



**Hallam Land Management Limited, St Albans School, and St
Albans School Woollam Trust**

Woollam Park, Land at North St Albans

Hydraulic Modelling Addendum

February 2026

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Version Control and Approval

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Purpose

This document has been prepared for Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust.

PJA Civil Engineering Limited accepts no responsibility or liability for any use that is made of this document other than by Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust for the purposes for which it was originally commissioned and prepared.

The conclusions and recommendations contained herein are limited by the availability of background information and the planned use for the Site.

Third party information has been used in the preparation of this report, which PJA Civil Engineering Limited, by necessity assumes is correct at the time of writing. Whilst all reasonable checks have been made on data sources and the accuracy of the data, PJA Civil Engineering Limited accepts no liability for same.

PJA Civil Engineering Limited. has no liability regarding the use of this report except to Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust.

CDM

The Construction (Design and Management) Regulations 2015 (CDM Regulations) came into force in April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities under clause 9 (1) is to ensure that the client organisation, in this instance Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust, is made aware of their duties under the CDM Regulations.

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I Introduction

- 1.1.1 PJA was commissioned by Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust, to construct a site-specific direct rainfall hydraulic model of the Site, and upstream contributing catchment, at Woollam Park, St Albans. This work was completed in October 2025 and summarised in the supporting hydraulic modelling report (Ref. North St Albans-Hydraulic Modelling Report, 05920-WR-HMR-01-P2).
- 1.1.2 As part of the ongoing refinement of the surface water drainage strategy, it has been identified that earthworks associated with the proposed attenuation basins may be located within the indicative Network Rail embankment easement along the eastern boundary of the Site. Accordingly, minor adjustments to the siting of Basins D and L, shifted marginally westwards, are proposed.
- 1.1.3 While the modifications are minor, the Surface Water Drainage Strategy (SWDS) (Ref. Surface Water Drainage Strategy, 5920-WR-A-0525-P12) and proposed levels strategy (Ref. Indicative Proposed Levels, 05920-WR-A-0530 (P06)) have been updated and provided in Appendix A.
- 1.1.4 For completeness, the site-specific hydraulic model has been re-run with the updated SWDS and proposed levels to determine what, if any impact, these minor modifications may have to the findings of the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).
- 1.1.5 This Addendum aims to summarise the impacts, if any, to the modelling works already completed, and summarise any updates undertaken within hydraulic modelling in response to received LLFA comments.

I.2 Limitations

- 1.2.1 Third party information has been used in the preparation of this Addendum which PJA, by necessity, assumes is correct at the time of writing. Whilst all reasonable checks have been made on data sources and the accuracy of the data, PJA accepts no liability for same.
- 1.2.2 PJA has no liability regarding the use of this report except to Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust.
- 1.2.3 The general limitations of this assessment are:
- Flooding of all forms is a natural process, which is inherently random. As such, the outputs produced by this model, cannot be considered to be a definitive representation of a single flood event, nor flood mechanism.



- Fluid flow within watercourses and/or on floodplains is governed by a set of complex physical processes. Hydraulic modelling requires the necessary simplification of these processes into mathematical models, thereby it may only be considered to be a simplified representation of a single flood event and/or mechanism and should not be conclusively relied upon.
- The hydraulic modelling undertaken assesses the potential flood risk associated with surface water flood risk only.



2 Baseline Model Update

- 2.1.1 No changes to the Baseline Model as submitted and summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2) have been made.



3 Post Development Model Update

3.1.1 This section summarises the changes to the Post Development Model as compared to the Post Development Model summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2). The changes undertaken are in relation to:

- Proposed Surface Water Drainage Strategy
- Indicative Proposed Levels
- Structures

3.2 Proposed Surface Water Drainage Strategy

3.2.1 The Post Development Model has been updated to include the updated Surface Water Drainage Strategy (SWDS) (Ref. Surface Water Drainage Strategy, 5920-WR-A-0525-P12) and proposed levels strategy (Ref. Indicative Proposed Levels, 05920-WR-A-0530 (P06)).

3.2.2 The changes to the Post Development Model comprise the minor modifications to the positioning of the Basins D and L, with the following layers amended in the model:

- Proposed Earthworks Surface – surface has been amended, relocation of the two surface water drainage basins (Basins D and L) to the west.
- Structures – one proposed drainage culvert has been removed..
- Storage feature water levels – initial water level representation has been shifted to the west, aligning with the updated proposed levels and position of Basins D and L.
- Basin design levels – cover levels for the basins have been re-aligned with the updated proposed levels .

3.2.3 All other aspects Post Development Model remain consistent with that summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2)

3.2.4 The updated Post Development Model build is shown in Figure 3-1.

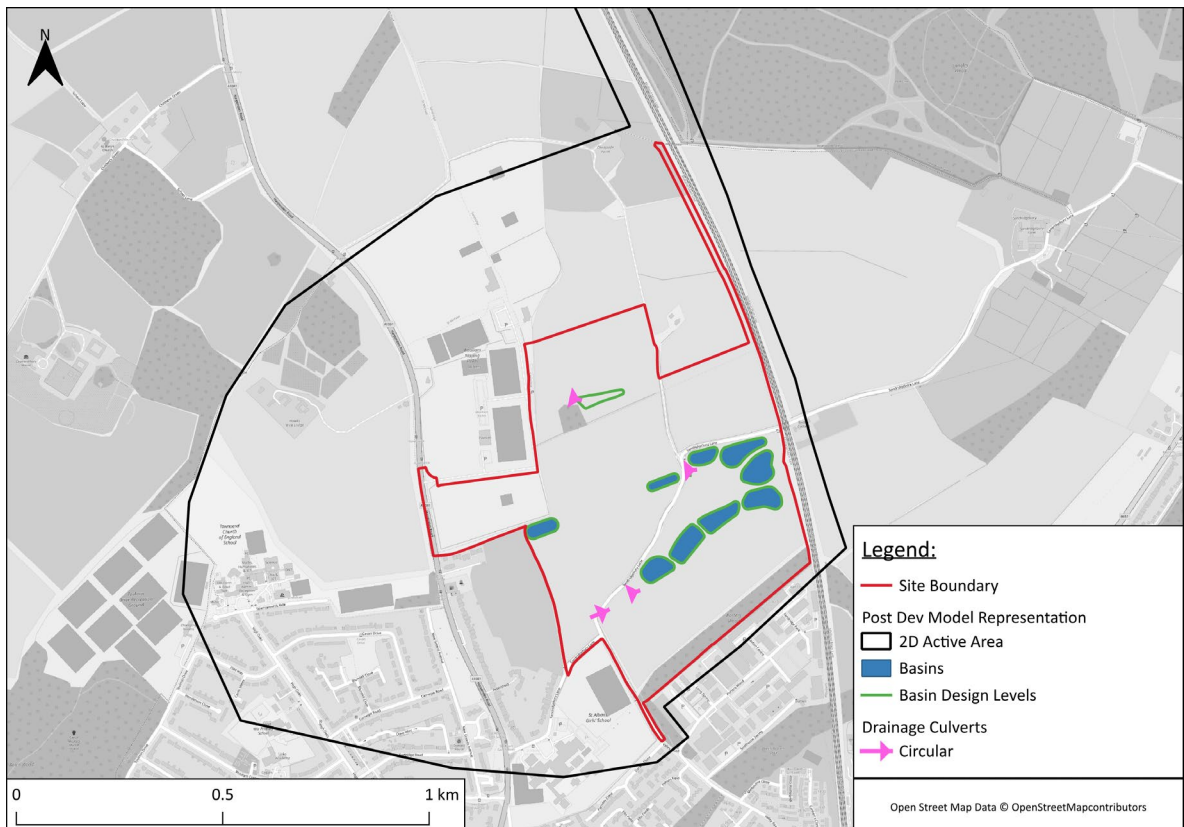


Figure 3-1 Post Development Model Updated Build

3.3 Indicative Proposed Levels

- 3.3.1 The updated indicative proposed levels (Ref. Indicative Proposed Levels, 05920-WR-A-0530 (P06)) are shown in Figure 3-2 and provided in Appendix C. The changes to the proposed levels comprise:
- Realignment of the Basin D and L
 - Removal of two small conveyance swales
- 3.3.2 The proposed levels for the remainder of the Site and the sports pitch remain unchanged from those summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).



Figure 3-2 Post-Development Updated Proposed Levels

3.4 Structures

- 3.4.1 One structure has been removed as this feature was required to connect the small conveyance swales which have been removed.

3.5 Storage feature water levels

- 3.5.1 Initial water levels have been applied to the proposed basins, as 'zpt' polygons, to represent the design level from the SWDS. These have been realigned to match the updated location of Basins D and L. The elevations applied to these remain unchanged from the Post Development Model summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).

3.6 Basin cover levels

- 3.6.1 Basin cover levels are represented in the Post Development model using z-lines in line with the indicative proposed levels and the SWDS. These have been realigned to match the updated location of Basin D and L. The elevations applied to these remain unchanged from the Post Development Model summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).



4 Post Development Model Results

- 4.1.1 The Post Development Model was simulated for the 1 in 30-year, 1 in 100-year plus climate change and 1 in 1,000-year design events.
- 4.1.2 Figure 4-1 illustrates the surface water flood extents for each of these events for the updated Post Development Model.

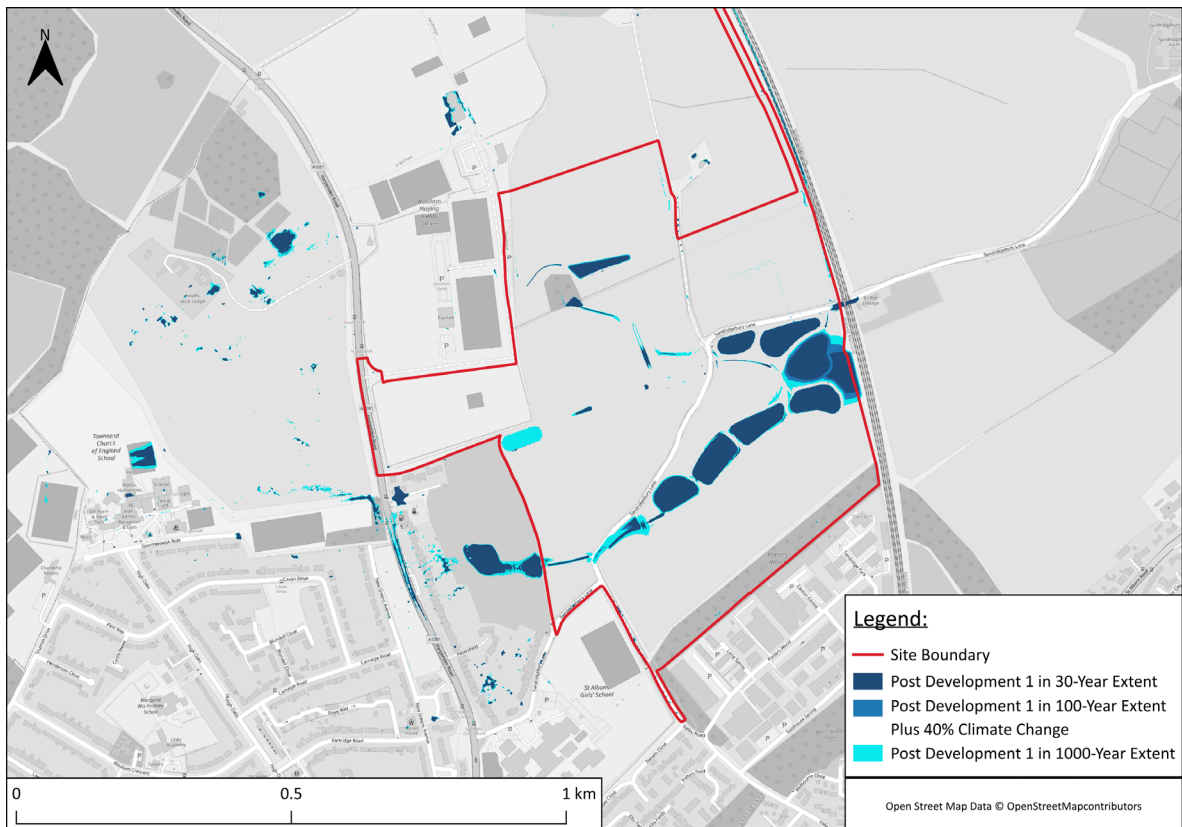


Figure 4-1 Post Development Model Flood Extents

- 4.1.3 The updated Post Development Model extents remain consistent with those previously identified in the Post Development Model as summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).
- 4.1.4 The updated Post Development Model maximum peak water levels remain largely consistent with those previously identified in the Post Development Model, as summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2), with some minor variation identified in each of the modelled events.
- 4.1.5 Table 5-1 shows a comparison of peak water levels, within the Site adjacent to the existing railway embankment, between the Post Development Model, as summarised in the supporting hydraulic



modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2) and the updated Post Development Model.

Table 4-1: Peak water levels within the Site adjacent to the existing railway embankment for the Post Development Model as summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2) and the Updated Post Development Model

	Post Development Model (mAOD)	Updated Post Development (mAOD)	Difference (mm)
1 in 30-year	103.48	103.53	+50
1 in 100-year plus climate change	104.70	104.61	-90
1 in 1,000-year	105.35	105.25	-100



5 Baseline and Updated Post Development Model Comparison

5.1 Comparison of peak water levels

- 5.1.1 Table 5-1 provides a comparison of peak water levels within the Site adjacent to the existing railway embankment between the Baseline Model and the updated Post Development Model for the 1 in 30-year, 1 in 100-year plus climate change, and 1 in 1,000-year events.

Table 5-1: Peak water levels within the Site adjacent to the existing railway embankment for the baseline and post-development scenarios

	Baseline (mAOD)	Post-development (mAOD)	Difference (mm)
1 in 30-year	104.59	103.53	-1060
1 in 100-year plus climate change	105.33	104.61	-720
1 in 1,000-year	105.61	105.25	-360

- 5.1.1 While minor variations in maximum peak water levels were identified between the Post Development Model, as summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2), and the updated Post Development Model, comparison with the Baseline Model identifies that the Proposed Development continues to generate a reduction in maximum peak water levels.

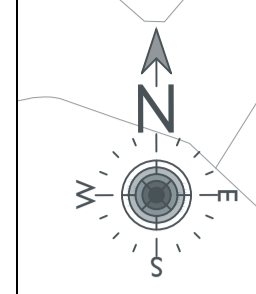
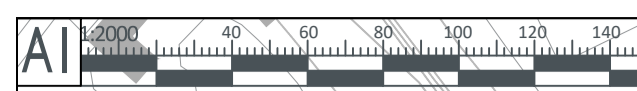


6 Conclusion

- 6.1.1 PJA was commissioned by Hallam Land Management Limited, St Albans School, and St Albans School Woollam Trust, to construct a site-specific direct rainfall hydraulic model of the Site, and upstream contributing catchment, at Woollam Park, St Albans. This work was completed in October 2025 and summarised in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).
- 6.1.2 As part of the ongoing refinement of the surface water drainage strategy, it has been identified that the earthworks associated with the proposed attenuation basins may be located within the indicative Network Rail embankment easement along the eastern boundary of the Site. Accordingly, minor adjustments to the siting of Basins D and L, shifted marginally westwards, are proposed as set out in the Surface Water Drainage Strategy (SWDS) (Ref: Surface Water Drainage Strategy, 5920-WR-A-0525-P12) and the proposed levels strategy (Ref: Indicative Proposed Levels, 05920-WR-A-0530 (P06)).
- 6.1.3 For completeness, the site-specific hydraulic model has been re-run with the updated SWDS and proposed levels to determine what, if any impact, these minor modifications may have to the findings of the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2).
- 6.1.4 The updated Post Development Model aligns with the Post Development Model as set out in the supporting hydraulic modelling report (Ref. North St Albans- Hydraulic Modelling Report, 05920-WR-HMR-01-P2). The key principles remain unchanged and have been summarised below:
- The proposed development will manage and mitigate potential surface water flooding in any event up to and including the 1 in 1,000-year.
 - The proposed surface water drainage strategy and proposed development levels redirect and manage surface water runoff within the Site via blue-green corridors, which incorporate attenuation basins and conveyance features.
 - The proposed development will generate a reduction in maximum peak water levels adjacent to the existing railway embankment, as compared to existing conditions, in all events up to and including the 1 in 1,000-year.
 - The proposed development will generate a reduction in maximum peak water depths within Sandridgebury Lane, as compared to existing conditions, in all events up to and including the 1 in 1,000-year



Appendix A Proposed Surface Water Drainage Strategy



Basin	Developable Area [ha]	Assumed Impermeable Area [ha]	Assumed Impermeable Area including 10% Urban Creep [ha]	Indicative Attenuation Volume [m ³]
Catchment A	3.35	2.65	2.84	1,785
Catchment B	2.41	1.57	1.57	1,220
Catchment C	3.46	2.59	2.78	5,115
Catchment D	3.00	2.37	2.54	2,110
Catchment E	0.62	0.63	0.66	2,165
Catchment F, I, G and J	9.63	7.10	7.48	4,145
Catchment H	1.11	1.44	1.44	4,015
Catchment K	2.42	1.87	2.01	3,010
Catchment L	0.75	0.86	0.90	5,000
Total	26.75	21.08	22.23	28,565

KEY:

- Site Boundary
- Catchment A
- Catchment B
- Catchment C
- Catchment D
- Catchment E
- Catchment F
- Catchment G
- Catchment H
- Catchment I
- Catchment J
- Catchment K
- Catchment L
- Indicative Location of Attenuation Basin with 3m maintenance strip
- Indicative Location of Infiltration Basin with 3m maintenance strip
- Location of Infiltration Testing Location IT04
- Indicative Location of Low proposed Flow Channel
- Indicative Location of proposed Conveyance Feature
- Indicative Location of proposed Headwall
- Indicative Location of Railway Line
- Indicative Easement of 21m from the Railway Line (TBC)
- Indicative Location of Proposed Surface Water Sewer
- Indicative Surface Water Flow Route
- Indicative Location of Proposed Foul Water Pumping Station with and Storage Compound
- Indicative Location of Proposed Surface Water Flow Routing Channel (0.5m deep with 1:3 side slopes)
- Indicative Location of Proposed Surface Water Swale (1.0m deep, 0.5m base width with 1:4 side slopes)
- Indicative Location of Proposed Orifice Plate
- Indicative Location of Proposed Flow Control

- NOTES**
- These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9
- This Drawing is not to be reproduced in any part or form without the consent of PJA Civil Engineering Ltd. All copyright reserved.
 - No assessment of earthworks has been undertaken at this stage.
 - No assessment of surcharged outfall has been undertaken at this stage.
 - No utilities and arbor-cultural consideration has been undertaken at this stage.
 - Drawing should be read in conjunction with all other relevant scheme drawings.
 - Drawing includes:
 - Blue Green Infrastructure Plan provided by Define in September 2025 (Drawing No: DE_565_74_REV_E).
 - Proposed Levels produced by PJA in September 2025 (Drawing no. 05920-WR-A-0530)
 - Tree Survey provided by FPCR dated December 2023 (8575-T-01)
 - An infiltration rate of 1.88x10⁻⁶m/s from location IT04 was used from the 2024 Geo Environmental Group Infiltration Testing.
 - Indicative Surface Water Drainage Strategy based on:
 - Attenuation Basin A is 1.3m deep with 1:4 side slopes (including 300mm freeboard)
 - Attenuation Basin B is 1.5m deep with 1:4 side slopes (including 300mm freeboard)
 - Attenuation Basins FIG, H, and K are 2.3m deep with platform to facilitate planting. Staged basin is 1m deep with 1:3 side slopes. From the proposed platform, the basin utilises 1:5 side slopes and is 1.3m in depth.
 - Attenuation Basins L and E are 2.3m deep with platform to facilitate planting. Staged basin is 0.8m deep with 1:3 side slopes. From the proposed platform, the basin utilises 1:5 side slopes and is 1.5m in depth.
 - Attenuation Basin C is 2.5m deep with platform to facilitate planting. Staged basin is 1m deep with 1:3 side slopes. From the proposed platform, the basin utilises 1:5 side slopes and is 1.5m in depth.
 - Attenuation Basin D is 2.4m deep with platform to facilitate planting. Staged basin is 1.4m deep with 1:4 side slopes. From the proposed platform, the basin utilises 1:5 side slopes and is 1m in depth.
 - Volume within conveyance features has not been included within the attenuation calculations at this stage.
 - Discharge limited to an infiltration rate of 1.88x10⁻⁶m/s in accordance with the Geo Environmental Group Infiltration Testing, FEH 22 Data.
 - Cv Values of 1.
 - Impermeable Area Assumptions:
 - 60% impermeable for all residential development with an additional 10% for urban creep.
 - 100% impermeable for all highways.
 - 50% impermeable for all attenuation basins.
 - 80% for mixed used development
 - 90% for commercial development.
 - Further consideration of utilities, arboricultural and ecological constraints should be undertaken prior to detailed design.
 - Indicative surface water drainage design based on masterplanning at the time of production and impermeable areas may result in changes to the drainage strategy.
 - Further ground investigation to confirm infiltration rates, seasonal groundwater levels and detail of the underlying chalk solubility is required.

- RISK ITEMS:**
- Risk Item 1: Indicative Surface Water Drainage Strategy is subject to proposed development hydraulic modelling to refine surface water flood extents across the Site.
- Risk Item 2: Indicative Surface Water Drainage Strategy is subject to a detailed earthworks and levels assessment.



REV	DATE	REVISION NOTE	BY
P12	12/09/2026	RELOCATED BASIN D & L	SF
P11	26/09/2025	REVISED MASTERPLAN	AB
P10	20/08/2025	UPDATES TO HYDRAULIC MODELLING	SF
P09	04/12/2024	UPDATING RED LINE BOUNDARY	JG
P08	04/11/2024	REVISED DRAINAGE STRATEGY	GD
P07	23/10/2024	LANDSCAPE STRATEGY UPDATED	CT
P06	16/10/2024	REVISED DRAINAGE STRATEGY	CT
P05	15/10/2024	REVISED DRAINAGE STRATEGY	CT
P04	07/10/2024	REVISED DRAINAGE STRATEGY	CT
P03	20/09/2024	REVISED DRAINAGE STRATEGY	CT
P02	19/08/2024	REVISED DRAINAGE STRATEGY	CT
P01	27/11/2023	DRAFT FOR COMMENT	GD

PJA Seven House - High Street, Longbridge, Birmingham B31 2JQ. Tel: 0121 475 0234

Birmingham - Bristol, Exeter - London - Reading, pja.co.uk

CLIENT: Hallam Land Management Limited and St Albans School

PROJECT: **Woollam Park, St Albans**

DRAWING TITLE: **Surface Water Drainage Strategy**

DRAWING ISSUE STATUS: **PLANNING**

PJA JOB No. SUB-CODE DRAWING NO. REVISION: **05920 -WR - 0525 - P12**

Revision Letter: P - Planning Approval / T - Tender / C - Construction / B - DRAWING REFERENCE

SCALE: A1@2,000 DRAWN: CT REVIEWED: AC DATE: Feb 2026



Appendix B Proposed Preliminary Site Levels



Proposed Levels designed by TGMS in drawing Ref. TGMS1284.4 3 Rev 1)

File name: C:\Users\SAMANTHA\OneDrive - PHIL JONES ASSOCIATES\05920 NORTH ST ALBANS - ENG12 - DESIGN\DRAWINGS\CURRENT\05920-WR-A-0530-006 PROPOSED LEVELS.DWG, printed on 12/02/2026 13:41:15, by Samantha Furey



CDM Note
 These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9.

- Notes**
1. Do not scale from this drawing.
 2. All Dimensions in metres unless stated otherwise.
 3. No utilities, ecological and arbor-cultural consideration.
 4. Drawing should be read in conjunction with all other relevant scheme drawings.
 5. Blue Green Infrastructure Plan provided by Define in September 2025 (Drawing No: DE_565_74_REV_E).
 6. No assessment of surface water drainage attenuation requirements have been considered within the proposed earthworks.
 7. No consideration has been made for the sports pitch earthworks.
 8. Levels are in meters (above Ordnance Datum) unless otherwise noted.
 9. The proposed level information in this drawing is indicative and has been used to inform sit specific post development hydraulic modelling only. A detailed assessment of levels will be required at the next design stage.
 10. This drawing is for information purposes only and should not be used for construction purposes. The indicative levels shown within this drawing have been produced to inform Hydraulic modelling requirements and the second iteration of a sitewide earthworks cut/fill strategy. Level information is subject to refinement and updates as more information is made available for the scheme and as the development site progresses through to detailed design.
 11. The spine road alignments within this drawing are based upon the main highway links shown within the latest masterplan referenced above.
 12. There are a series of existing Thames Water assets crossing the development site with associated easements. Depth information is required for these assets; however, indicative levels have been designed to be at existing level or above within the easement footprint of these assets.
 13. Outside the extent of earthworks boundary shown on this drawing, the levels are to remain at existing.
 14. Levels are in meters (above Ordnance Datum) unless otherwise noted.

P06	12/02/26	RELOCATED BASIN LAND D	SF	AC	AC
P05	26/09/25	REVISED MASTERPLAN	AB	SF	AC
P04	09/09/25	UPDATED TO REVISED SWDS	SF	AC	AC
P03	04/12/24	RED LINE BOUNDARY UPDATE	JIG	SF	SF
P02	22/10/24	SITE LAYOUT UPDATED	SRW		
P0	28/02/24	FIRST ISSUE	SF	AC	AC
Rev	Date	Revision Note	Drw	CHK	App

Client
Hallam Land

Project
Woollam Park, St Albans

Title
Indicative Proposed Levels

Drawing Issue Status
For Planning

PJA Ref 05920	Scale @ A1 1:2000	Date Feb 2026
Drawing No. 05920-WR-A-0530		Revision P06
Primary Contact alison.caldwell@pja.co.uk		