Non-Technical Summary – Surface Water Drainage

Introduction

1.1 Mayer Brown Ltd (MBL) have been commissioned by Persimmon Homes Thames Valley (PHTV) to produce this Non-Technical Summary (NTS) that describes the proposed surface water drainage for Phase 5 of their development at Hampton Park, under Arun DC planning reference **LU/206/21/RES,** described as follows:

> *"Approval of reserved matters following outline consent LU/47/11/ for the development of 260 No. dwellings and the construction of part of the Central Spine Road running through Hampton Park"*

1.2 The purpose of this NTS is to provide a high level overview of the proposed surface water drainage and how is works in conjunction with the adjacent future phases that will eventually form part of future planning applications. A more detailed drainage report with calculations and levels and detailed drainage plans has already accompanied the planning application.

1.3 The RM planning application for the Central Wetland Area (CWA) has not yet been submitted by PHTV. The design is significantly advanced and it is anticipated to be submitted imminently. The design as it currently stand is covered at the end of the NTS.

Hampton Park – Surface Water Drainage Overview

1.4 From a drainage perspective the outline approved masterplan (in Appendix A) can viewed as two distinct areas that is divided by the central wetlands:

- **West of Central Wetlands:** The west of central wetlands catchment covers a total area of 19 hectares that is subdivided into 18 land parcels. A large proportion of this catchment has already been constructed and the overall surface water strategy has been reviewed and approved by Arun DC.
- **South and East of Central Wetlands:** The south and east central wetlands catchment covers a total area of **24.3 hectares** that is subdivided into phases / land parcels. None of the phases / land parcels within this catchment have obtained reserved matters planning approval yet and, as such, none of it has been constructed. A breakdown of this catchment is as follows:

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- **Phase 5** – Residential for 206 dwellings **(Subject to this RM Application)**
- Central Spine Road – Approximately 1.0 kilometre of tree lined main road/main road looping from the west of wetlands through the east of wetlands residential areas, past the new school, community centre and youth centre and linking back onto Toddington Lane **(Subject of this RM Application)**
- Phases 6 & 7 Residential, number of dwelling tbc (future applications)
- Community Centre, Primary School, Youth Centre (future applications)

Outline Approved Surface Water Strategy (2011)

1.5 Greencore obtained outlined planning consent for the scheme in 2011 and the approved drainage strategy from 2011 is contained in Appendix A. This is a high level drawing identifying a central swale (dark blue dashed line) that forms a distinct break running though the centre of the overall development. This central collection swale is in similar location as the central wetland area.

1.6 This central swale is fed by secondary swales from within the development parcels. The secondary swales are also shown to discharge into the wetland area to the north using the existing ditch network. There is also an attenuation pond connected to the head of the central swale that is formed by partially filling in an existing lake.

Updated Surface Water Strategy (2021)

1.7 The updated surface water strategy **retains the principles** set out in the outlined approved drainage strategy by keeping the swales and pond in similar locations. Refer to the strategy drawing in Appendix B.

1.8 This strategy covers a total area of approximately 24.3 hectares that has been progressed/engineered significantly where swale dimensions, bed levels, top of bank levels have all been established. The proposed ground levels in the development parcels have been engineered to ensure their drainage networks feed on a gravity basis into swales the swales in turn feed into the central wetlands, northern wetland or proposed new lake to the east.

1.9 A micro drainage model for the entire interconnecting network of swales and pipes has been created to ensure the required volume of attenuation is accurately calculated. The modelled

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network in Phase 5 and the central spine road has been modelled accurately to reflect the drainage runs on the submitted RM drawings. It is a very large model and the micro drainage pipe numbers are shown on the overall drainage plan in Appendix B.

Catchments & Outfall Locations

1.10 The 24.3 hectares is divided into 4 catchments that are identified on the overall drainage strategy drawing in Appendix B. Each catchment has a corresponding separate outfall into the central wetland area.

- There are 4 primary outfalls discharging into the central wetland area. Most of the surface water run-off discharges via these 4 outfalls
- There are 3 secondary outfalls along the northern boundary to enable the swale network and attenuation pond to drain down. The discharge rates from these outfalls are very low because we are pushing as much water as possible to the south into the central wetland area. The reason for pushing most of the flow towards the central wetland area is to maintain a flow of water this area and to also increase the travel distance before it reaches the Black Ditch that helps with improved water quality

Phase 5 and Central Spine Road Surface Water Drainage

1.11 The entire south and east of central wetlands drainage network had to be designed because this reserved matters area for Phase 5 and the Central Spine Road is spread across all 4 drainage catchments. Refer to appendix C that shows the RM application boundary within the overall catchment.

1.12 Detailed drainage plans for the phase 5 residential area and the central spine road are not included in this NTS but have accompanied the application in the more detailed drainage report.

Attenuation Structures

1.13 Most of the surface water attenuation is achieved in the proposed swales. In total there are seven swales across the network and their typical cross sections are shown on a drawing in Appendix D. The Development parcels and their respective swales are all set higher than the central and northern wetland, which enables them to discharge/empty into the wetland outfalls without being affected by the 1in100yr flood level of 1.83 AOD.

1.14 There is an attenuation pond to the east that will be created by partially filling in an existing lake.

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1.15 There is a proprietary attenuation tank in the car park of the Community Centre site.

1.16 The approximate volumes are as follows:

- Swale 01 - 07 Combined Attenuation Volume 10,000m3.
- Attenuation Pond (existing lake partially filled in): Attenuation Volume 7,220m3.
- Attenuation Tank: Attenuation Volume 190m3.

Catchment Discharge Rates

1.17 The peak rate of surface water discharge for up to the 1 in 100 year return period + 30% climate change will be restricted to 15 litres / second / hectare. The proposed total combined discharge from the 4 catchments will not exceed **364 litres/second** (15 litre/sec/hectare x 24.27 hectares) for up all storm events up to the 1in100 year return period plus 30% climate change.

1.18 The proposed discharge rate from each catchment is not proportional to the areas it drains. For example, catchment 01 with a catchment area of 0.533 hectares, is not restricted to a peak discharge of 8 litres/sec (based upon 15 litres/sec/hectare). This is because a very large volume of attenuation within the swale network and attenuation pond of catchment 03 (total volume of approximately 15,000m3) so the plan is to sub-divide / distribute proposed outfall rates that will enable Catchment 01 & 02 to have a free unrestricted discharge and remove/reduce the volumes of below ground proprietary attenuation tanks. The total combined discharge across the entire network still **will not exceed 364 litres / second.**

Adoption and Maintenance

1.19 The proposed surface water drainage below ground network up to and including the pre-cast concrete headwalls into the swales will be offered for adoption to ICOSA Water under a S104 agreement, which will ensure they are maintained in perpetuity.

1.20 The swales and attenuation pond will be maintained by a management company organised by the applicant.

Exceedence Flows

1.21 The entire drainage network drainage network is designed to cope with all rainfall events up to the 1in100yr return period+30%CC and this water will be contained on site within the developed area (not the wetlands).

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1.22 The ground and road levels have been engineered so they fall either towards a swale or outwards towards the wetlands away from the new dwellings. The proposed overall drainage plan in Appendix B show the proposed levels and the route of overland flow in the event of system failure, blockage or overload.

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Central Wetland Area (CWA)

1.24 The RM planning application for the Central Wetland Area (CWA) has not yet been submitted by PHTV. The design is significantly advanced and it is anticipated to be submitted imminently.

1.23 MBL have progressed the civils, levels and drainage to a sufficient standard to inform the CWA application. A ground model of the proposed work has been generated in 3D Civils that has enabled the bulk earthworks volumes, cross sections, long sections and proposed contours to be created.

1.24 The CWA information contained in Appendix F of this report contains the following work in progress drawings (anticipated to undergo very minor further alterations).

- Proposed Drainage & Levels General Arrangement Plan
- Construction Treatments Plan: Showing new footpaths, new swales, lowered ground levels, embankments, tree protection platforms and cross sections locations
- Proposed Footpaths longitudinal sections and chainages
- Typical Cross Sections for footpath, swales and development platform embankments
- Drawing showing sections and details of Northern crossing and Bebo Arch.
- Bulk Earthworks Isopachyte Heights: Showing area of cut and fill and associated level difference between finished surface and existing ground.
- Bulk Earthworks cross sections: Showing cross sections through the CWA

CWA Levels

1.25 The new development platforms are extending into the wetland areas to the north and the CWA. Therefore, the ground levels within the CWA will be lowered where possible to facilitate a flood compensation balance.

1.26 The proposed levels headlines are as follows:

- The ground levels will mostly be lowered to a constant level of 1.38m AOD, apart from root protection areas where the existing levels will be retained
- There are proposed shared 3m wide shared asphalt pathways crossing the CWAs. These drop from the higher development platforms down into the CWA at gradients no steeper than 1in20 where they level off through the CWA

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- Most of the shared pathways are no lower than 2.1m AOD, which is approximately 300mm above the predicted 1in100yr flood level.
- It is necessary for footpath 03 to the north to be lower than 2.1m AOD, otherwise it would form a barrier to floodwater form the black ditch passing back up into the CWA. In the rare event that this footpath become inundated that are numerous alternative roads and footpath to the south that will enable the CWA to be crossed.
- The earthworks embankments from the development platforms, footpaths and northern crossing down into the CWA are generally 1in3 (or shallower)

CWA Drainage

1.27 The CWA drainage is formed creating a new primary collection swale running from the proposed Outfall 03 to the south to the final connection point to the north, which is an existing tributary of the black ditch. (This new swale is represented by the blue dashed line as shown on the outlined approved drainage strategy described in paragraph 1.5.

1.28 The new primary swale picks up secondary swales that convey the surface water from outfalls 01, 02, 04 and Phase 4.

1.29 The proposed drainage headlines are as follows:

- Black Ditch to the north is very flat and the water is generally 1.0m AOD. The new primary swale will not have a longitudinal fall and laid completely flat.
- The swales are shallow with a bed level 1.0m AOD and top of bank level of 1.38m. They are 3m wide in total with a 1m wide bed
- The swales open into lagoons/pools as shown on the drainage plans
- There will be oversized culverts (2m wide x x1m deep) to allow water to pass under the shared footpaths, and also enable flood water to flood back up into the CWA.
- There is no surface water attenuation proposed in the CWA. It will act as a conduit to collect the run-off from the new outfalls from the adjacent development platforms and safely convey it to the Black Ditch to the north

Author: SF

Date: 21st September 2021

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APPENDIX A: Outline Application: Illustrative Masterplan & Surface Water Strategy

COMMUNITY CENTRE
EDUCATION
YOUTH FACILITY
Toddington
Pond
Pond
Drain
Footbridge
Black Ditch
Foot Bridge
Drain
Drain
Drain

TODDINGTON PARK, LITTLEHAMPTON

DO NOT SCALE; CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

NOTES:

1. LEVELS TO BE ESTABLISHED DURING DETAILED DESIGN
2. EXISTING DITCH AND DRAIN INFORMATION TAKEN FROM ENVIRONMENT AGENCY RIVER ARUN CATCHMENT DRAWING NO. 7 DATED DEC 2003
3. PERMEABLE PAVING AND BELOW GROUND GEOCELLULAR STORAGE TO BE IMPLEMENTED IN ALL AREAS OF DEVELOPMENT WHERE POSSIBLE
4. SOAKAWAYS AND INFILTRATION METHODS TO BE IMPLEMENTED WHERE GROUND CONDITIONS AND TOPOGRAPHY ALLOW
5. PIPED DRAINAGE SYSTEMS MAY BE REQUIRED TO SUPPLEMENT OPEN WATER FEATURES
6. NO SURFACE WATER ATTENUATION WILL BE LOCATED WITHIN AREA OF FLOODPLAIN
7. MASTERPLAN INFORMATION TAKEN FROM JTP DRAWING SK202A DATED DEC 2010
8. ESTIMATE OF TOTAL ATTENUATION REQUIRED FOR DEVELOPMENT IS 15,564m³

REV	DESCRIPTION	BY	CHK	APP	DATE
A	MASTERPLAN UPDATED	JP	JP	CT	10/02/11

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LAND AT
NORTH LITTLEHAMPTON

Drawing Title:

PROPOSED SURFACE WATER MANAGEMENT PLAN

Scale @ A4	Drawn	Date	Checked	Date	Approved	Date
NTS	JP	24-11-2009	CT	24-11-2009	CT	24-11-2009

Project No.	Office	Type	Drawing No.	Revision
A044029	35	12	SK04	A

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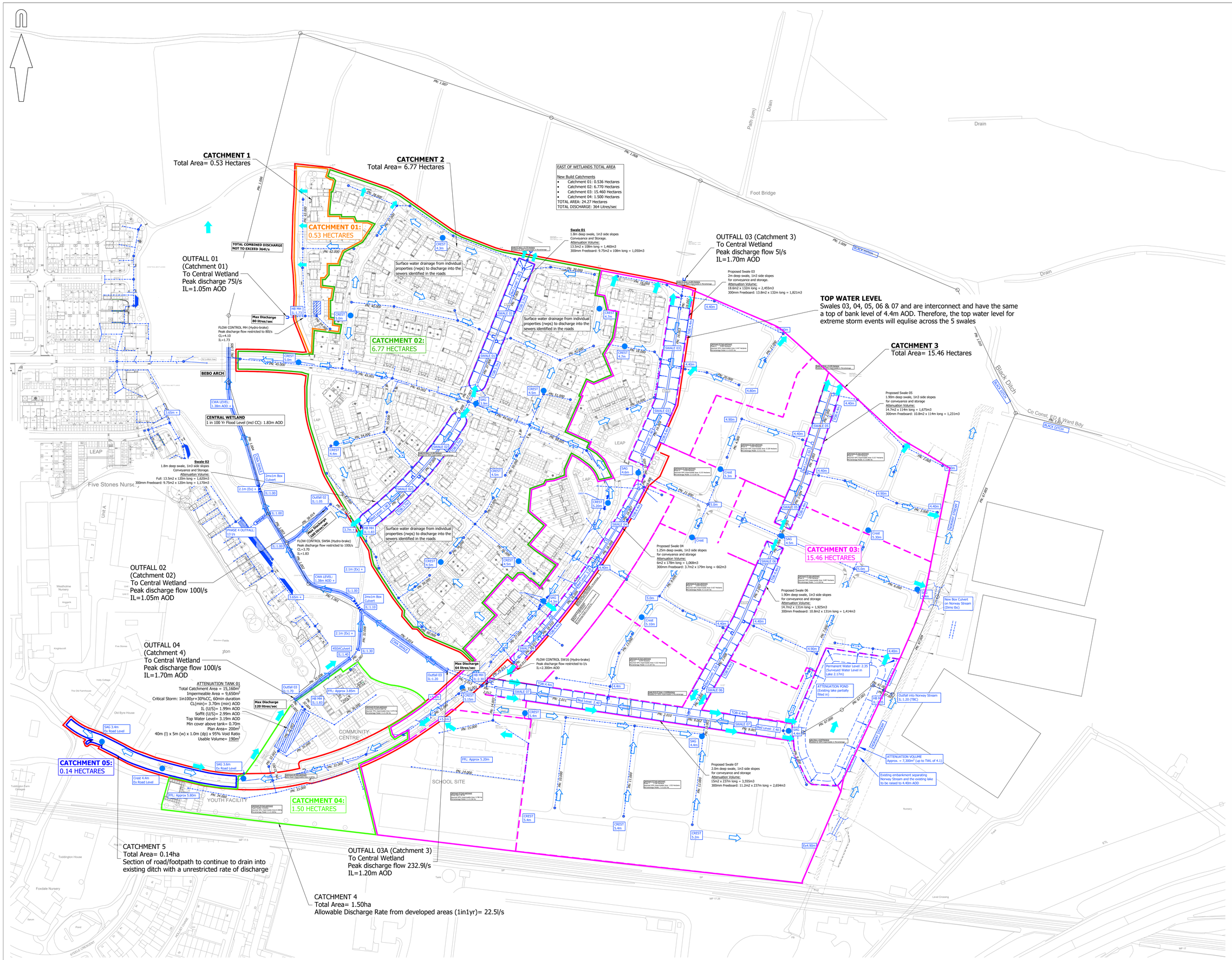
PROPOSED INDICATIVE SURFACE WATER MANAGEMENT PLAN

NOT TO SCALE

KEY

- EXISTING DRAINAGE DITCH TO BE RETAINED
- PROPOSED 'CENTRAL' SWALE DISCHARGING TO BLACK DITCH
- PROPOSED 'SECONDARY' SWALE
- PROPOSED AREA TO BE DRAINED VIA 'WESTERN' SWALE
- PROPOSED BALANCING POND

APPENDIX B: South & East Central Wetlands Drainage Strategy



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SURFACE WATER KEY:

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED SURFACE WATER SWALE
- PROPOSED SURFACE WATER ATTENUATION TANK
- PROPOSED PERMEABLE PAVING
- DIRECTIONAL FLOW/FALL OF PROPOSED SURFACE WATER AND ROADS
- INDICATIVE EXCEEDANCE FLOW ROUTE
- CATCHMENT BOUNDARY
- SUB CATCHMENT BOUNDARY
- PN: XX.XXX — MICRODRAINAGE PIPE NUMBER LABELS
- PHASE 5 AND MAIN AVENUE BOUNDARY

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rev.	amendment	checked	date
P1	Initial Issue. (TC)	SF	21/06/2021

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project
NORTH LITTLEHAMPTON
MAIN AVENUE & PARCELS EAST OF WETLANDS

scale	drawn by	checked by
1:1000	TC	SF

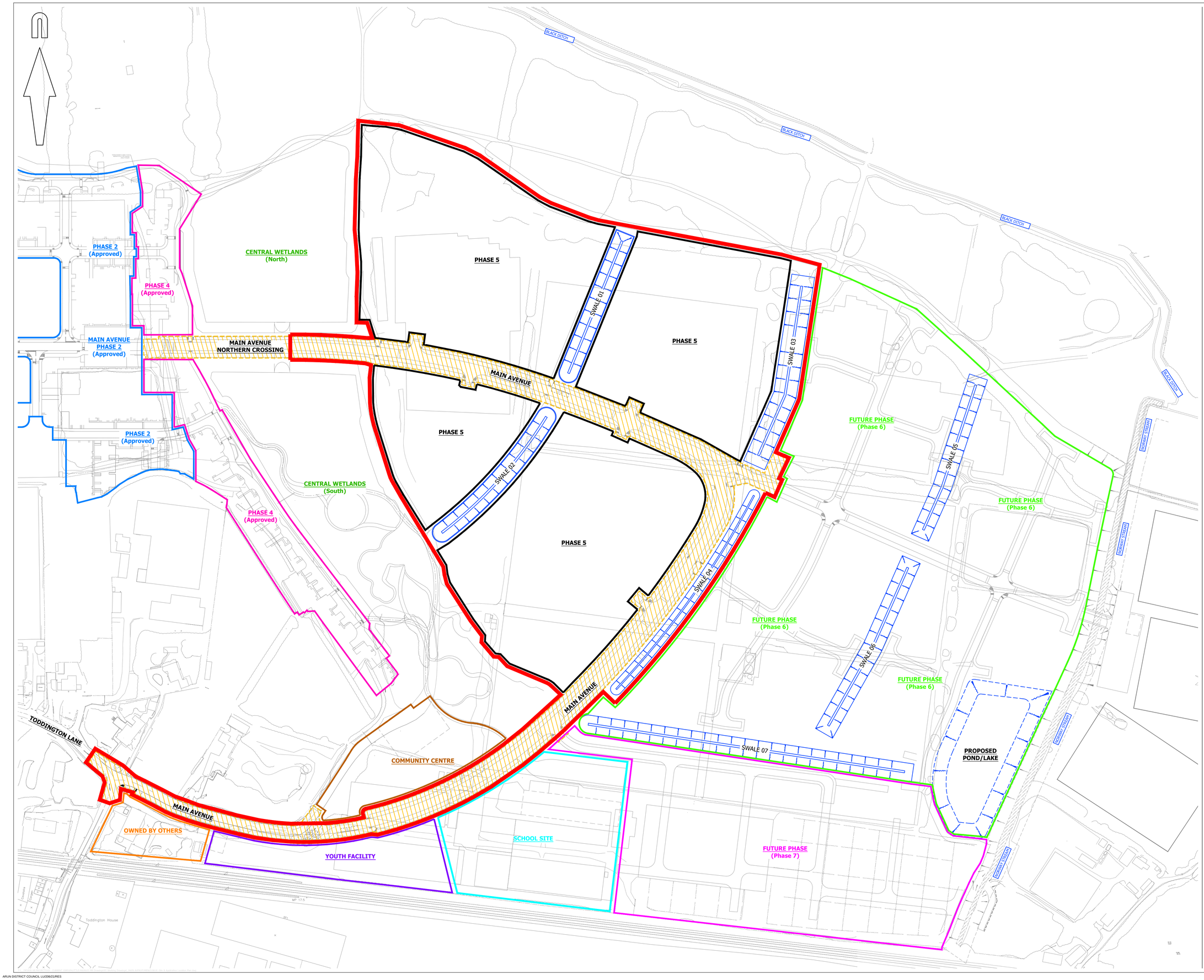
date	cad file
JUNE 2021	01.DWG

title
MAIN AVENUE & EAST OF WETLANDS
SURFACE WATER DRAINAGE STRATEGY

Mayer Brown Limited jobcode	suitability	revision
A/PHLITTLE-MAIN.10		P1

drawing number
A/PHLITTLE-MAIN.1/01

APPENDIX C: Phase 5 & Main Avenue Location



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KEY:

PROPOSED PHASE 5 AND MAIN AVENUE APPLICATION BOUNDARY

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P1	Initial Issue. (TC)	SF	21/06/2021

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MAIN AVENUE & NORTHERN CROSSING

scale	drawn by	checked by
1:1250	TC	SF

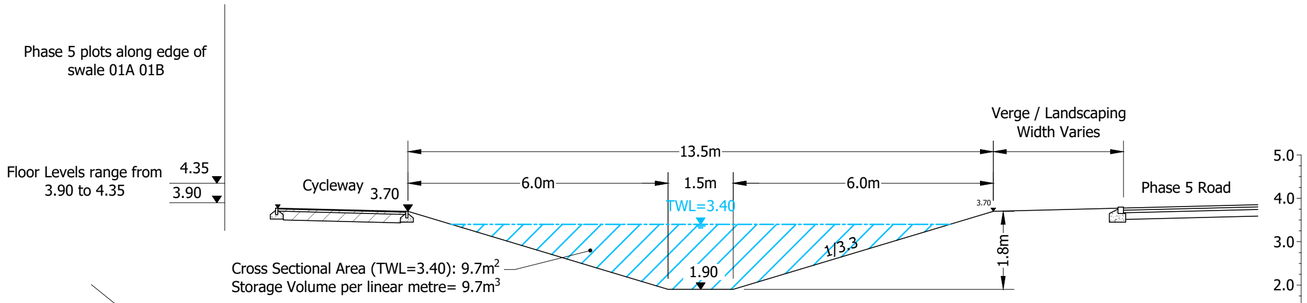
date	cad file
JUNE 2021	MBSK210618.DWG

title
PHASE 5 & MAIN AVENUE LOCATION PLAN

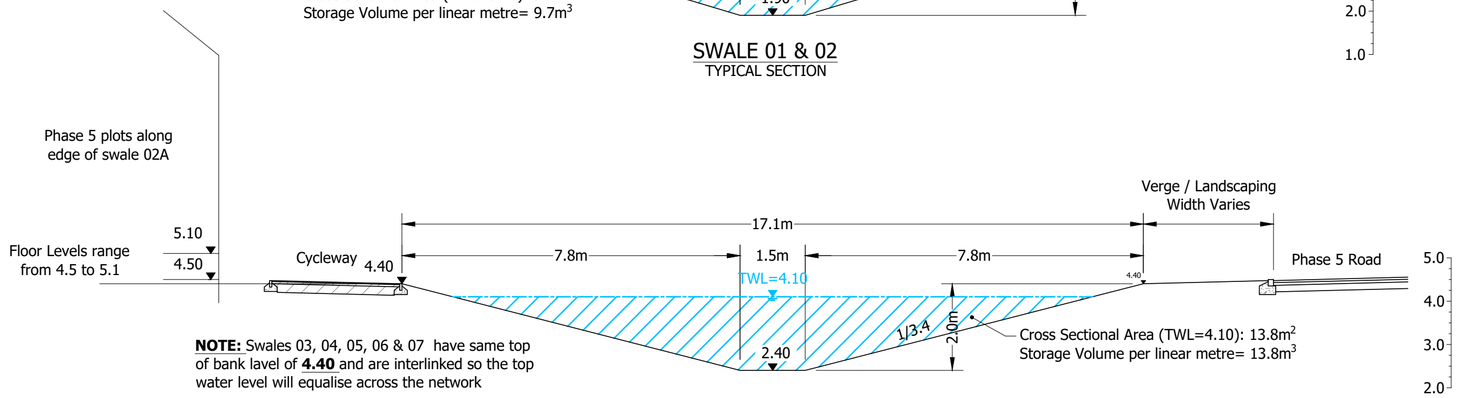
Mayer Brown Limited jobcode	suitability	revision
	-	P1

drawing number
MBSK210621

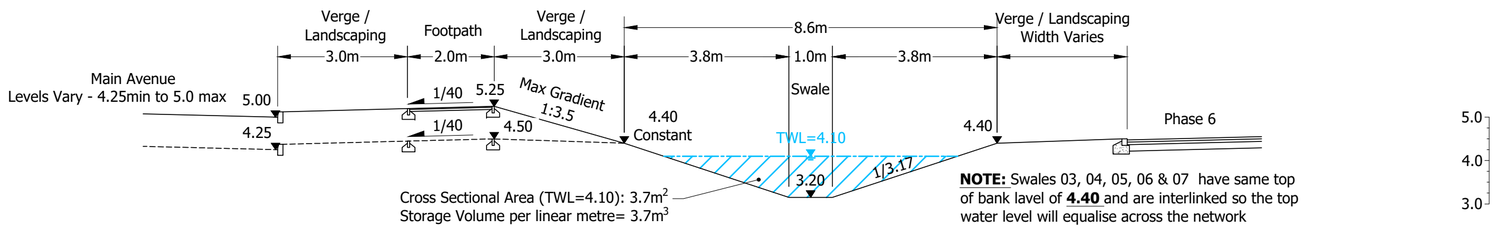
APPENDIX D: Typical Swale Sections



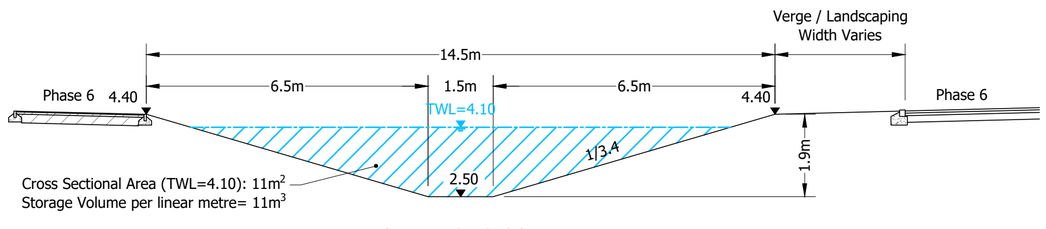
SWALE 01 & 02
TYPICAL SECTION



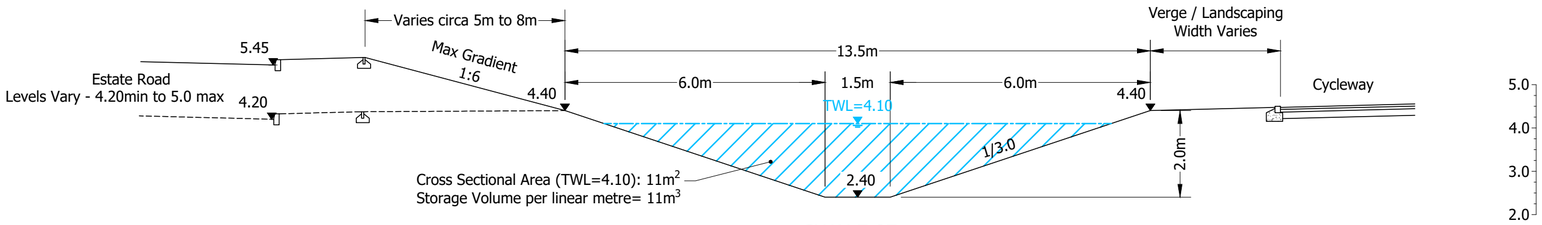
SWALE 03
TYPICAL SECTION



SWALE 04
TYPICAL SECTION



SWALE 05 & 06
TYPICAL SECTION



SWALE 07
TYPICAL SECTION

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NOTES:

1. This drawing is not to be scaled.
2. Levels are in metres above Ordnance Datum.
3. This drawing is to be read in conjunction with the following Mayer Brown drawing references:
   - A/PHLITTLE-MAIN.1/10 series - General Arrangement Drawing
   - A/PHLITTLE-MAIN.1/30 series - Construction Treatments Drawing
   - A/PHLITTLE-MAIN.1/40 - Proposed Main Avenue Setting out String
   - A/PHLITTLE-MAIN.1/41 - Proposed Main Avenue Longitudinal Sections
   - MB/C/01 - Roads and Pavement Construction Details

FOR TENDER
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EAST OF WETLANDS
MAIN AVENUE & NORTHERN CROSSING

scale	drawn by	checked by
1:100 @ A2	IC	SF

date	cad file
JUNE 2021	MBF01.DWG

title
PROPOSED SWALE TYPICAL CROSS SECTIONS

Mayer Brown Limited jobcode	suitability	revision
	-	T1

drawing number
MB/F/01

APPENDIX E: Central Wetland Area (WIP Drawings)