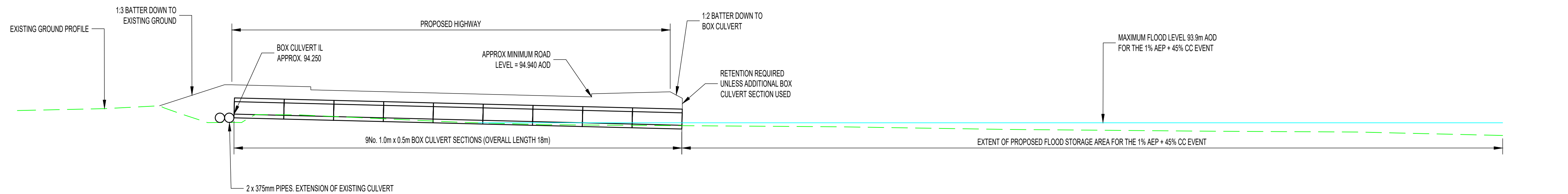
Appendix C – Digital Elevation Models



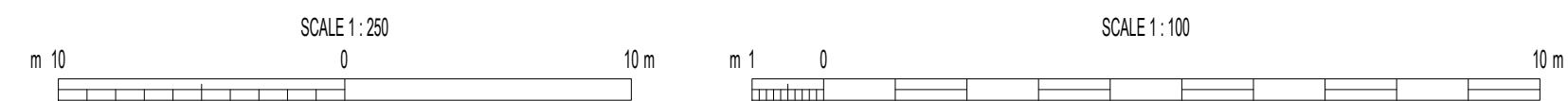
Appendix D – Culvert Sketch Plan



EXISTING CULVERT EXTENSION & PROPOSED BOX CULVERT UNDER HIGHWAY LAYOUT
1:250



SECTION A-A
1:100



- NOTES
- ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS SHOWN OTHERWISE.
 - THIS DESIGN IS PROPOSED ON THE BASIS OF CLIENT BRIEF, SPECIFICATIONS, BEST PRACTICE AND RISK REDUCTION / ELIMINATION. THE DESIGNER MUST BE CONSULTED ON ANY PROPOSED CHANGES, BEFORE THEY ARE CONSIDERED FOR IMPLEMENTATION.

SITE LOCATION
GRID REFERENCE: 331778, 350051
SITE ADDRESS: RUTHIN ROAD,
WREXHAM,
LL11 3EP

CAUTION: THE MANAGEMENT AND DESIGN OF ANY AND ALL TEMPORARY WORKS REQUIRED TO EXECUTE THIS DESIGN ARE THE RESPONSIBILITY OF THE CONTRACTOR.

P01	01/06/26	FIRST ISSUE	AV	AR	NJ
REV	DATE	DESCRIPTION	ORG	CHK	APP

CLIENT

REDROW

PRINCIPAL DESIGNER

Waterco

Waterco Ltd., Eden Court,
Lon Parcw Business Park, Ruthin LL15 1NJ

tel (+44) 1824 702220
www.waterco.co.uk

SCHEME

RUTHIN ROAD,
WREXHAM

TITLE

EXISTING CULVERT EXTENSION & PROPOSED
BOX CULVERT UNDER HIGHWAY LAYOUT WITH
SECTION

ORIGINATOR A.VALE	CHECKER A.RUSSELL	APPROVER N.JONES
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STATUS

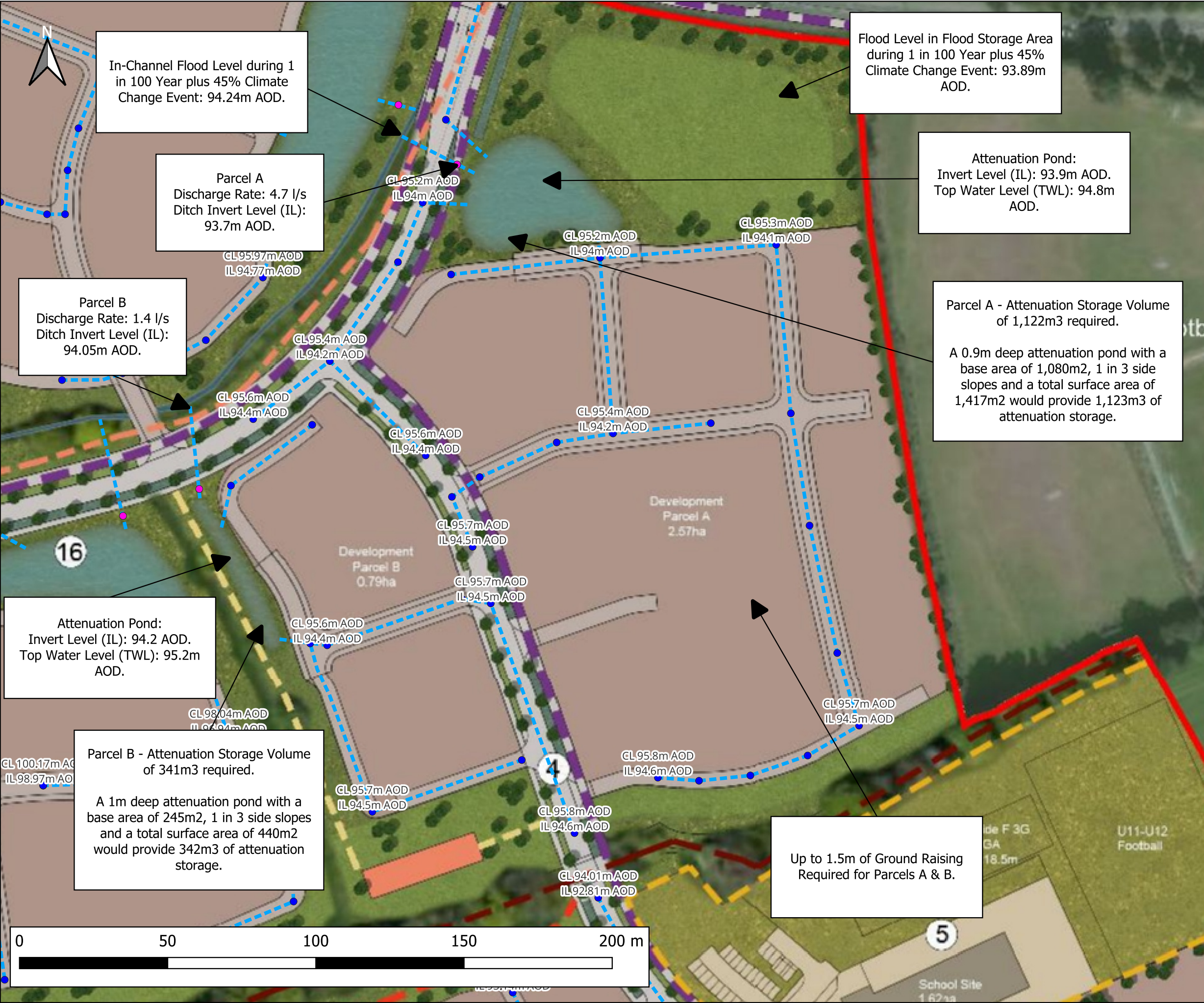
PRELIMINARY

SCALE / SHEET SIZE AS SHOWN / A1	REV P01
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DRAWING NUMBER

13840-2400

Appendix E – Concept Drainage Sketches

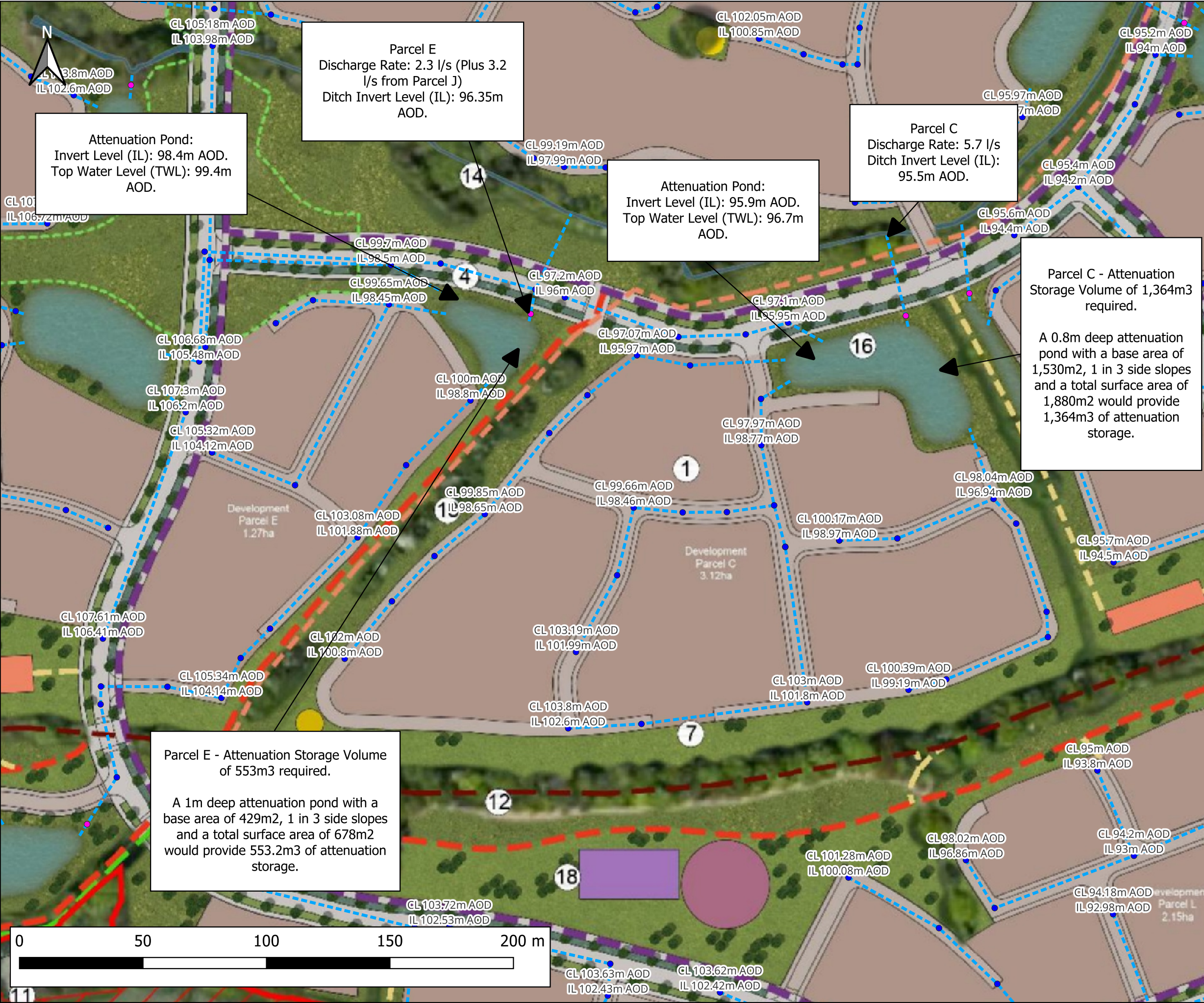


Notes:
1) This sketch has not been subject to formal checks or approvals. Its validity and use must therefore be limited to discussion and information purposes only.
2) Unless otherwise noted the risks associated with this proposal are not considered to be extra ordinary and within the remit of an experienced and competent contractor.
3) All dimensions in millimetres and all levels in metres above ordnance datum unless shown otherwise.
4) This drawing is an amendment of the 'Masterplan Framework' (Drawing No. PS9730.001G) by 'The Environment Partnership'. This drawing provides a concept only and is not intended for detailed design.

LEGEND

- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT: REDROW			
Waterco www.waterco.co.uk			
SCHEME: Ruthin Road, Wrexham			
PLOT TITLE: Development Parcels A and B Concept Drainage Sketch			
PLOT STATUS: SKETCH			DATE: 22-06-2026
DRAWN: RM	CHECKED: AW	APPROVED: NJ	PLOT SCALE AT A3: 1:1250
PLOT NAME: 13840_Concept_Drainage_Sketch_A_&_B			REVISION: 01



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LEGEND

- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT:

REDROW

Waterco
www.waterco.co.uk

SCHEME:

Ruthin Road, Wrexham

PLOT TITLE:

Development Parcels C & E
Concept Drainage Sketch

PLOT STATUS:

SKETCH

DATE: 22-06-2026

DRAWN: RM

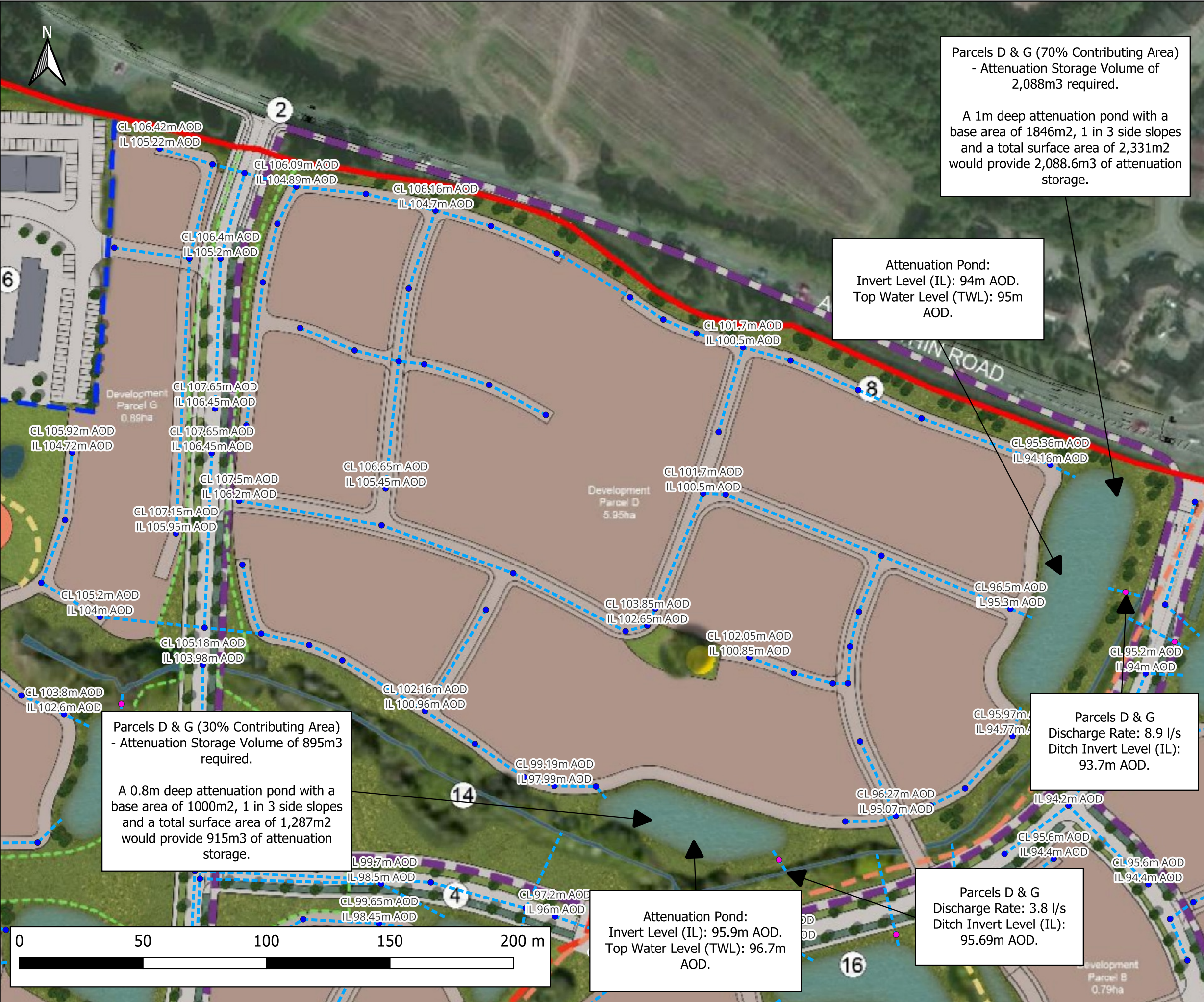
CHECKED: AW

APPROVED: NJ

PLOT SCALE AT A3: 1:1500

PLOT NAME: 13840_Concept_Drainage_Sketch_C_&_E

REVISION: 01



Notes:

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- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT:

REDROW

Waterco
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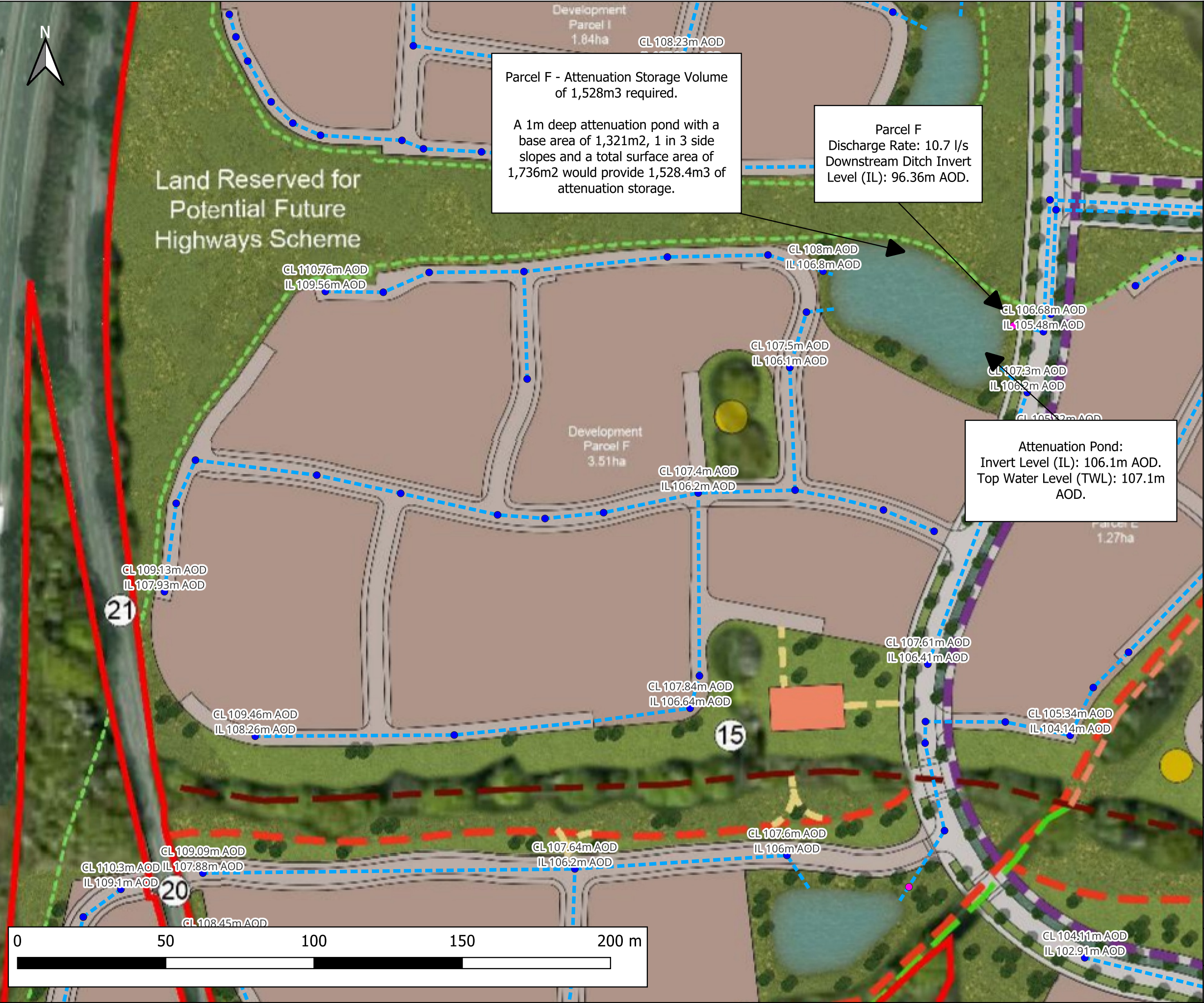
SCHEME:

Ruthin Road, Wrexham

PLOT TITLE:

Development Parcels D & G
Concept Drainage Sketch

PLOT STATUS:		DATE:	
SKETCH		22-06-2026	
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
RM	AW	NJ	1:1500
PLOT NAME:			REVISION:
13840_Concept_Drainage_Sketch_D_&_G			01



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LEGEND

- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT:

www.waterco.co.uk

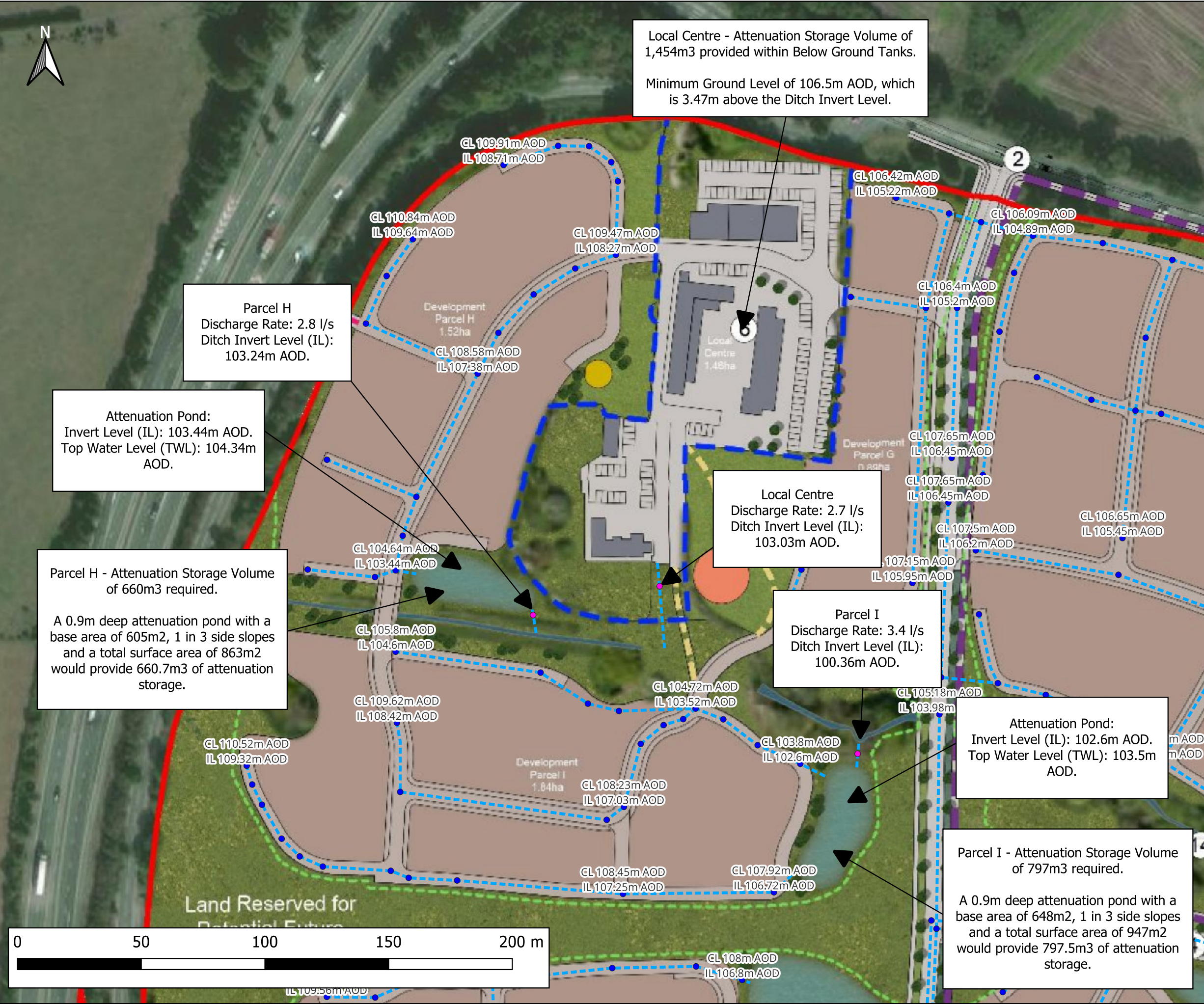
SCHEME:

Ruthin Road, Wrexham

PLOT TITLE:

Development Parcel F
Concept Drainage Sketch

PLOT STATUS:			DATE:
SKETCH			22-06-2026
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
RM	AW	NJ	1:1250
PLOT NAME:			REVISION:
13840_Concept_Drainage_Sketch_F			01



Notes:

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LEGEND

- ▬ Site Boundary
- - - Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT:



SCHEME:

Ruthin Road, Wrexham

PLOT TITLE:

Development Parcels H & I
Concept Drainage Sketch

PLOT STATUS:

SKETCH

DATE:

22-06-2026

DRAWN:

RM

CHECKED:

AW

APPROVED:

NJ

PLOT SCALE AT A3:

1:1500

PLOT NAME:

13840_Concept_Drainage_Sketch_H_&_I

REVISION:

01

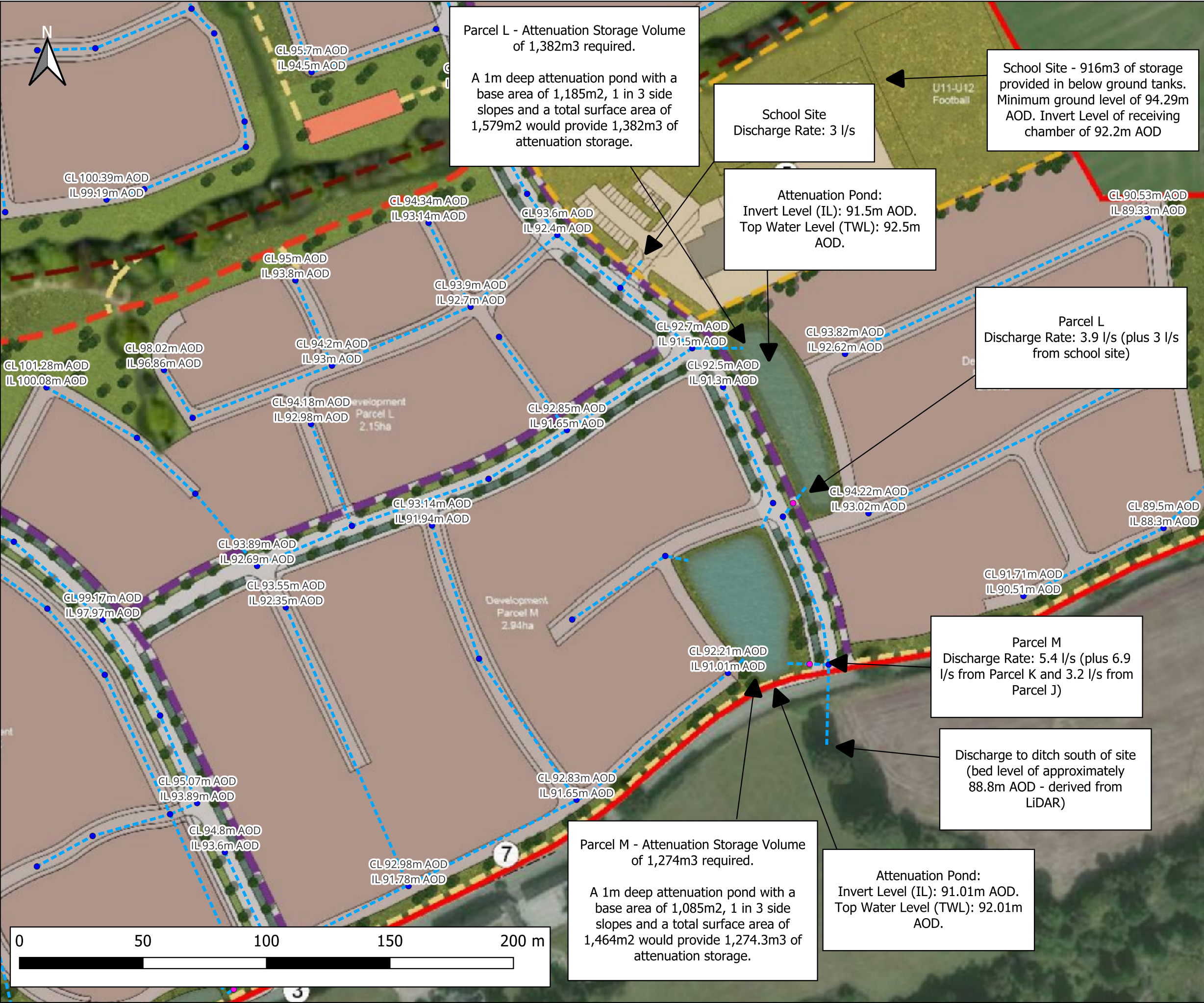


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LEGEND

- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT: 			
 www.waterco.co.uk			
SCHEME: Ruthin Road, Wrexham			
PLOT TITLE: Development Parcel K Concept Drainage Sketch			
PLOT STATUS: SKETCH			DATE: 22-06-2026
DRAWN: RM	CHECKED: AW	APPROVED: NJ	PLOT SCALE AT A3: 1:1500
PLOT NAME: 13840_Concept_Drainage_Sketch_K			REVISION: 01

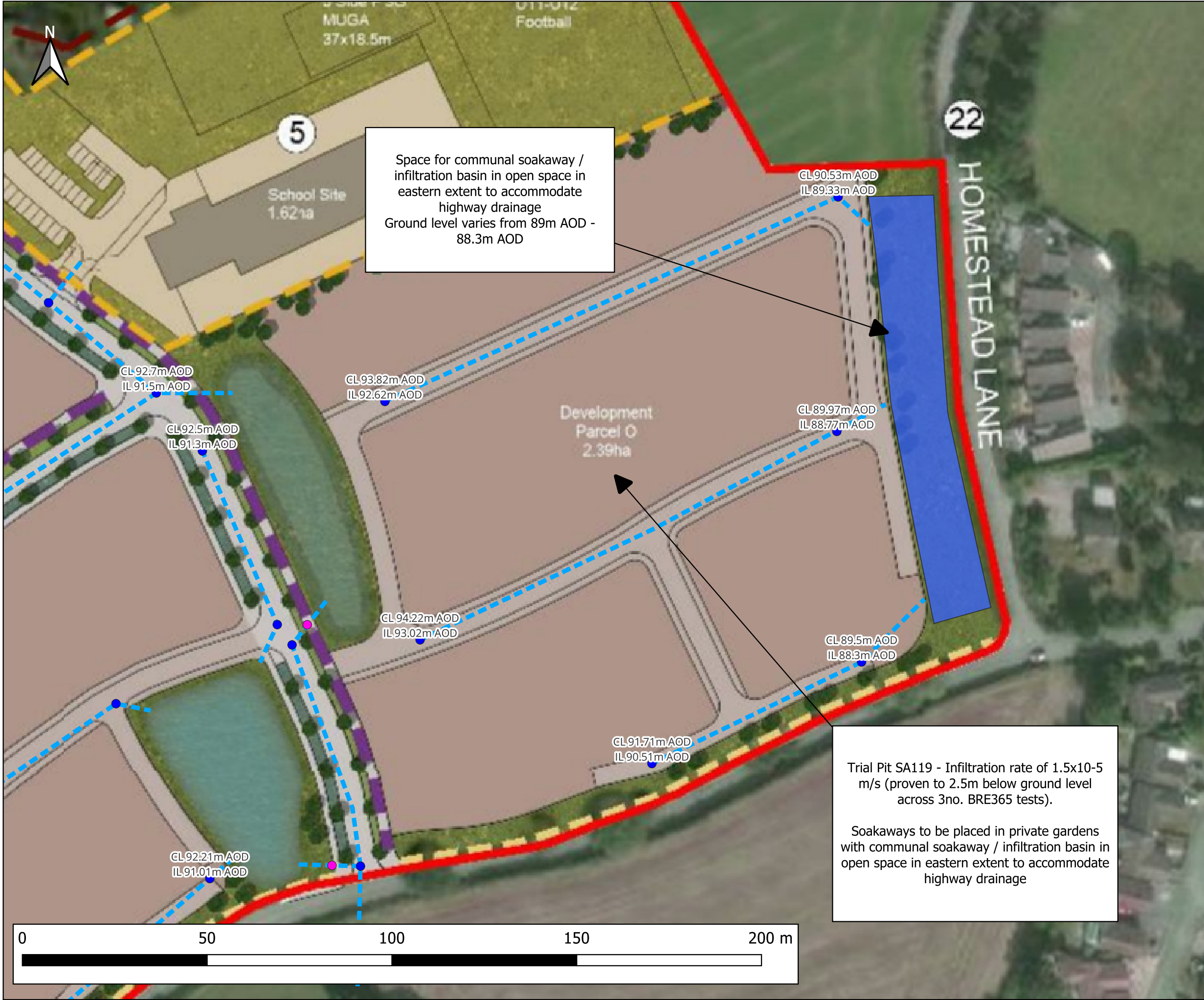


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- Proposed Flow Control Chamber

CLIENT: 			
 www.waterco.co.uk			
SCHEME: Ruthin Road, Wrexham			
PLOT TITLE: Development Parcels L and M Concept Drainage Sketch			
PLOT STATUS: SKETCH			DATE: 22-06-2026
DRAWN: RM	CHECKED: AW	APPROVED: NJ	PLOT SCALE AT A3: 1:1500
PLOT NAME: 13840_Concept_Drainage_Sketch_L_M			REVISION: 01



Space for communal soakaway / infiltration basin in open space in eastern extent to accommodate highway drainage
Ground level varies from 89m AOD - 88.3m AOD

Trial Pit SA119 - Infiltration rate of 1.5x10-5 m/s (proven to 2.5m below ground level across 3no. BRE365 tests).

Soakaways to be placed in private gardens with communal soakaway / infiltration basin in open space in eastern extent to accommodate highway drainage

Notes:
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LEGEND

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- Proposed Surface Water Drain
- Proposed Surface Water Inspection Chamber
- Proposed Flow Control Chamber

CLIENT:			
			
 www.waterco.co.uk			
SCHEME:			
Ruthin Road, Wrexham			
PLOT TITLE:			
Development Parcel O Concept Drainage Sketch			
PLOT STATUS:			DATE:
SKETCH			22-06-2026
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
RM	AW	NJ	1:1000
PLOT NAME:			REVISION:
13840_Concept_Drainage_Sketch_O			01