

Project Title
London Road, Teynham,
Kent

Report Title
Reserved Matters and
Discharge of Conditions
Technical Note

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Prepared For
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EXECUTIVE SUMMARY

- I. This Technical Note has been produced in support of the Reserved Matters / Discharge of Condition Application for discharging of the below listed Conditions of the Swale Borough Council Outline Planning Permission 16/507689/OUT for the development including up to 300 dwellings, sports ground (including pavilion/changing rooms); open space (including allotments and community orchard); access, including new link road and roundabout on A2; other vehicular / pedestrian / cycle accesses (including alterations to Frognal Lane); reserve site for health centre; and associated parking and servicing areas, landscaping, wildlife areas, swales and other drainage / surface water storage areas, and related development for the for the on Land Between Frognal Lane And Orchard View, Lower Road, Teynham, Kent, ME9 9TU.
 - Condition 7
 - Condition 10
 - Condition 11
 - Condition 12
 - Condition 13
 - Condition 24
 - Condition 32
 - Condition 33

- II. This Technical Note is to be read in conjunction with all planning, architectural and other reports that accompany the Planning Application for the proposed development.

1.0 CONDITION 7

Outline Planning Condition

1.1 Condition 7 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'The details submitted pursuant to condition (1) above shall include cross-sectional drawings through the site, of the existing and proposed site levels. The development shall then be completed strictly in accordance with the approved levels.'

Reason: In order to secure a satisfactory form of development having regard to the nature of the site.'

Summary of Information Submitted for Discharge of Condition 8

1.2 Cross-sectional drawings through the site, of the existing and proposed site are detailed on the following drawings which are included within the Application Pack:

- CON608-3907 - Residential Site Levels Sections Key Plan
- CON608-3908 to CON608-3923 - Residential Site Levels Sections (16 Sheets)
- CON608-3900 - Open Space Levels Sections Key Plan
- CON608-3901 to CON608-3906 - Open Space Levels Sections (6 Sheets)
- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)

2.0 CONDITION 10

Outline Planning Condition

2.1 Condition 10 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'Prior to the commencement of the development hereby approved full details of the method of disposal of surface waters as part of a detailed drainage strategy (including measures to prevent runoff on to public highways) shall be submitted to and approved in writing by the Local Planning Authority. This drainage strategy should be based on Sustainable Urban Drainage Systems (SUDS) principles - incorporating features designed to enhance biodiversity where possible - and shall be based on the recommendations of the Flood Risk Assessment October 2016 prepared by WSP, project reference 70021028 and shall demonstrate that both the rate and volume of run-off leaving the site post-development will be limited to 7 litres / second / metre squared. No building shall be occupied until details of the implementation, maintenance and management of the SUDS relating to such building have been submitted to and approved in writing by the Local Planning Authority and thereafter the scheme shall be implemented, managed and maintained in accordance with the approved details. Such details shall include:

- 1) a timetable for its implementation*
- 2) a management and a maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public or statutory undertaker, or any other arrangements to secure the operation of the SUDS throughout its lifetime.*

Reason: To ensure that the principles of sustainable drainage are incorporated into this proposal and to ensure ongoing efficacy of the drainage provisions.'

Summary of Information Submitted for Discharge of Condition 10

Design Criteria

- 2.2 The surface water design has been undertaken in compliance with the principles of the Flood Risk Assessment (October 2016) prepared by WSP with Project Reference 70021028 approved as part of the Outline Application and with reference to Kent County Council's (KCC) Drainage and Planning Policy - a Local Flood Risk Management Strategy Document (September 2019), The SuDS Manual C753, Sewerage Sector Guidance and recognised best practice.
- 2.3 All surface water drainage systems have been designed to attenuate all storm events up to and including the critical 1 in 100 year storm with a 45% allowance for climate change. The design for exceedance events has been accommodated within the attenuation systems to ensure that all surface water is retained on site.

- 2.4 CIRIA report C753 The SuDS Manual-v6 provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.
- 2.5 For surface water discharge, the drainage hierarchy notes the following list of drainage options in order of preference:
- 1) Infiltration to ground
 - 2) Discharge to a watercourse
 - 3) Discharge to a surface water sewer
 - 4) Discharge to a foul water sewer
- 2.6 In accordance with the Drainage Hierarchy preference and CIRIA SuDS C753 infiltration to ground is proposed for the whole site and the design has been based upon infiltration rates determined by testing completed by WSP in August 2016.
- 2.7 Requirements of Table 26.2 of CIRIA SuDS Manual have been achieved to ensure water quality requirements are met across the site.
- 2.8 Infiltration rates used within the calculations are based on the lowest recorded rates within the area of each system.
- Existing Drainage
- 2.9 The Application Site comprises of an approximate gross area of 20.42 ha. The developed site comprise 5.9ha of impermeable area.
- 2.10 A site walkover survey, initially undertaken in 2023 did not identify a surface water drainage system servicing the existing outbuilding adjacent to the existing football pitch the remaining area of the site is currently a permeable field with no positive surface water drainage.
- 2.11 The Environment Agency has confirmed that there are no watercourses within 500m of the site and Southern Water's Sewer Records do not show any surface water sewers in the area.
- 2.12 Surface water runoff generated by the Application Site currently drains via a combination of infiltration to the underlying soil and natural overland runoff.
- 2.13 Ground levels fall from the south-east to north-west. The topographical survey indicates that the highest point is 17.0mAOD and the lowest point is 8.3mAOD.

2.14 As the Proposed Development area is less than 50 ha, the Institute of Hydrology (IoH) Report 124 Flood Estimation for Small Catchments (1994) method has been used to estimate the Greenfield site peak flow rate, which is an approved methodology specified within the Environment Agency’s Rainfall Runoff Management for Developments Report.

2.15 Table 2.1 below displays the ICP SuDS Parameters used to estimate the Greenfield Run-off Rates for the existing development site.

Parameter	Value
SAAR	640mm
Soil Class	3
Region	7
Urban	0

Table 2.1: ICP SuDS Parameters

2.16 Table 2.2 below summarises the estimated existing Greenfield Discharge Rates for 1 ha of the developable area, the Application Site as a whole; 20.42ha and the proposed developable impermeable area of the site; 5.9ha.

Total Site Area (ha)	Developable Area (ha)	Return Period (Year)	Peak Greenfield Discharge Rate (l/s/ha)	Application Site – 5.9ha Discharge Rate (l/s)
20.42	5.9	QBar	2.6	15.34
		Q1	2.2	12.98
		Q30	6.0	35.4
		Q100	8.3	48.97

Table 2.2: Summary of Greenfield Discharge Rates

Site Investigation, Geology and Groundwater

2.17 British Geological Survey (BGS) maps indicate that the site is situated on Thanet Formation (Sand, Silt and Clay) and Seaford Chalk Formation. Superficial deposits are comprised of Head - Clay and Silt.

2.18 WSP produced an Infiltration Testing Report in August 2016.

2.19 The fieldwork was undertaken in general accordance with BRE Digest 365 ‘Soakaway Design’ and was undertaken on 12th and 13th July 2016.

2.20 Four trial pits (TP102, TP103, TP104 and TP105) were excavated for the soil infiltration tests. The number, location and depth of the pits were agreed with the Client.

2.21 Ground conditions typically encountered during the investigation comprised Topsoil overlying Head Deposits. Thanet Sands were encountered underlying the Head Deposits to the north and east of the site (TP102 and TP103) and Seaford Chalk Formation to the south of the site (TP104 and TP105).

2.22 Table 2.3 below displays a summary of ground conditions for the development site.

Stratum Description	Depth to Base of Strata (mbgl)	Thickness (m)
Top Soil	0.20 - 0.50	0.20 - 0.50
Head Deposits	0.30 - 0.90	0.40 - 0.50
Thanet Formation	(2.00 - 2.40)	(1.70 - 1.80)
Seaford Chalk Formation	(1.50 - 2.05)	(1.00 - 1.05)

() = Depth of Stratum Unproven

Table 2.3: Summary of Ground Conditions (TP102 - TP105)

2.23 The geology is described as follows:

- Topsoil - Typically comprised dark brown slightly clayey sand with occasional rootlets.
- Head Deposits - Firm dark grey clay.
- Thanet Formation - Encountered at TP102 and TP103 and typically comprised brown clayey silty sand.
- Seaford Chalk Formation - Encountered at TP104 and TP105 and typically comprised fine to coarse sandy clayey gravel. Gravel was recorded as fine to coarse angular to rounded flint with a low flint cobble content.

2.24 Groundwater strikes were not encountered during the trial pit investigation. Based on BGS borehole records, the infiltration tests were designed to maintain at least a 1 m unsaturated zone between base of trial pit and groundwater level as recommended by BRE Digest 365.

2.25 Table 2.4 below displays a summary of infiltration rates which were recorded during the testing undertaken.

Test Location	Test No.	Depth (m)	Infiltration Rate (m/s)	Stratum	Comments
TP102	1	2.4	8.4×10^{-6}	Thanet Sands	BRE Compliant
	2		3.7×10^{-6}		
TP104	1	2.05	2.1×10^{-4}	Seaford Chalk Formation	BRE Compliant
	2		2.3×10^{-4}		
	3		3.1×10^{-4}		
TP105	1	1.5	1.0×10^{-3}	Seaford Chalk Formation	BRE Compliant
	2		1.7×10^{-3}		
	3		1.5×10^{-3}		

Table 2.4: Summary of Infiltration Rates

2.26 It should be noted that due to access constraints, infiltrations tests were not undertaken at TP103.

2.27 Results of the testing confirm infiltration rates of between 3.7×10^{-6} m/s and 1.7×10^{-3} m/s.

2.28 A full copy of the WSP Infiltration Testing Report has been included within the Application Pack.

Overview of the Detailed Surface Water Drainage Design

2.29 Surface water drainage for the development is provided by 4 separate systems.

2.30 System 1 provides drainage for the proposed roundabout and first section of the proposed access road (S38), System 2 provides drainage for the remaining section of the access road and whole residential site, System 3 provides drainage for the sports pitches and System 4 provides drainage for the allotment / Health Centre access road and parking.

2.31 All four systems drain surface water via infiltration to ground.

2.32 Each system works independently of the other and provides adequate storage to accommodate the 1 in 100 year storm event plus 45% to account for future climate change.

Modelling Criteria

2.33 The FSR rainfall methodology data has been used within the calculations.

2.34 Runoff Coefficient Values (CV) of 0.75 (summer) and 0.85 (winter) have been used for summer and winter storms respectively within the analysis.

- 2.35 A Time of Entry of 5 minutes and a Maximum Time of Concentration of 30 minutes has been applied to each system.
- 2.36 Each system is designed to have a minimum self-cleansing velocity of 0.75m/s within all surface water pipework.
- 2.37 Table 25.2 of the SuDS manual, seen below, suggests factors of safety for infiltration systems based on the area they drain. Each system is considered to have a Consequence of Failure Rating of Minor such that failure would cause minor damage to external areas or inconvenience. Each system serves over 1000m² therefore in accordance with Table 25.2 a factor of safety of 5 has been applied to all calculations.

TABLE 25.2 Suggested factors of safety, F, for use in hydraulic design of infiltration systems (designed using Bettess (1996). Note: not relevant for BRE method)

Size of area to be drained	Consequences of failure		
	No damage or inconvenience	Minor damage to external areas or inconvenience (eg surface water on car parking)	Damage to buildings or structures, or major inconvenience (eg flooding of roads)
< 100 m ²	1.5	2	10
100–1000 m ²	1.5	3	10
> 1000 m ²	1.5	5	10

- 2.38 The infiltration rate used within the surface water calculations is based on the lowest rate recorded within TP104, the nearest test location to the infiltrating structures.

Highway Drainage

- 2.39 All surface water runoff from the highways, driveways and parking areas is intercepted by gullies.

Swales

- 2.40 No.2 swales serve the main site access road (S38). The swales are proposed purely for surface water conveyance purposes to the proposed infiltration basins and to provide water quality treatment to the runoff they receive. Infiltration is not permitted through the base or sides of the swales and an impermeable membrane is proposed to line the base and sides of the swale.
- 2.41 The design of the swales is in accordance with the KCC standard detail KCC/HTW/500/034 (Standard Swale).

- 2.42 The swales have been designed with a 1m wide base and varies between a minimum depth of 0.3m to a maximum depth of 1.2m. The side slopes of the swales have been designed with a 1:4 side slope.
- 2.43 No.2 swales are proposed to serve the sports pitches, pitch carpark and sports pavilion. The swales are located to the west and north of the pitches.
- 2.44 The swales are proposed to intercept surface water runoff which does not infiltrate through the surface of the grass pitches. The pitches have been designed to fall towards these SuDS features.
- 2.45 The swales will also serve pitch carpark and pavilion building where a piped network will discharge into the swales.
- 2.46 Infiltration is not permitted through the base or sides of the western swale due to the close proximity of the adjacent proposed highway. An impermeable membrane is proposed to line the base and sides of the western swale.
- 2.47 The western swale has been designed in accordance with the KCC standard detail KCC/HTW/500/034 (Enhanced Swale).
- 2.48 The western swale has been designed with a 1m wide base and has a depth of 0.6m. The side slopes of the swales have been designed with a 1:4 side slope.
- 2.49 The western swale will be linked to the northern swale to allow flows from the pitches, pitch carpark and pavilion to discharge into the northern swale.
- 2.50 The northern swale will allow infiltration to ground. Surface water from the pitches, pitch carpark and pavilion will infiltrate to ground in this location through the base and sides of the swale.
- 2.51 The northern swale has been designed in accordance with the KCC standard detail KCC/HTW/500/034 (Enhanced Swale).
- 2.52 The northern swale has been designed with a 2m wide base and varies between a minimum depth of 0.4m to a maximum depth of 1.0m. The side slopes of the swales have been designed with a 1:4 side slope.
- 2.53 All swales will be faced with turf / seed / topsoil as per the KCC Making It Happen Design Guide – Landscaping.

SuDS Basin

- 2.54 A SuDS Basin feature (Basin A) is proposed to the north of Plots 1 - 7. This feature provides the first stage of water quality improvement to runoff within System 2 which is generated by the residential area of the site.
- 2.55 Basin A is 1.7m deep and has been designed with a flat base. The basin has side slopes between 1:3 and 1:4. Rock filled gabion baskets will be used to create the northern bank of Basin A. Basin A links to Basin B via No.2 450mm pipes crossing beneath Frogal Lane to the west.
- 2.56 Basin A will be unfenced.
- 2.57 Infiltration is not permitted through the base or sides of the Basin A. An impermeable membrane is proposed to line the base and sides of the Basin A.

Infiltration Basins

- 2.58 The surface water system includes No.2 infiltration basins. Basin C serves the proposed roundabout and first section of the access road with Basin B serving the remaining area of access road and the residential development site.
- 2.59 Basin C is 1.2m deep and has been designed with a flat base. The basin has side slopes between 1:5 and 1:10.
- 2.60 The invert level of Basin C is 10.3mAOD with a maximum water level of Basin C is 10.677mAOD which equates to a maximum water depth of 0.377m.
- 2.61 Basin B is 2.6m deep and has been designed with a flat base. The basin has side slopes between 1:4 and 1:16.
- 2.62 The invert level of Basin B is 6.93mAOD with a maximum water level of Basin C is 7.922mAOD which equates to a maximum water depth of 0.922m.
- 2.63 A maintenance track has been provided 0.85m above the base of the basin, which is located above the 1:100 year water level.
- 2.64 The infiltration basins will be unfenced.
- 2.65 The infiltration basins will be lined with a permeable geotextile to allow surface water to infiltrate to ground.

2.66 The basins have been designed to accommodate the 1 in 10 year water level beneath the invert of the lowest incoming pipe therefore not compromising maintenance of the outfall structure.

Inlet Filter Drains

- 2.67 The design includes an inlet filter drains utilised for water quality on the inlet to the infiltration basins. The filter drain will provide gravel scour protection within a minimum 600mm deep trench filled with granular material 10-63mm stone with 30% voids. The inlet filter drain will also be planted with plants suitable for Rain Gardens to provide an additional silt interceptor and some absorption.

Proposed Overland Flow Route

- 2.68 The proposed overland flow route, should an exceedance event occur due to a blocked system, will drain towards the proposed SuDS features.

Impermeable Areas

- 2.69 The total impermeable area of the site is approximately 5.9ha.
- 2.70 As per Kent County Council's requirements an additional 10 percent impermeable area to account for Urban Creep has been included for the dwellings within the calculations where appropriate.
- 2.71 A copy of the Proposed Impermeable Areas Plan detailing proposed impermeable areas which drain to each system has been included within the Application Pack.

Water Quality

- 2.72 The proposed development is for residential use. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is between very low and medium depending on the use / area of the site.
- 2.73 The surface water scheme includes mitigation to ensure that surface water is suitably treated and any pollution risk adequately managed prior to discharge to ground.
- 2.74 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the development proposals are as follows:

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park, low-traffic roads (below 300 movements)	Low	0.5	0.4	0.4
Non-residential car parking with infrequent change (e.g. school)	Low	0.5	0.4	0.4
Non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads, trunk roads and motorways	Medium	0.7	0.6	0.7

Table 2.5: Pollution Hazard Indices

2.75 The following water quality features are included within the overall surface water design. Pollution Mitigation Indices for each SuDS component are as follows:

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Infiltration basin	0.5	0.5	0.6
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300mm in depth	0.4	0.3	0.3
Soakaway with 300mm minimum depth underlying soil drainage media	0.4	0.4	0.4

Table 2.6: Pollution Mitigation Indices

2.76 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered by 50% due to reduced performance associated with primary treatment.

System 1

- 2.77 System 1 provides drainage for the proposed roundabout and first section of the proposed access road (S38 area).
- 2.78 System 1 drains surface water to ground via the infiltration Basin C and is located within the western open space area to the west of Frogal Lane and serves 8,390m² of impermeable area.
- 2.79 Surface water from the access road and roundabout drains via road gullies into a conveyance / water quality swale to the south of the access road before being discharged into Basin C.
- 2.80 An allowance has been made within the design to serve two additional areas of the existing highway on the A10 to the east and west of the proposed roundabout where the existing highway gullies are serving a larger contributory area than preferred. To accommodate these additional areas several additional gullies has been included with the design to provide a betterment to the existing highway drainage system. Run-off from these additional gullies drains to the new System 1 and will reduce flood risk for the area compared to the existing arrangement,
- 2.81 To provide sufficient storage to accommodate the 1 in 100-year storm event plus 45% to account for climate change including a minimum of 300mm freeboard an infiltration basin with a minimum depth of 1.148m and surface area of 3,127m² is proposed This structure has a half drain time of 104 minutes (1.73 hours) for the 1:100+45 storm event.
- 2.82 The base of the infiltration basin is situated 1.3mbgl within the infiltration strata confirmed by the testing.
- 2.83 The Pollution Hazard Indices for the area drained by this system is Medium Risk. The proposed use of a swale, an inlet filter drain and infiltration basin with a layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth will meet the target treatment level required for runoff.

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Primary – Swale (100%)	0.5	0.6	0.6
Secondary - Filter drain (50%)	0.2	0.2	0.2
Secondary - Infiltration basin (50%)	0.25	0.25	0.3
Secondary - A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth (50%)	0.3	0.25	0.3
Target Level of Treatment Required (Medium Risk)	0.7	0.6	0.7
Total Treatment Provision	1.25	1.3	1.5

Table 2.7: System 1 - Pollution Mitigation Indices

System 2

- 2.84 System 2 provides drainage for the remaining section of the access road (S38 area) and the whole residential site.
- 2.85 System 2 drains surface water to ground via the infiltration Basin B located within the western open space area to the west of Frogal Lane and serves 5.06ha of impermeable area.
- 2.86 Surface water from the remaining section of access road drains via road gullies into a conveyance / water quality swale to the south of the access road before being discharged into Basin B. Surface water runoff from the residential development drains via Basin A to the north of Plots 1 -7 into Basin B.
- 2.87 To provide sufficient storage to accommodate the 1 in 100-year storm event plus 45% to account for climate change including a minimum of 300mm freeboard an infiltration basin with a minimum depth of 2.35m and surface area of 9,740m² is proposed. This structure has a half drain time of 564 minutes (9.4 hours).
- 2.88 The base of the infiltration basin is situated 4.0mbgl within the infiltration strata confirmed by the testing.
- 2.89 The Pollution Hazard Indices for the area drained by this system is Medium Risk. The proposed use of a SuDS basin, an inlet filter drain and infiltration basin with a layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth will meet the target treatment level required for runoff.

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Primary – Infiltration basin (100%)	0.5	0.5	0.6
Secondary - Filter drain (50%)	0.2	0.2	0.2
Secondary - Infiltration basin (50%)	0.25	0.25	0.3
Secondary - A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth (50%)	0.3	0.25	0.3
Target Level of Treatment Required (Medium Risk)	0.7	0.6	0.7
Total Treatment Provision	1.25	1.2	1.4

Table 2.8: System 2 – Minimum Pollution Mitigation Indices

System 3

- 2.90 System 3 provides drainage for the sports pitches, pitch carpark and sports pavilion.
- 2.91 System 3 drains surface water to ground via an infiltration swale along the northern edge of the sports pitches serves 1,550m² of impermeable area together with 2.5ha of permeable grass pitch.
- 2.92 The permeable area of the sports pitches will drain to ground as per the existing situation with System 3 only providing drainage for the sorts pitches should an exceedance event occurs which causes overland flows from the permeable area of the pitches.
- 2.93 The infiltration swale is proposed to intercept surface water runoff which does not infiltrate through the surface of the grass pitches. The pitches have been designed to fall towards these SuDS features. The infiltration swale also serves the pitch carpark and pavilion building where a piped network will discharge into the swale.
- 2.94 To provide sufficient storage to accommodate runoff from the 1 in 100 year storm event plus 45% to account for climate change generated by the Sport Pavilion and pitch carpark and to also act as land drainage for any exceedance from the sports pitches a 40m long enhanced infiltration swale 1m wide by 1.25m deep filled with 30% voided stone beneath the swale is proposed which provides a minimum of 15m³ of storage. This structure has a half drain time of 144 minutes (2.4 hours).
- 2.95 The base of the infiltration trench is situated 1.65mbgl within the infiltration strata confirmed by the testing.

2.96 The Pollution Hazard Indices for the area drained by this system is Low Risk. The proposed use of a swale with a minimum of 300mm minimum depth underlying soil drainage media will meet the target treatment level required for runoff.

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Primary – Swale (100%)	0.5	0.6	0.6
Secondary - A 300mm minimum depth underlying soil drainage media (50%)	0.2	0.2	0.2
Target Level of Treatment Required (Low Risk)	0.5	0.4	0.4
Total Treatment Provision	0.7	0.8	0.8

Table 2.9: System 3 –Pollution Mitigation Indices

System 4

2.97 System 4 provides drainage for the allotment / Health Centre access road and parking.

2.98 System 4 drains surface water to ground via a crate soakaway within the open space area to the north of the allotments and serves 710m² of impermeable area.

2.99 To provide sufficient storage to accommodate the 1 in 100-year storm event plus 45% to account for climate change a crate soakaway with minimum dimensions of 3m wide x 6.5m long x 2.0m deep (5 crates) is proposed which provides a minimum of 37m³ of storage. This structure has a half drain time of 140minutes (2.3 hours).

2.100 The base of the crate soakaway is situated 3mbgl within the infiltration strata.

2.101 The Pollution Hazard Indices for the area drained by this system is Low Risk. The proposed use of a swale with a minimum of 300mm minimum depth underlying soil drainage media will meet the target treatment level required for runoff.

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Primary - Filter drain (100%)	0.4	0.4	0.4
Secondary - A soakaway with a 300mm minimum depth underlying soil drainage media (50%)	0.2	0.2	0.2
Target Level of Treatment Required (Low Risk)	0.5	0.4	0.4
Total Treatment Provision	0.6	0.6	0.6

Table 2.10: System 4 –Pollution Mitigation Indices

Summary of Information Submitted for Discharge of Condition 10

2.102 Information to discharge Condition 10 is listed below and included within the Application Pack:

- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)
- CON608-3885 to CON608-3886 - Site Wide Proposed Drainage (2 Sheets)
- CON608-3887 - Site Wide Drainage Manhole Schedules
- CON608-3888 - Site Wide Drainage Catchment Plan
- CON608-3891 to CON608-3899 - Site Wide Drainage Construction Details (9 Sheets)
- CON608-3925 - Basin A Levels Sections
- CON608-3926 - Basin B Levels Sections
- CON608-3927 - Basin C Levels Sections
- CON608-3708 - S38-278 Site Access Roundabout Levels Contours Plan
- CON608-3711 - S38-278 Site Access Roundabout Drainage
- CON608-3712 to CON608-3717 - S38-278 Site Access Road & Roundabout Construction Details (6 Sheets)
- CON608-3718 to CON608-3719 - S38-278 Site Access Roundabout Gully Catchment Plan (1 of 2)
- CON608-3730 to CON608-3731- S38-278 Site Access Road Levels Contours Plan (2 Sheets)
- CON608-3739 to CON608-3740 - S38-278 Site Access Road Gully Catchment Plan (2 Sheets)
- CON608-3737 to CON608-3738 - S38-278 Site Access Road Drainage (2 Sheets)
- KCC-HTW-500-001 Rev 0
- KCC-HTW-500-039 Rev 0
- KCC-HTW-500-051 Rev 0
- CON608-3862 to 3863 - S38-278 Overall Highway Drainage Contribution Areas (2 Sheets)

2.103 A copy of the Causeway Flow calculations for each of the surface water systems has been included within the Application Pack.

2.104 A copy of the timetable for the SuDS system to be implemented has been included within the Application Pack

2.105 CON608-3889 Entire Site Drainage Plan - Phasing & Timeline detailing the phasing and timetable for the implementation of the SuDS system has been included within the Application Pack.

2.106 A copy of the drainage management and a maintenance plan for the lifetime of the development which has been included within the Application Pack.

3.0 CONDITION 11

Outline Planning Condition

3.1 Condition 11 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'Layout details submitted pursuant to Condition (1) shall demonstrate that requirements for the surface water drainage strategy can be accommodated within the proposed development layout.'

'Reason: To ensure that the principles of sustainable drainage are incorporated into this proposal and to ensure ongoing efficacy of the drainage provisions.'

Summary of Information Submitted for Discharge of Condition 11

3.2 Information to discharge Condition 11 is listed below and included within the Application Pack:

- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)
- CON608-3885 to CON608-3886 - Site Wide Proposed Drainage (2 Sheets)
- CON608-3887 - Site Wide Drainage Manhole Schedules
- CON608-3888 - Site Wide Drainage Catchment Plan
- CON608-3891 to CON608-3899 - Site Wide Drainage Construction Details (9 Sheets)
- CON608-3925 - Basin A Levels Sections
- CON608-3926 - Basin B Levels Sections
- CON608-3927 - Basin C Levels Sections
- CON608-3708 - S38-278 Site Access Roundabout Levels Contours Plan
- CON608-3711 - S38-278 Site Access Roundabout Drainage
- CON608-3712 to CON608-3717 - S38-278 Site Access Road & Roundabout Construction Details (6 Sheets)
- CON608-3718 to CON608-3719 - S38-278 Site Access Roundabout Gully Catchment Plan (1 of 2)
- CON608-3730 to CON608-3731- S38-278 Site Access Road Levels Contours Plan (2 Sheets)
- CON608-3739 to CON608-3740 - S38-278 Site Access Road Gully Catchment Plan (2 Sheets)
- CON608-3737 to CON608-3738 - S38-278 Site Access Road Drainage (2 Sheets)
- CON608-3862 to 3863 - S38-278 Overall Highway Drainage Contribution Areas (2 Sheets)

3.3 A copy of the Causeway Flow calculations for each of the surface water systems has been included within the Application Pack.

4.0 CONDITION 12

Outline Planning Condition

- 4.1 Condition 12 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'No development shall take place until a detailed design for the attenuation basins has been submitted to and approved in writing by the Local Planning Authority. The attenuation basins shall be designed with appropriate side slopes, such that they may be unfenced for free recreational access and provide an area of permanent water to provide biodiversity enhancements. The detailed design shall include, but not be limited to details of all outfall structures, cross-sections, and landscaping specifications within the ponds and surrounds.

Reason: To ensure that the principles of sustainable drainage are incorporated into this proposal and to ensure ongoing efficacy of the drainage provisions.'

Summary of Information Submitted for Discharge of Condition 12

- 4.2 Information to discharge Condition 12 is listed below and included within the Application Pack:
- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)
 - CON608-3885 to CON608-3886 - Site Wide Proposed Drainage (2 Sheets)
 - CON608-3887 - Site Wide Drainage Manhole Schedules
 - CON608-3888 - Site Wide Drainage Catchment Plan
 - CON608-3891 to CON608-3899 - Site Wide Drainage Construction Details (9 Sheets)
 - CON608-3925 - Basin A Levels Sections
 - CON608-3926 - Basin B Levels Sections
 - CON608-3927 - Basin C Levels Sections
 - KCC-HTW-500-001 Rev 0
 - KCC-HTW-500-039 Rev 0
 - KCC-HTW-500-051 Rev 0
 - CON608-3862 to 3863 - S38-278 Overall Highway Drainage Contribution Areas (2 Sheets)
- 4.3 A copy of the Causeway Flow calculations for each of the surface water systems has been included within the Application Pack.
- 4.4 The following External Works and Landscaping Plans have also been included within the Application Pack:
- Illustrative Masterplan - 3136-APA-ZZ-00-LA-L-1001
 - POS General Arrangements Plan 1 of 3 - 3136-APA-ZZ-00-LA-L-1002
 - POS General Arrangements Plan 2 of 3 - 3136-APA-ZZ-00-LA-L-1003
 - POS General Arrangements Plan 3 of 3 - 3136-APA-ZZ-00-LA-L-1004
 - Residential Area General Arrangements Plan 1 of 7 - 3136-APA-ZZ-00-LA-L-1005

- Residential Area General Arrangements Plan 2 of 7 - 3136-APA-ZZ-00-LA-L-1006
- Residential Area General Arrangements Plan 3 of 7 - 3136-APA-ZZ-00-LA-L-1007
- Residential Area General Arrangements Plan 4 of 7 - 3136-APA-ZZ-00-LA-L-1008
- Residential Area General Arrangements Plan 5 of 7 - 3136-APA-ZZ-00-LA-L-1009
- Residential Area General Arrangement Plan 6 of 7 - 3136-APA-ZZ-00-LA-L-1010
- Residential Area General Arrangements Plan 7 of 7 - 3136-APA-ZZ-00-LA-L-1011
- Planting Plan: Legend & Horticultural Notes - 3136-APA-ZZ-00-PP-L-2000
- POS Planting Plan 1 of 9 - 3136-APA-ZZ-00-PP-L-2001
- POS Planting Plan 2 of 9 - 3136-APA-ZZ-00-PP-L-2002
- POS Planting Plan 3 of 9 - 3136-APA-ZZ-00-PP-L-2003
- POS Planting Plan 4 of 9 - 3136-APA-ZZ-00-PP-L-2004
- POS Planting Plan 5 of 9 - 3136-APA-ZZ-00-PP-L-2005
- POS Planting Plan 6 of 9 - 3136-APA-ZZ-00-PP-L-2006
- POS Planting Plan 7 of 9 - 3136-APA-ZZ-00-PP-L-2007
- POS Planting Plan 8 of 9 - 3136-APA-ZZ-00-PP-L-2008
- POS Planting Plan 9 of 9 - 3136-APA-ZZ-00-PP-L-2009
- Residential Area Planting Plan 1 of 7 - 3136-APA-ZZ-00-PP-L-2010
- Residential Area Planting Plan 2 of 7 - 3136-APA-ZZ-00-PP-L-2011
- Residential Area Planting Plan 3 of 7 - 3136-APA-ZZ-00-PP-L-2012
- Residential Area Planting Plan 4 of 7 - 3136-APA-ZZ-00-PP-L-2013
- Residential Area Planting Plan 5 of 7 - 3136-APA-ZZ-00-PP-L-2014
- Residential Area Planting Plan 6 of 7 - 3136-APA-ZZ-00-PP-L-2015
- Residential Area Planting Plan 7 of 7 - 3136-APA-ZZ-00-PP-L-2016
- POS Planting Schedule - 3136-APA-ZZ-00-PS-L-4201
- Residential Area Planting Schedule - 3136-APA-ZZ-00-PS-L-4202
- Landscape Design Statement - 3136-APA-ZZ-00-DS-L-4001
- Landscape Management Plan - 3136-APA-ZZ-00-MP-L-4300

5.0 CONDITION 13

Outline Planning Condition

5.1 Condition 13 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'The development shall not begin until a Drainage Management Plan for the surface water drainage scheme has been submitted to and approved in writing by the Local Planning Authority which demonstrates the provision of a drainage network to serve the development. The DMP shall include:

- 1) a phasing plan which shall also indicate and provide details of any temporary works associated with the construction of the surface water drainage system*
- 2) a timetable for its implementation and*
- 3) management and maintenance arrangements for the lifetime of the development including arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage system throughout its lifetime. Such management and maintenance arrangements shall include details of the following:*
 - a) design criteria;*
 - b) management techniques*
 - c) maintenance schedules and frequency of operations, whether regular, occasional, remedial or monitoring action*
 - d) health and safety matters*
 - e) timescales for the replacement of any elements to ensure operation*
 - f) public access issues*

The Plan shall be implemented and thereafter managed and maintained in accordance with the approved details.

Reason: To ensure that the principles of sustainable drainage are incorporated into this proposal and to ensure ongoing efficacy of the drainage provisions.'

Summary of Information Submitted for Discharge of Condition 13

5.2 The following drawings and documents are relevant to this condition and are included within the Application Pack:

- CON608-3885 to CON608-3886 - Site Wide Proposed Drainage (2 Sheets)
- CON608-3887 - Site Wide Drainage Manhole Schedules
- CON608-3888 - Site Wide Drainage Catchment Plan

- CON608-3891 to CON608-3899 - Site Wide Drainage Construction Details (9 Sheets)
 - CON608-3711 - S38-278 Site Access Roundabout Drainage
 - CON608-3712 to CON608-3717 - S38-278 Site Access Road & Roundabout Construction Details (6 Sheets)
 - Sheets)
 - CON608-3737 to CON608-3738 - S38-278 Site Access Road Drainage (2 Sheets)
 - CON608/001/002 - Drainage Maintenance Strategy Report#
 - CON608-3862 to 3863 - S38-278 Overall Highway Drainage Contribution Areas (2 Sheets)
- 5.3 CON608-3889 Entire Site Drainage Plan - Phasing & Timeline detailing the phasing and timetable for the implementation of the SuDS system has been included within the Application Pack.

6.0 CONDITION 24

Outline Planning Condition

6.1 Condition 24 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

'The proposed estate roads, footways, footpaths, verges, junctions, street lighting, retaining walls, service routes, vehicle overhang margins, embankments, visibility splays, accesses, carriageway gradients, drive gradients, and street furniture in any phase of development shall be constructed and laid out in accordance with details to be submitted and approved by the Local Planning Authority in writing before their construction begins. For this purpose, plans and sections, indicating as appropriate, the design, layout, levels, gradients, materials and method of construction shall be submitted to the Local Planning Authority.'

Reason: To ensure that the roads are laid out and constructed in a satisfactory manner.'

Summary of Information Submitted for Discharge of Condition 24

6.2 The following drawings detail the estate roads, footways, footpaths, verges, junctions, street lighting, retaining walls, service routes, vehicle overhang margins, embankments, visibility splays, accesses, carriageway gradients, drive gradients, and street furniture together with plans and sections, indicating as appropriate, the design, layout, levels, gradients, materials and method of construction and are included within the Application Pack:

- CON608-3700 - S38-278 Site Access Roundabout General Arrangement
- CON608-3701 to CON608-3702 - S38-278 Site Access Roundabout Swept Paths (2 Sheets)
- CON608-3703 - S38-278 Site Access Roundabout Entry Path, Curvature and Deflection
- CON608-3704 - S38-278 Site Access Roundabout Sections Key Plan
- CON608-3705 to CON608-3706 - S38-278 Site Access Roundabout Long-sections (2 Sheets)
- CON608-3707 - S38-278 Site Access Roundabout Cross-sections
- CON608-3708 - S38-278 Site Access Roundabout Levels Contours Plan
- CON608-3710 - S38-278 Site Access Roundabout Pavement Plan
- CON608-3712 to CON608-3717 - S38-278 Site Access Road & Roundabout Construction Details (6 Sheets)
- CON608-3720 to CON608-3721 - S38-278 Site Access Road General Arrangement (2 Sheets)
- CON608-3722 - S38-278 Site Access Road Swept Paths
- CON608-3723 to CON608-3724 - S38-278 Site Access Road Sections Key Plan (2 Sheets)
- CON608-3725 to CON608-3727 - S38-278 Site Access Road Long-sections (3 Sheets)
- CON608-3728 - S38-278 Site Access Road Cross-sections
- CON608-3730 to CON608-3731 - S38-278 Site Access Road Levels Contours Plan (2 Sheets 2)

- CON608-3734 to CON608-3735 - S38-278 Site Access Road Pavement Plan (2 Sheets)
- CON608-3770 - S278 Site Access off Frogmal Lane General Arrangement
- CON608-3771 - S278 Site Access off Frogmal Lane Swept Paths
- CON608-3772 - S278 Site Access off Frogmal Lane Sections
- CON608-3773 - S278 Site Access off Frogmal Lane Levels Contours and Gully Catchment
- CON608-3774 - S278 Site Access off Frogmal Lane Pavement Plan
- CON608-3776 to CON608-3777 - S278 Site Access off Frogmal Lane Construction Details (2 Sheets)
- CON608-3865 - Residential Site Visibility Splays
- CON608-3866 to CON608-3869 - Residential Site Swept Path Analysis (4 Sheets)
- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)
- CON608-3907 - Residential Site Levels Sections Key Plan
- CON608-3908 to CON608-3923 - Residential Site Levels Sections (16 Sheets)
- CON608-3900 - Open Space Levels Sections Key Plan
- CON608-3901 to CON608-3906 - Open Space Levels Sections (6 Sheets)
- CON608-3930 to CON608-3932 - Residential Site Road Construction Details (3 Sheets)
- 3-1-5-1 KCC 2600 005A

6.3 The following Street Lighting information is included within the Application Pack:

- Teynham Onsite Lighting Report 20-06-23
- Teynham Onsite Lighting Drawing 20-06-23

6.4 The following External Works and Landscaping Plans have also been included within the Application Pack:

- Illustrative Masterplan - 3136-APA-ZZ-00-LA-L-1001
- POS General Arrangements Plan 1 of 3 - 3136-APA-ZZ-00-LA-L-1002
- POS General Arrangements Plan 2 of 3 - 3136-APA-ZZ-00-LA-L-1003
- POS General Arrangements Plan 3 of 3 - 3136-APA-ZZ-00-LA-L-1004
- Residential Area General Arrangements Plan 1 of 7 - 3136-APA-ZZ-00-LA-L-1005
- Residential Area General Arrangements Plan 2 of 7 - 3136-APA-ZZ-00-LA-L-1006
- Residential Area General Arrangements Plan 3 of 7 - 3136-APA-ZZ-00-LA-L-1007
- Residential Area General Arrangements Plan 4 of 7 - 3136-APA-ZZ-00-LA-L-1008
- Residential Area General Arrangements Plan 5 of 7 - 3136-APA-ZZ-00-LA-L-1009
- Residential Area General Arrangement Plan 6 of 7 - 3136-APA-ZZ-00-LA-L-1010
- Residential Area General Arrangements Plan 7 of 7 - 3136-APA-ZZ-00-LA-L-1011
- Planting Plan: Legend & Horticultural Notes - 3136-APA-ZZ-00-PP-L-2000
- POS Planting Plan 1 of 9 - 3136-APA-ZZ-00-PP-L-2001
- POS Planting Plan 2 of 9 - 3136-APA-ZZ-00-PP-L-2002
- POS Planting Plan 3 of 9 - 3136-APA-ZZ-00-PP-L-2003
- POS Planting Plan 4 of 9 - 3136-APA-ZZ-00-PP-L-2004
- POS Planting Plan 5 of 9 - 3136-APA-ZZ-00-PP-L-2005
- POS Planting Plan 6 of 9 - 3136-APA-ZZ-00-PP-L-2006
- POS Planting Plan 7 of 9 - 3136-APA-ZZ-00-PP-L-2007
- POS Planting Plan 8 of 9 - 3136-APA-ZZ-00-PP-L-2008
- POS Planting Plan 9 of 9 - 3136-APA-ZZ-00-PP-L-2009
- Residential Area Planting Plan 1 of 7 - 3136-APA-ZZ-00-PP-L-2010

- Residential Area Planting Plan 2 of 7 - 3136-APA-ZZ-00-PP-L-2011
- Residential Area Planting Plan 3 of 7 - 3136-APA-ZZ-00-PP-L-2012
- Residential Area Planting Plan 4 of 7 - 3136-APA-ZZ-00-PP-L-2013
- Residential Area Planting Plan 5 of 7 - 3136-APA-ZZ-00-PP-L-2014
- Residential Area Planting Plan 6 of 7 - 3136-APA-ZZ-00-PP-L-2015
- Residential Area Planting Plan 7 of 7 - 3136-APA-ZZ-00-PP-L-2016
- POS Planting Schedule - 3136-APA-ZZ-00-PS-L-4201
- Residential Area Planting Schedule - 3136-APA-ZZ-00-PS-L-4202
- Landscape Design Statement - 3136-APA-ZZ-00-DS-L-4001
- Landscape Management Plan - 3136-APA-ZZ-00-MP-L-4300

7.0 CONDITION 32

Outline Planning Condition

7.1 Condition 32 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

7.2 *'Details relating to the upgrade of the existing public rights of way (known as ZR247 and ZR256) within the site shall be submitted to, and approved in writing by, the Local Planning Authority before the development is commenced and works shall be implemented in accordance with the agreed details and a timetable that shall have been agreed in writing with the Local Planning Authority before the development is commenced.*

Reason: In the interests of highway and pedestrian safety and convenience.'

Summary of Information Submitted for Discharge of Condition 32

7.3 The following drawing contain details relating to the upgrade of the existing public rights of way known as ZR247 and ZR256 and is included within the Application Pack:

- CON608-3850 - Proposed PROW General Arrangement

8.0 CONDITION 33

Outline Planning Condition

- 8.1 Condition 33 of the Swale Borough Council Outline Planning Permission 16/507689/OUT states:

‘Construction of any sub-phase of the development hereby approved shall not commence until details of the proposed means of foul drainage for that sub-phase have been submitted to and approved in writing by the Local Planning Authority. Development shall be carried out fully in accordance with those approved details and shall thereafter be retained.

Reason: In the interests of achieving an acceptable scheme of foul drainage and in the interests of minimising flood risk and ground water contamination.’

Existing Drainage

- 8.2 There is an existing Southern Water Pipe Size 225mm diameter foul sewer located to the west of the site beneath Frogmal Lane which flows south to north. There is also a Southern Water 225mm diameter foul sewer located to the east of the site beneath the existing Public Right of Way (PROW) south to north.

Overview of the Detailed Foul Water Drainage Design

- 8.3 Foul water drainage for the development is provided by 1 system.
- 8.4 Foul water is proposed to drain via gravity to a Type 3 adoptable pumping station located to the west of the proposed sports pitches.
- 8.5 Foul water will then be pumped to a new manhole upstream of the existing Southern Water 225mm diameter public foul sewer located on Frogmal Lane where it will fall via gravity into the existing sewer.
- 8.6 The Design and Construction Guidance clause D5.5.3 notes that for foul pumping stations serving less than 500 dwellings, as a minimum, the storage should equate to 160 litres per dwelling.
- 8.7 Therefore the required emergency storage is estimated to be 48m³.

- 8.8 The Design and Construction Guidance document allows storage within any upstream public sewers and public lateral drains and associated manholes and inspection chambers above high-level alarm and up to the upstream end of the lowest public lateral drain as detailed in clause D5.5.2a.
- 8.9 Plot 3 and 4 have the lowest FFL on-site (9.825m AOD). Therefore, the lowest upstream IL of the lateral drain is assumed to be 8.500m AOD. As such a maximum storage level of 8.500m AOD has been used in the design of emergency storage.
- 8.10 Below is breakdown of the wet well and inlet manhole have been sized as 3000mm and 1800mm diameter accordingly.
- Upstream manholes F8, F9, F10, F11, F12, F29, F30, F31 provide circa 18.8m³
 - Wet well (2400mm dia) provides circa 25m³
 - Inlet manhole (1200mm dia) provides circa 6.3m³
- 8.11 Approval for this connection will be sought via a Section 106 with Southern Water.
- 8.12 Southern Water have an obligation to upgrade the existing network if a connection to an equivalent or larger sized public sewer is technically achievable.

Summary of Information Submitted for Discharge of Condition 33

- 8.13 The following drawings contain details of the proposed means of foul drainage and are included within the Application Pack:
- CON608-3880 to CON608-3881 - Site Wide Proposed External Levels (2 Sheets)
 - CON608-3885 to CON608-3886 - Site Wide Proposed Drainage (2 Sheets)
 - CON608-3887 - Site Wide Drainage Manhole Schedules
 - CON608-3891 to CON608-3899 - Site Wide Drainage Construction Details (9 Sheets)