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Technical Note

Site 1 – Lytchett Matravers, Dorset

Highways, Flood Risk, Drainage and Utilities Technical Note

Project No.	0657
Revision	B
Date	27 October 2017
Client	Wyatt Homes
Prepared	T Ball / A Hanks
Checked	C Yalden / A Wozniczko
Authorised	I Awcock
File Ref.	P:\0657 Purbeck promotion sites for Wyatt\C Documents\Reports\0657 Site 1 (Purbeck Promotion Sites)- Highways, Flood Risk, Drainage and Utilities - Technical Note.docx

1 Introduction

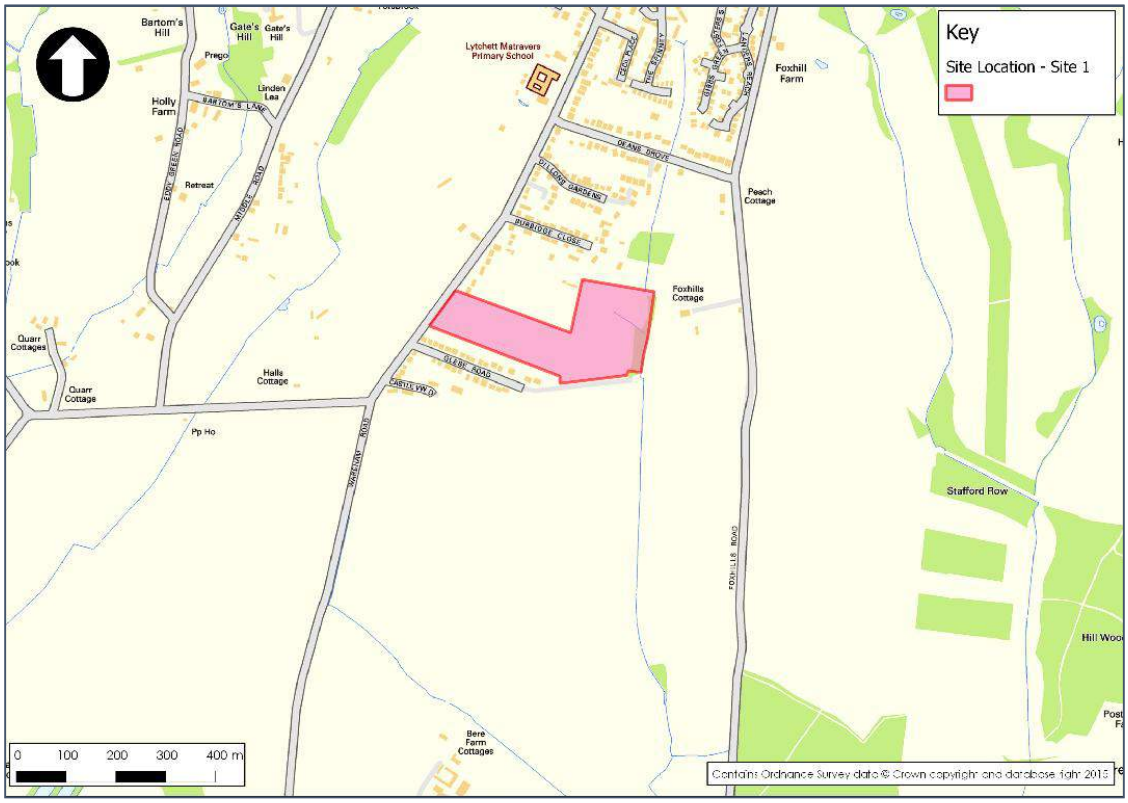
1.1 Wyatt Homes are reviewing opportunities for the promotion of new residential development, comprising of approximately 95 dwellings, on greenfield land to the east of Wareham Road, Lytchett Matravers, Dorset. A copy of the proposed framework masterplan is included within Appendix A of this technical note.

1.2 This Technical Note has been prepared to support the proposed allocation of the site within the emerging Partial Review Local Plan. It identifies existing highways, flood risk, drainage and utility opportunities and constraints, and proposes preliminary strategies for access and drainage to facilitate development at the site.

2 Site Location

2.1 The site, as shown by Figure 2.1 below, is located on land to the east of Wareham Road, towards the southern extents of Lytchett Matravers at National Grid Reference SY 944 942.

Figure 2.1 – Site Location plan



3 Existing land uses

3.1 The existing site comprises undeveloped greenfield land with established hedgerows forming boundaries within the site and at its perimeter. The site comprises two existing fields, referred to as 'western' and 'eastern' through this report. Within the eastern area there is a small wooded area with a minor watercourse forming the eastern boundary.

4 Surrounding land use

4.1 The site is surrounded by the following existing land uses:

- To the north lies Burbidge Close with the village centre of Lytchett Matravers beyond.

- To the east lies Foxhills Cottage and Foxhills Road, with greenfield and woodland beyond.
- To the south is Glebe Road with greenfield land beyond.
- To the west is Wareham Road with greenfield land and agricultural buildings beyond.

5 Topography

5.1 A topographic survey has been undertaken and indicates that the western area of the site falls in a south to south-east direction from a high point of approximately 54m above ordnance datum (AOD), to a low point of 47m AOD, with an average gradient of 1 in 24. This is a relatively shallow grade, unlikely to require any significant earthworks or retaining elements to accommodate future development.

5.2 The eastern area of the site falls in an easterly direction towards the existing minor watercourse at its boundary, from a high point of approximately 49m AOD, to a low point of approximately 31m AOD, with an average gradient of 1 in 11. This is relatively steep and will likely require a degree of localised earthworks and retaining structures to support future development.

5.3 A copy of the existing site survey can be seen on drawing 0657-CNS-101 within Appendix B of this technical note.

6 Transport, Access and Movement

6.1 The site is located immediately to the east of Wareham Road towards the south of Lytchett Matravers. Figure 6.1 (included within Appendix C of this Technical Note) highlights the location of the site with respect to existing local facilities in Lytchett Matravers with approximate walking distances/times.

6.2 The centre of Lytchett Matravers is located approximately 900m (11 minutes' walk) to the north of the site. This includes a number of local facilities including a Tesco Convenience store, post office, library, GP surgery, pharmacy, and Parish Hall.

6.3 The local Primary School is located on Wareham Road within around 400m (5 minutes' walk) of the site, together with further convenience retail opportunities.

6.4 The nearest bus stop is positioned immediately adjacent to the site on Wareham Road. This is served by bus route 10 which provides an hourly service between

Lytchett Matravers and Poole town centre (via Poole railway station) throughout the day.

6.5 For secondary education, the site falls within the catchment of Lytchett Minster School approximately 1.5km to the south east of Lytchett Matravers. This is accessible by school bus service 718 which also departs from the Wareham Road stop.

6.6 In summary, the site is considered to be accessible to a range of local facilities in Lytchett Matravers within a reasonable walking distance, including primary education, convenience retail and health services. The existing public transport links to Lytchett Minster School and Poole Town Centre would also provide good opportunities to travel to larger education, retail, employment and health facilities further afield using a sustainable mode of travel. Clearly, development at the site would generate an increase in potential patronage for local bus services that would help to underpin their viability.

6.7 The site is therefore considered to be positioned in an accessible location as required by the NPPF, and that there would be good opportunities for residents to use sustainable modes of travel to meet their everyday needs.

6.8 The site has a frontage on Wareham Road within the 30mph limit that extends to around 90m. Drawing SK-02 attached as Appendix D of this Technical Note, shows a preliminary arrangement for a simple priority junction to provide access to the site at this location. This includes visibility splays of 2.4 x 43m in line with Manual for Streets Guidance for 30mph traffic.

6.9 Pedestrian access to the site could be provided at the same location by means of a new footway adjacent to the main access road. This would connect with the existing footway on the eastern side of Wareham Road which links to the primary school and village centre beyond to the north.

6.10 The length of the frontage available, and the straight alignment and good visibility along Wareham Road, also provides the opportunity for further private accesses to individual dwellings to be introduced along the street. This approach is consistent with the existing highway context along Wareham Road.

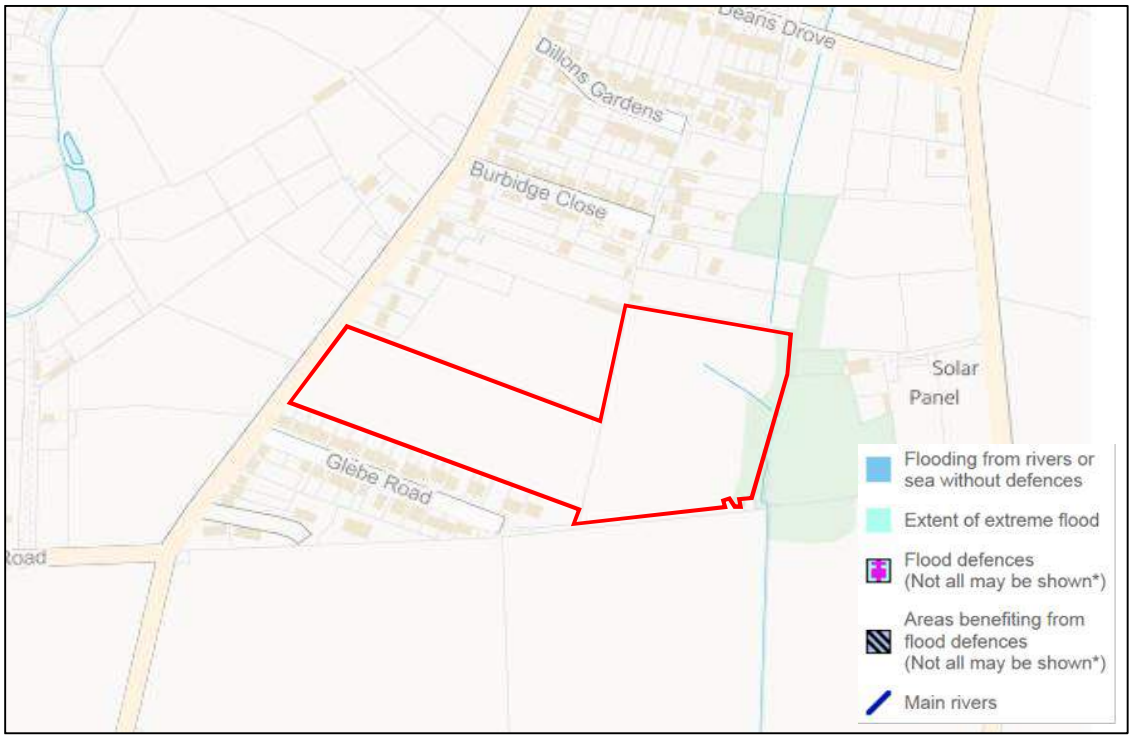
6.11 It is therefore considered that a safe and suitable means of access to the site could be provided as required by the NPPF.

6.12 Existing traffic flows within Lytchett Matravers are anticipated to be relatively low, and it is considered that the development of the site is unlikely to result in a significant change in traffic conditions in the centre of the village or offer the potential for any severe traffic impacts.

7 Flood Risk

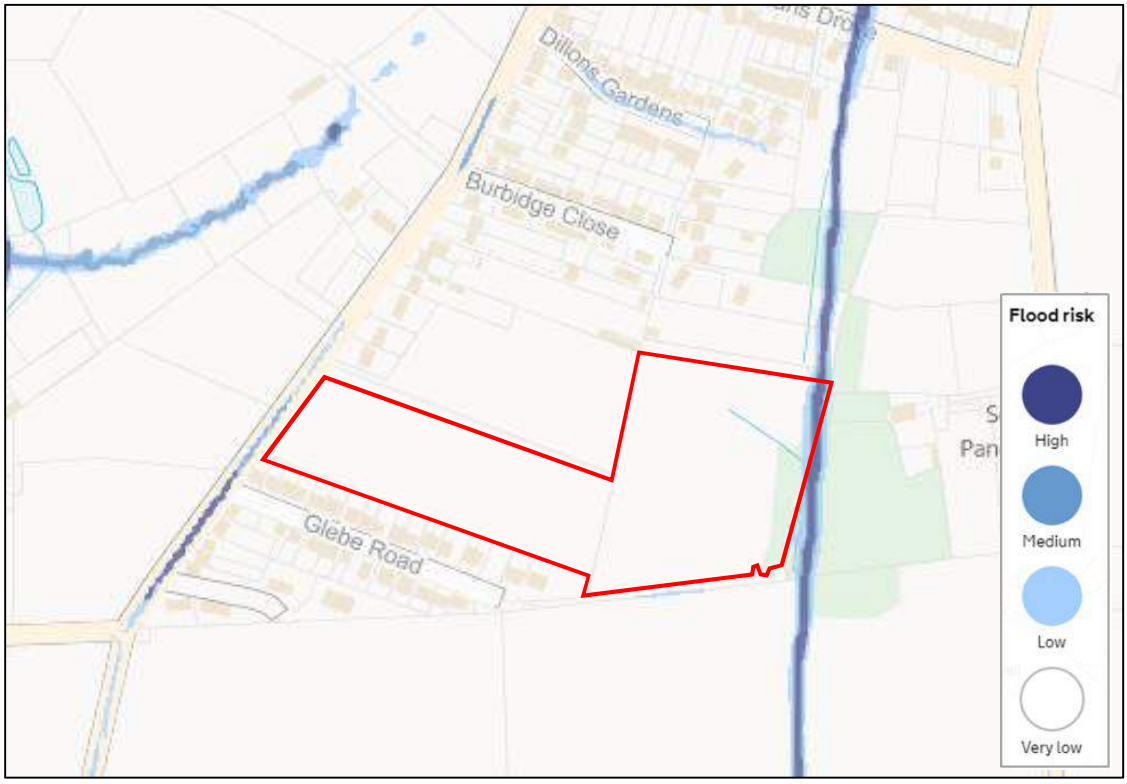
7.1 An extract of the Environment Agency's (EA) 'Flood Risk from Rivers or Sea' mapping is reproduced below as Figure 7.1. This mapping shows the entire site to be within Flood Zone 1, as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

Figure 7.1 – Flood Risk from Rivers or Sea



7.2 The EA's 'Flooding from Surface Water' mapping (Figure 7.2) indicates that the majority of the site is within an area at very low risk of flooding from surface water (less than 0.1% chance of flooding each year), with the exception of the area adjacent the eastern perimeter of the site, which shows a high risk of flooding (greater than 3.3% chance of flooding each year) along the line of the existing watercourse. Given this area would not be developed, the site should not be impacted by existing flooding from surface water throughout its lifetime.

Figure 7.2 – Flood Risk from Surface Water map



Existing site drainage

7.3 An existing minor watercourse forms the eastern boundary of the site. This watercourse receives flows from a small ditch within the site, which picks up any rural runoff from the eastern area.

7.4 The minor watercourse continues south beyond the site, towards the Sherford River and the Lytchett Bay area of Poole Harbour beyond.

Existing drainage infrastructure

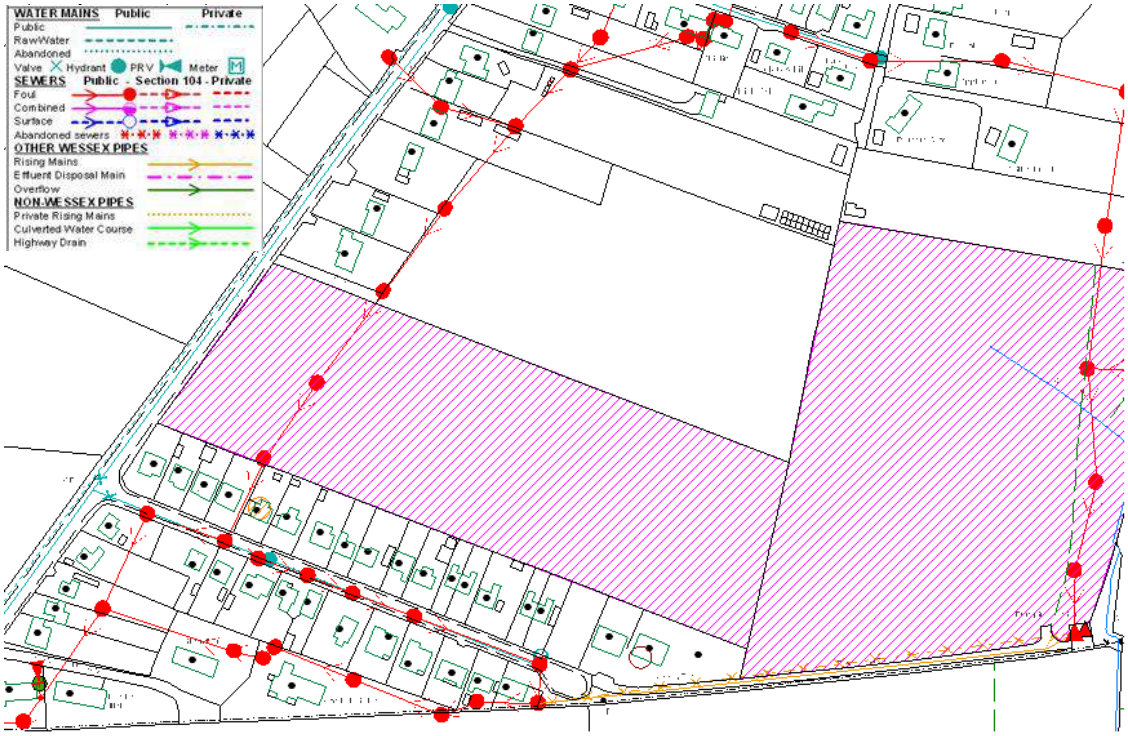
7.5 An extract of the Wessex Water (WW) asset record data for this area has been included as Figure 7.3 of this report. The records show existing 150mm diameter and 225mm diameter foul sewers routing southwards through the western and eastern extents of the site respectively, and also an existing foul rising main immediately beyond the southern site boundary.

7.6 If these sewers and rising main are to be retained (and not diverted) they would need to be accurately traced, with no buildings permitted within 3m of the sewer and 6m of the rising main, and no tree planting permitted within 6m of either.

7.7 The eastern network discharges to the Lytchett Matravers Glebe Road Pumping Station (WW Ref. 14260), located just beyond the south-east corner of the proposed development boundary. From the sewage pumping station (SPS) a

rising main of unspecified diameter follows the southern development boundary towards the adopted gravity network at Glebe Road.

Figure 7.3 – Wessex Water's asset database



Ground conditions

7.8 A ground investigation has yet to be undertaken. However, a desktop review of the Soilscape Dataset indicates that the site is underlain by 'slightly acid loamy and clayey soils with impeded drainage' and therefore soakaways are unlikely to present a viable method of surface water disposal for this site. Instead, on-site attenuation combined with off-site discharge is considered to be the most appropriate drainage solution.

7.9 Confirmation of the drainage characteristics would need to be verified by BRE Digest 365 compliant soakaway testing in advance of a Flood Risk Assessment to support any future planning application for this site.

Proposed foul water drainage

7.10 Wherever possible, foul flows from the proposed development will discharge to the existing gravity sewers within the site. Any residual development which is unable to discharge to these sewers would need to be requisitioned off site towards the existing adopted SPS.

7.11 Connectivity to the eastern gravity sewer and directly to the SPS will be subject to further assessment by WW, to consider any reinforcement requirements, which may include additional foul storage provision.

7.12 Exact points of connection can be agreed within Wessex Water once a detailed site layout is available.

7.13 A copy of any correspondence with Wessex Water has been included within Appendix E.

Surface Water Drainage Strategy

7.14 The proposed developable area for this site has been established through consultation with NEW Masterplanning and includes consideration towards any existing topographical, utility and arboricultural constraints.

7.15 The pre-development greenfield run-off rate has been estimated using the MircoDrainage Source Control module, ICP SUDS method. This method is based on the IH 124 methodology, which is the best practice for greenfield sites.

7.16 A copy of the greenfield run-off assessment can be seen within Appendix F of this report, with the results summarised in Table 7.1 below;

Table 7.1 – Greenfield Runoff Rates

Return Period	Greenfield Runoff Rate (l/s)
2yr	19.5
30yr	50.2
100yr	70.7

7.17 To ensure any future development would be safe from flooding throughout its lifetime and that flood risk elsewhere is not increased, the greenfield runoff rates above must be replicated or reduced. This is achieved through the attenuation of surface water runoff within the site.

7.18 To calculate the attenuation storage requirements, it has been assumed that 60% of the developable area will be impermeable catchment. This offers a slightly conservative approach but is common practice until a site layout is available, allowing impermeable catchments to be measured more accurately.

7.19 The MircoDrainage Source Control module has been used to estimate the storage requirements for the proposed scheme. This modelling includes allowances for the Long-Term Storage volume, which aims to mitigate the impact of any increased volume of runoff, and has been calculated using equation 24.10 of CIRIA C753, shown within Appendix F of this technical note.

7.20 The output of the MicroDrainage model can be seen within Appendix F of this report, with the results summarised in Table 7.2 below;

Table 7.2 Attenuation Storage Requirements

Proposed Attenuation Feature	Storage Volume (m^3)
Detention Basin	1,230
TOTAL	1,230

7.21 The attenuation storage volume must be provided within the application boundary. This storage can be provided as a single feature near the low point of the site, as reflected by drawing 0657-CNS-101 within Appendix B of this technical note, or it could be sub-divided into several smaller features if the site layout allows and this is a preferred approach.

7.22 The peak rates of discharge will be managed by a series of hydraulic controls, with the restricted outflow being discharged to the existing watercourse adjacent the eastern site boundary.

8 Utilities

8.1 An existing utility search was commissioned in May 2017 to establish which utility providers hold assets within the locality of the site.

8.2 The records received in response to this search show that an SSE high voltage (HV) overhead (OH) cable currently routes through the entire length of the site (east to west).

8.3 Wareham Road, to the west, contains multiple services, including underground (UG) low pressure (LP) gas main, UG Virgin Media telecoms, UG Wessex Water (WW) water supply main, UG BT telecoms and OH low voltage (LV) SSE cable.

8.4 The existing utility records have been transposed on to drawing 0657-CNS-101 within Appendix B of this technical note.

8.5 Aside from the two foul sewers and single HV cable, no additional utility services are known to pass through the site. It is likely that below ground diversion of the HV cable may be required to suit any proposed development within the site.

8.6 We are currently liaising with utility providers to verify whether the existing available services have capacity to accommodate a development of this nature and to provide budget estimates for any likely diversion or reinforcement works.

8.7 The utility supply sheet included within Appendix G of this Technical Note, provides a summary of the utility responses received to date.

9 Conclusion

9.1 The site is considered to be accessible to a range of local facilities in Lytchett Matravers within a reasonable walking distance, including primary education, convenience retail and health services. The existing public transport links to Lytchett Minster School and Poole Town Centre would also provide good opportunities to travel to larger education, retail, employment and health facilities further afield using a sustainable mode of travel.

9.2 The site is therefore considered to be positioned in an accessible location as required by the NPPF, and that there would be good opportunities for residents to use sustainable modes of travel to meet their everyday needs.

9.3 Access to the site could be provided by means of a simple priority junction on Wareham Road. Pedestrian access to the site could be provided at the same location by means of a new footway adjacent to the main access road. This would connect with the existing footway on the eastern side of Wareham Road which links to the primary school and village centre beyond to the north.

9.4 It is therefore considered that a safe and suitable means of access to the site could be provided as required by the NPPF. Existing traffic flows within Lytchett Matravers are anticipated to be relatively low, and it is considered that the development of the site is unlikely to result in a significant change in traffic conditions in the centre of the village or offer the potential for any severe traffic impacts.

9.5 A topographic survey has been undertaken and indicates that the western area of the site has an average gradient of 1 in 24; this is a relatively shallow grade and is unlikely to require any significant earthworks or retaining elements to accommodate future development. The eastern area of the site has an average gradient of 1 in 11; this is relatively steep and will likely require a degree of localised earthworks and retaining structures to support future development.

9.6 The EA's 'Flood Risk from Rivers or Sea' mapping shows the entire site to be within Flood Zone 1, as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

9.7 The EA's 'Flooding from Surface Water' mapping shows the developable extents of the site to be at 'very low risk' of flooding from surface water, with less than 0.1% chance of flooding each year.

9.8 A ground investigation has yet to be undertaken. However, a desktop review of the Soilscape Dataset indicates that the site is underlain by 'slightly acid loamy

and clayey soils with impeded drainage' and therefore soakaways are unlikely to present a viable method of surface water disposal for this site.

9.9 Confirmation of the drainage characteristics would need to be verified by BRE Digest 365 compliant soakaway testing in advance of a Flood Risk Assessment to support any future planning application for this site.

9.10 The surface water strategy will be designed to ensure that the flood risk to downstream properties is not increased as a result of this development in up to the 1 in 100 year return period storm event, including the upper end 40% allowances for climate change.

9.11 The storm water runoff attenuation requirement must be provided within the application boundary as either a single feature (as shown on the current constraints plan), or as a series of smaller features, subject to final site layout and client preference.

9.12 The peak rates of storm water discharge will be managed by a series of hydraulic controls, with the restricted outflow being discharged to the existing watercourse adjacent the eastern site boundary.

9.13 A site-specific FRA will be prepared to support a future planning application which will conclude that the development will be safe from flooding for its design life and not increase the flood risk to any third parties.

9.14 Existing 150mm diameter and 225mm diameter adopted fouls sewers route southwards through the western and eastern extents of the site respectively. If these sewers are to be retained (and not diverted) they would need to be accurately traced, with no buildings permitted within 3m of the sewer or 6m of the rising main, and no tree planting permitted within 6m of either.

9.15 Wherever possible, foul flows from the proposed development will discharge to the existing gravity sewers within the site. Any residual development which is unable to discharge to these sewers would need to be requisitioned off site towards the existing adopted SPS.

9.16 Connectivity to the eastern gravity sewer and directly to the SPS will be subject to further assessment by WW, to consider any reinforcement requirements, which may include additional foul storage provision.

9.17 Exact points of connection for foul flows can be agreed within Wessex Water once a detailed site layout is available.

9.18 An existing utility search was commissioned in May 2017 to establish which utility providers hold assets within the locality of the site. The records show that an SSE

high voltage overhead cable currently routes through the entire length of the site (east to west), whereas Wareham Road, to the west, contains multiple services, including underground low pressure gas main, Virgin Media telecoms, South West Water supply main, BT telecoms and overhead low voltage SSE cable.

9.19 We are currently liaising with utility providers to verify whether the existing available services have capacity to accommodate a development of this nature and to provide budget estimates for any likely diversion or reinforcement works.

AWP

Appendix A Proposed Framework Masterplan

0 20m 40m

Wareham Road
Lytchett Matravers

Framework Plan
Drwg. no: 122_DI_03.5

2017-09-13
1:1000 @ A2
DA ref: 122_DA_03.4

NEW masterplanning
Second Floor 107 Bournemouth Road
Poole, Dorset BH14 9HR
+44 (0)1202 742228
www.newmasterplanning.com

Appendix B Drainage and Utilities Plan

Notes

1. Service locations are based on utility supply records supplied by Atkins Ready to Dig Survey (May 2017) and should be seen as indicative only, until verified on site.
2. This plan only indicates known utilities located within the site and its local vicinity. Services further afield and any potential unknown services will not have been plotted on this drawing.
3. Based on a proposed development of up to 170 dwellings, Wessex Water have confirmed that further assessment of the existing Lytchett Matravers Glebe Road Pumping Station (14260) will be required to determine appropriate improvements, emergency storage allowances and an agreed point of connection.

Existing public foul sewer with 3m clear easement (either side of sewer) to dwellings (or 6m to tree planting)

Existing SSE OH Cables to be diverted underground to suit the proposed development

Existing public foul sewer with 3m clear easement (either side of sewer) to dwellings (or 6m to tree planting)

Proposed Detention Basin

Abandoned Foul Rising Main

Existing public foul rising main with 6m clear easement

Existing adopted foul pumping station with 15m easement to habitable dwellings

Key

- (Site 1) Land East of Wareham Road
- Developable Area

Existing Utilities

- WW Distribution Main
- SSE HV OH Cable
- SSE HV UG Cable
- SSE LV UG Cable
- SSE LV OH Cable
- SSE OH EHV Cable
- BT UG Cable
- BT OH Cable
- Virgin Media UG Cable
- SGN Low Pressure Main
- SGN HIgh Pressure Main

Existing Drainage

- Adopted Foul water sewer
- Adopted Surface water sewer
- Adopted Foul Rising Main
- Adopted Foul Pumping Station
- Abandoned Foul Rising Main
- Sewer Easement
- Field Ditch

Area Summary Schedule

Gross Site Area	5.32 ha
Developable Area	3.934 ha
Impermeable Area (60%)	2.360 ha

Attenuation Summary

Attenuation Type	Basin
Side Slopes	1 in 3
Max Depth	1.3 m
100yr +40% Water Level	1.0 m
100yr +40% CC Volume	1230 m^3 *

* Assumes a single attenuation feature with no allowances for potential infiltration

REV	DATE	DESCRIPTION	BY	CHK	APD
B	23.06.2017	UPDATED DETENTION BASIN	JDLC	CPY	CPY
A	19.06.2017	INITIAL ISSUE	PAB	JDLC	CPY

CLIENT: WYATT HOMES

DRAWING STATUS: FOR INFORMATION ONLY

PROJECT: PURBECK PROMOTIONAL SITES

TITLE: SITE CONSTRAINTS PLAN Site 1 Wareham Road

PROJECT No:	DRAWING No:	REV:
0657	CNS-101	B

SCALE @ A2: 0 1:1000 50 metres

DESIGN BY:

awcockward partnership

Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 5TY
Tel: 01392 409007 Web: www.awpexeter.com

Appendix C Local Facilities Plan

awcockward partnership

Lytchett Matravers (Site 1)
Accessibility Plan

Job number:	0657
Drawn:	IW
Checked:	AJW
Approved:	IDA

Figure 6.1

Appendix D Frontage Access Plan (Drawing SK-02)

Notes:

Visibility splays to be kept clear of obstructions above 600mm.

REV	DATE	DESCRIPTION	BY	CHK	APD
A	11.07.2017	INITIAL ISSUE	IW	AJH	AJW

CLIENT: WYATT HOMES

DRAWING STATUS: FOR INFORMATION ONLY

PROJECT: LYTCHETT MATRAVERS PROMOTION SITES

TITLE: PRELIMINARY ACCESS ARRANGEMENT, (SITE 1, WAREHAM ROAD)

PROJECT No:	DRAWING No:	REV:
0657	SK-02	A

SCALE @ A0: 1:500 (0 – 25 metres)

awcockward partnership

Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 5TY
Tel: 01392 409007 Web: www.awpexeter.com

Appendix E Correspondence with Wessex Water

Toby Ball

From:	Teddy Takyi-Amuah <Teddy.Takyi-Amuah@wessexwater.co.uk>
Sent:	15 May 2017 10:35
To:	Jacob De la Croix
Cc:	Planning Liaison
Subject:	WW RESP : SY99SW/ 22 Wareham Road

FAO Jacob.DelaCroix@awpexeter.com

Thank you for your enquiry regarding the proposed development of 170 new dwelling at the above site.

We have completed a preliminary capacity assessment and can provide the following details for your attention. Please refer to the plans below for information

Foul Water disposal

There is an existing 150 mm public foul sewer, which crosses north to south within the boundary of the proposed site. There is also a 225 mm dia public foul sewer to the west of the site. These sewers must be accurately located on site: no building within 3 metres and no tree planting within 6 metres.

The sewer connects to the public foul pumping station in the southeast corner of the site. There must be no habitable building within 15 metres of this sewage pumping station and no building / construction to impede current access arrangements (no building or tree planting within 6 metres of the rising main). Connection of the predicted foul drainage flow from 170 dwellings will increase the foul flow through Lytchett Matravers Glebe Road Pumping Station (14260). Further assessment will be required to consider appropriate improvements, which may include extra storage provision.

- A point of connection to be agreed to the afore mentioned sewers subject to detail site layout and the above.

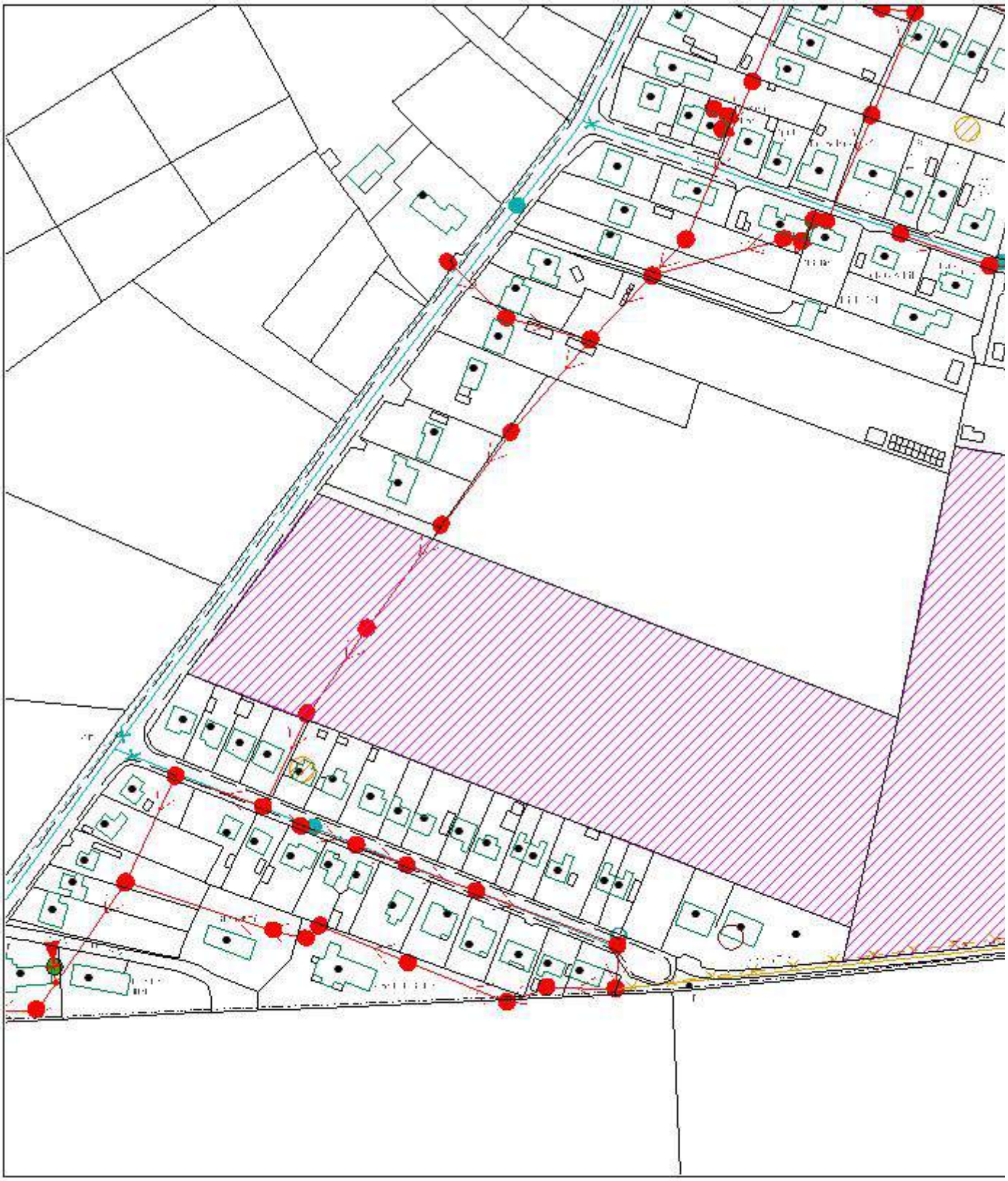
Surface Water disposal

Surface water to be discharged to local land drainage systems with agreed flood risk measures approved by the Lead Local Flood Authority. Surface water connections to the public foul sewer system will not be permitted, as surface water discharges to the public sewer will lead to sewer flooding.

Next steps

Modelling:
As detailed above, a formal appraisal with network modelling will be required to confirm the impact and the scope of capacity improvements. This appraisal can be instructed with a payment of £2000 + VAT. Please review the attached and below.

1. You submit your application and payment. We need detailed information about your development (as highlighted in * on the attached)
2. We call/email you to confirm your requirements and payment and. Then we instruct the modelers to proceed.
3. We will then review the study with our modelling group and formalize the modelling study. Please note the appraisal takes an approximation of 21 days.
4. We prepare and send you the final report.



Kind regards,

Appendix F Modelling Output

ICP SUDS Mean Annual Flood

Input

Return Period (years) 2 SAAR (mm) 866 Urban 0.000
Area (ha) 3.934 Soil 0.450 Region Number Region 7

Results l/s

QBAR Rural 22.2
QBAR Urban 22.2

Q2 years 19.5

Q1 year 18.8
Q30 years 50.2
Q100 years 70.7

Long Term Storage (LTS) Volume Calculation

Project No.	0657
Project Title	Purbeck promotion sites for Wyatt
Client	Wyatt Homes
	Site 1
Calcs by	MR
Reviewed by	
Date	21.06.2017
Revision	B

awcockward partnership

LTS calculation method based on equation 24.10 from CIRIA C753 - The SuDS Manual (2015);

$$Vol_{xs} = RD \times A \times 10\,[PIMP/100 \times (\alpha \times Cv) + (1\text{-}PIMP/100) \times (\beta \times SPR) - SPR]$$

Where; Vol_{xs} Extra runoff volume from a dev. site compared to the greenfield equivalent during the 100 yr 6 hr storm

RD	Rainfall Depth	70	mm	*(for 100 year 6 hour storm)*
A	*Site Area*	3.934	ha	*(Exc. large undeveloped areas)*
	Impermeable Catchment	2.36	ha	
PIMP	*Percentage Impermeable*	60.0	%	
α	Proportion Impermeable to Network	1.0		
Cv	Impermeable Runoff Coefficient	0.84		*(0.84 Modified Rational Method)*
	Permeable Catchment	1.57	ha	
	Permeable Catchment to Network	0.00	ha	
β	Proportion Perm. to Network	0.00		
SPR	Soil Proportion Runoff	0.45		*(Ref. to WRAP map)*

	RD	A		PIMP	α	Cv		PIMP	β	SPR	SPR
Vol_{xs} =	70	x 3.93	x 10 x ((	60	/ 100) x (	1.00	x 0.84) + (1 -	60	/ 100) x (	0.00	x 0.45) - 0.45)

$Volume_{xs}$ **148.47**

LTS Discharge Rate **7.87** *(2 l/s/ha)*

As above, assuming all permeable surfaces do not enter the drainage system

Vol_{xs} = *148.47*

As above, assuming all permeable surfaces enter the drainage system

Vol_{xs} = *644.28*

Kensington Court Woodwater Park Pynes Hill Exeter EX2 5TY	Attenuation Req (Site 1) 2 year + 40%
Date 04/07/2017 12:57 File 0657-SW-01-A (SITE 1 - ...	Designed by Toby.Ball Checked by
XP Solutions	Source Control 2016.1

Summary of Results for 2 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.876	0.176	7.9	0.0	7.9	216.5	O K
30 min Summer	98.933	0.233	8.1	0.0	8.1	286.2	O K
60 min Summer	98.994	0.294	9.0	0.0	9.0	361.0	O K
120 min Summer	99.057	0.357	9.9	0.0	9.9	439.0	O K
180 min Summer	99.092	0.392	10.4	0.0	10.4	482.6	O K
240 min Summer	99.115	0.415	10.6	0.0	10.6	510.4	O K
360 min Summer	99.139	0.439	10.9	0.0	10.9	539.4	O K
480 min Summer	99.152	0.452	11.1	0.0	11.1	556.3	O K
600 min Summer	99.162	0.462	11.2	0.0	11.2	567.9	O K
720 min Summer	99.168	0.468	11.3	0.0	11.3	575.8	O K
960 min Summer	99.175	0.475	11.3	0.0	11.3	584.0	O K
1440 min Summer	99.174	0.474	11.3	0.0	11.3	582.5	O K
2160 min Summer	99.156	0.456	11.1	0.0	11.1	560.7	O K
2880 min Summer	99.133	0.433	10.8	0.0	10.8	532.2	O K
4320 min Summer	99.086	0.386	10.3	0.0	10.3	474.2	O K
5760 min Summer	99.043	0.343	9.7	0.0	9.7	421.8	O K
7200 min Summer	99.005	0.305	9.2	0.0	9.2	375.6	O K
8640 min Summer	98.973	0.273	8.7	0.0	8.7	335.2	O K
10080 min Summer	98.944	0.244	8.3	0.0	8.3	300.3	O K
15 min Winter	98.897	0.197	7.9	0.0	7.9	242.9	O K
30 min Winter	98.961	0.261	8.6	0.0	8.6	321.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	49.988	0.0	194.9	0.0	19
30 min Summer	33.354	0.0	265.6	0.0	33
60 min Summer	21.493	0.0	365.6	0.0	62
120 min Summer	13.588	0.0	465.0	0.0	122
180 min Summer	10.343	0.0	532.2	0.0	182
240 min Summer	8.513	0.0	584.9	0.0	240
360 min Summer	6.440	0.0	664.6	0.0	344
480 min Summer	5.278	0.0	726.5	0.0	400
600 min Summer	4.522	0.0	778.1	0.0	464
720 min Summer	3.985	0.0	822.7	0.0	526
960 min Summer	3.265	0.0	897.5	0.0	664
1440 min Summer	2.466	0.0	1011.1	0.0	938
2160 min Summer	1.861	0.0	1174.7	0.0	1360
2880 min Summer	1.524	0.0	1282.0	0.0	1760
4320 min Summer	1.151	0.0	1446.4	0.0	2548
5760 min Summer	0.943	0.0	1596.8	0.0	3296
7200 min Summer	0.807	0.0	1706.5	0.0	4040
8640 min Summer	0.710	0.0	1799.9	0.0	4832
10080 min Summer	0.638	0.0	1879.0	0.0	5544
15 min Winter	49.988	0.0	220.4	0.0	19
30 min Winter	33.354	0.0	299.3	0.0	33

Summary of Results for 2 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	99.030	0.330	9.5	0.0	9.5	405.6	O K
120 min Winter	99.102	0.402	10.5	0.0	10.5	494.2	O K
180 min Winter	99.143	0.443	11.0	0.0	11.0	544.7	O K
240 min Winter	99.170	0.470	11.3	0.0	11.3	577.9	O K
360 min Winter	99.200	0.500	11.6	0.0	11.6	614.7	O K
480 min Winter	99.214	0.514	11.8	0.0	11.8	631.8	O K
600 min Winter	99.222	0.522	11.8	0.0	11.8	641.5	O K
720 min Winter	99.228	0.528	11.9	0.0	11.9	649.1	O K
960 min Winter	99.232	0.532	12.0	0.0	12.0	654.0	O K
1440 min Winter	99.221	0.521	11.8	0.0	11.8	641.1	O K
2160 min Winter	99.187	0.487	11.5	0.0	11.5	599.0	O K
2880 min Winter	99.148	0.448	11.0	0.0	11.0	551.4	O K
4320 min Winter	99.076	0.376	10.1	0.0	10.1	462.1	O K
5760 min Winter	99.015	0.315	9.3	0.0	9.3	387.1	O K
7200 min Winter	98.963	0.263	8.6	0.0	8.6	323.5	O K
8640 min Winter	98.916	0.216	7.9	0.0	7.9	265.2	O K
10080 min Winter	98.868	0.168	7.9	0.0	7.9	206.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	21.493	0.0	410.8	0.0	62
120 min Winter	13.588	0.0	522.1	0.0	120
180 min Winter	10.343	0.0	597.3	0.0	178
240 min Winter	8.513	0.0	656.3	0.0	234
360 min Winter	6.440	0.0	745.5	0.0	346
480 min Winter	5.278	0.0	814.8	0.0	448
600 min Winter	4.522	0.0	872.6	0.0	484
720 min Winter	3.985	0.0	922.4	0.0	558
960 min Winter	3.265	0.0	1005.9	0.0	714
1440 min Winter	2.466	0.0	1132.0	0.0	1022
2160 min Winter	1.861	0.0	1316.5	0.0	1452
2880 min Winter	1.524	0.0	1436.8	0.0	1876
4320 min Winter	1.151	0.0	1622.0	0.0	2684
5760 min Winter	0.943	0.0	1789.1	0.0	3464
7200 min Winter	0.807	0.0	1912.3	0.0	4248
8640 min Winter	0.710	0.0	2017.5	0.0	5016
10080 min Winter	0.638	0.0	2107.4	0.0	5552

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.331	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.360

Time (mins) From:	To:	Area (ha)
0	4	2.360

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1230.0	1.300	1230.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0142-7900-0220-7900
Design Head (m)	0.220
Design Flow (l/s)	7.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	142
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.220	7.9
Flush-Flo™	0.181	7.9
Kick-Flo®	0.215	7.8
Mean Flow over Head Range	-	4.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	17.6	3.000	27.2	7.000	41.8
0.200	7.9	1.400	19.0	3.500	29.4	7.500	43.3
0.300	9.1	1.600	20.2	4.000	31.5	8.000	44.7
0.400	10.5	1.800	21.4	4.500	33.4	8.500	46.1
0.500	11.6	2.000	22.5	5.000	35.3	9.000	47.5
0.600	12.7	2.200	23.5	5.500	37.0	9.500	48.8
0.800	14.5	2.400	24.2	6.000	38.7		
1.000	16.1	2.600	25.3	6.500	40.3		

Orifice Overflow Control

Diameter (m) 0.205 Discharge Coefficient 0.600 Invert Level (m) 99.232

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.035	0.335	9.6	0.0	9.6	412.3	O K
30 min Summer	99.147	0.447	11.0	0.0	11.0	549.4	O K
60 min Summer	99.266	0.566	12.3	0.8	13.1	696.2	O K
120 min Summer	99.370	0.670	13.3	12.1	25.5	823.8	O K
180 min Summer	99.404	0.704	13.7	16.9	30.6	865.9	O K
240 min Summer	99.418	0.718	13.8	19.2	33.0	883.0	O K
360 min Summer	99.439	0.739	14.0	22.8	36.8	908.5	O K
480 min Summer	99.450	0.750	14.1	24.9	39.0	922.5	O K
600 min Summer	99.455	0.755	14.1	25.7	39.8	928.5	O K
720 min Summer	99.456	0.756	14.1	25.9	40.0	929.7	O K
960 min Summer	99.451	0.751	14.1	25.1	39.2	924.1	O K
1440 min Summer	99.433	0.733	13.9	21.9	35.8	901.8	O K
2160 min Summer	99.404	0.704	13.7	16.9	30.6	866.2	O K
2880 min Summer	99.378	0.678	13.4	13.1	26.6	833.6	O K
4320 min Summer	99.339	0.639	13.0	7.7	20.8	785.5	O K
5760 min Summer	99.305	0.605	12.7	3.6	16.3	744.5	O K
7200 min Summer	99.270	0.570	12.4	1.0	13.4	701.5	O K
8640 min Summer	99.224	0.524	11.9	0.0	11.9	644.0	O K
10080 min Summer	99.176	0.476	11.3	0.0	11.3	585.3	O K
15 min Winter	99.076	0.376	10.1	0.0	10.1	462.1	O K
30 min Winter	99.201	0.501	11.6	0.0	11.6	616.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	94.570	0.0	382.7	0.0	19
30 min Summer	63.537	0.0	516.6	0.0	34
60 min Summer	40.933	0.0	705.8	1.3	64
120 min Summer	25.598	0.0	885.7	58.6	122
180 min Summer	19.223	0.0	999.3	119.1	180
240 min Summer	15.603	0.0	1082.4	165.7	200
360 min Summer	11.615	0.0	1209.6	234.3	256
480 min Summer	9.411	0.0	1307.1	280.6	322
600 min Summer	7.988	0.0	1386.6	312.0	388
720 min Summer	6.984	0.0	1454.0	332.0	456
960 min Summer	5.645	0.0	1564.3	350.5	588
1440 min Summer	4.177	0.0	1722.1	344.5	852
2160 min Summer	3.086	0.0	1953.9	307.5	1252
2880 min Summer	2.487	0.0	2097.8	262.4	1644
4320 min Summer	1.832	0.0	2309.7	167.6	2424
5760 min Summer	1.474	0.0	2498.4	83.1	3280
7200 min Summer	1.246	0.0	2638.6	20.3	4104
8640 min Summer	1.086	0.0	2757.5	0.0	4928
10080 min Summer	0.967	0.0	2857.4	0.0	5648
15 min Winter	94.570	0.0	429.9	0.0	19
30 min Winter	63.537	0.0	578.3	0.0	33

Kensington Court Woodwater Park Pynes Hill Exeter EX2 5TY	Attenuation Req (Site 1) 30 year + 40%
Date 04/07/2017 13:39 File 0657-SW-01-A (SITE 1 - ...	Designed by Toby.Ball Checked by
XP Solutions	Source Control 2016.1

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	99.332	0.632	13.0	6.6	19.6	778.0	O K
120 min Winter	99.438	0.738	14.0	22.7	36.6	907.6	O K
180 min Winter	99.471	0.771	14.3	28.5	42.8	947.8	O K
240 min Winter	99.487	0.787	14.4	31.4	45.8	968.0	O K
360 min Winter	99.506	0.806	14.6	34.9	49.5	991.5	O K
480 min Winter	99.510	0.810	14.6	35.6	50.2	996.2	O K
600 min Winter	99.507	0.807	14.6	35.0	49.6	992.4	O K
720 min Winter	99.501	0.801	14.5	33.9	48.5	984.7	O K
960 min Winter	99.484	0.784	14.4	31.0	45.3	964.9	O K
1440 min Winter	99.452	0.752	14.1	25.2	39.3	924.8	O K
2160 min Winter	99.412	0.712	13.7	18.3	32.0	875.8	O K
2880 min Winter	99.380	0.680	13.4	13.4	26.8	836.1	O K
4320 min Winter	99.335	0.635	13.0	7.1	20.1	781.5	O K
5760 min Winter	99.296	0.596	12.6	2.8	15.4	733.3	O K
7200 min Winter	99.245	0.545	12.1	0.1	12.2	670.0	O K
8640 min Winter	99.173	0.473	11.3	0.0	11.3	582.0	O K
10080 min Winter	99.113	0.413	10.6	0.0	10.6	507.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	40.933	0.0	791.9	21.3	62
120 min Winter	25.598	0.0	993.9	127.8	118
180 min Winter	19.223	0.0	1121.3	208.4	170
240 min Winter	15.603	0.0	1214.5	267.0	188
360 min Winter	11.615	0.0	1357.3	351.5	262
480 min Winter	9.411	0.0	1466.6	408.5	334
600 min Winter	7.988	0.0	1555.8	447.5	406
720 min Winter	6.984	0.0	1631.5	474.3	476
960 min Winter	5.645	0.0	1755.5	501.3	616
1440 min Winter	4.177	0.0	1933.0	496.1	882
2160 min Winter	3.086	0.0	2189.5	437.4	1280
2880 min Winter	2.487	0.0	2350.8	366.4	1700
4320 min Winter	1.832	0.0	2587.4	214.2	2508
5760 min Winter	1.474	0.0	2798.8	81.6	3408
7200 min Winter	1.246	0.0	2956.2	1.9	4392
8640 min Winter	1.086	0.0	3090.0	0.0	5104
10080 min Winter	0.967	0.0	3203.7	0.0	5856

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.331	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.360

Time (mins) From:	To:	Area (ha)
0	4	2.360

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1230.0	1.300	1230.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0142-7900-0220-7900
Design Head (m)	0.220
Design Flow (l/s)	7.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	142
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.220	7.9
Flush-Flo™	0.181	7.9
Kick-Flo®	0.215	7.8
Mean Flow over Head Range	-	4.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	17.6	3.000	27.2	7.000	41.8
0.200	7.9	1.400	19.0	3.500	29.4	7.500	43.3
0.300	9.1	1.600	20.2	4.000	31.5	8.000	44.7
0.400	10.5	1.800	21.4	4.500	33.4	8.500	46.1
0.500	11.6	2.000	22.5	5.000	35.3	9.000	47.5
0.600	12.7	2.200	23.5	5.500	37.0	9.500	48.8
0.800	14.5	2.400	24.2	6.000	38.7		
1.000	16.1	2.600	25.3	6.500	40.3		

Orifice Overflow Control

Diameter (m) 0.205 Discharge Coefficient 0.600 Invert Level (m) 99.232

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.134	0.434	10.9	0.0	10.9	533.7	O K
30 min Summer	99.284	0.584	12.5	1.9	14.4	718.6	O K
60 min Summer	99.430	0.730	13.9	21.3	35.2	898.0	O K
120 min Summer	99.528	0.828	14.7	38.6	53.3	1018.0	O K
180 min Summer	99.562	0.862	15.0	41.8	56.8	1059.7	O K
240 min Summer	99.582	0.882	15.2	43.6	58.8	1084.3	O K
360 min Summer	99.604	0.904	15.4	45.5	60.9	1111.9	O K
480 min Summer	99.611	0.911	15.4	46.1	61.6	1120.5	O K
600 min Summer	99.609	0.909	15.4	46.0	61.4	1118.6	O K
720 min Summer	99.603	0.903	15.4	45.5	60.8	1110.8	O K
960 min Summer	99.584	0.884	15.2	43.8	59.0	1087.2	O K
1440 min Summer	99.541	0.841	14.9	39.8	54.7	1034.4	O K
2160 min Summer	99.493	0.793	14.4	32.5	47.0	974.9	O K
2880 min Summer	99.457	0.757	14.1	26.1	40.3	931.4	O K
4320 min Summer	99.407	0.707	13.7	17.3	31.0	869.1	O K
5760 min Summer	99.368	0.668	13.3	12.0	25.3	822.1	O K
7200 min Summer	99.342	0.642	13.1	8.2	21.3	789.2	O K
8640 min Summer	99.318	0.618	12.8	4.9	17.7	759.5	O K
10080 min Summer	99.293	0.593	12.6	2.5	15.1	730.0	O K
15 min Winter	99.186	0.486	11.5	0.0	11.5	598.1	O K
30 min Winter	99.353	0.653	13.2	10.0	23.2	802.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	122.221	0.0	497.1	0.0	19
30 min Summer	82.951	0.0	671.6	3.6	34
60 min Summer	53.779	0.0	931.6	98.4	62
120 min Summer	33.649	0.0	1169.7	262.1	120
180 min Summer	25.176	0.0	1314.5	363.7	146
240 min Summer	20.331	0.0	1416.3	432.4	176
360 min Summer	15.031	0.0	1571.6	531.3	242
480 min Summer	12.118	0.0	1689.7	598.0	310
600 min Summer	10.244	0.0	1785.1	643.7	378
720 min Summer	8.925	0.0	1865.4	675.2	442
960 min Summer	7.173	0.0	1995.6	707.7	576
1440 min Summer	5.260	0.0	2178.6	706.6	824
2160 min Summer	3.849	0.0	2439.7	653.2	1208
2880 min Summer	3.079	0.0	2600.3	590.3	1584
4320 min Summer	2.243	0.0	2831.4	464.3	2336
5760 min Summer	1.790	0.0	3034.9	347.2	3112
7200 min Summer	1.504	0.0	3186.3	242.6	3888
8640 min Summer	1.305	0.0	3314.1	151.1	4680
10080 min Summer	1.157	0.0	3421.3	74.2	5544
15 min Winter	122.221	0.0	556.8	0.0	19
30 min Winter	82.951	0.0	751.2	30.5	33

Kensington Court Woodwater Park Pynes Hill Exeter EX2 5TY	Attenuation Req (Site 1) 100 year + 40%
Date 04/07/2017 13:41 File 0657-SW-01-A (SITE 1 - ...	Designed by Toby.Ball Checked by
XP Solutions	Source Control 2016.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	99.509	0.809	14.6	35.4	50.0	994.7	O K
120 min Winter	99.625	0.925	15.5	47.3	62.8	1137.2	O K
180 min Winter	99.661	0.961	15.8	50.1	66.0	1182.4	O K
240 min Winter	99.681	0.981	16.0	51.7	67.6	1207.1	O K
360 min Winter	99.693	0.993	16.1	52.5	68.6	1221.7	O K
480 min Winter	99.686	0.986	16.0	52.0	68.1	1213.2	O K
600 min Winter	99.671	0.971	15.9	50.9	66.8	1194.5	O K
720 min Winter	99.652	0.952	15.8	49.4	65.2	1171.5	O K
960 min Winter	99.613	0.913	15.4	46.3	61.7	1122.6	O K
1440 min Winter	99.544	0.844	14.9	40.1	55.0	1037.9	O K
2160 min Winter	99.482	0.782	14.4	30.6	45.0	962.3	O K
2880 min Winter	99.442	0.742	14.0	23.4	37.4	912.6	O K
4320 min Winter	99.387	0.687	13.5	14.3	27.8	845.0	O K
5760 min Winter	99.349	0.649	13.1	9.4	22.5	797.9	O K
7200 min Winter	99.323	0.623	12.9	5.3	18.2	765.8	O K
8640 min Winter	99.294	0.594	12.6	2.5	15.1	730.4	O K
10080 min Winter	99.256	0.556	12.2	0.4	12.7	683.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	53.779	0.0	1045.4	178.8	60
120 min Winter	33.649	0.0	1312.2	372.1	116
180 min Winter	25.176	0.0	1474.5	488.3	146
240 min Winter	20.331	0.0	1588.6	567.4	184
360 min Winter	15.031	0.0	1762.7	682.7	258
480 min Winter	12.118	0.0	1895.1	763.9	332
600 min Winter	10.244	0.0	2002.2	821.9	402
720 min Winter	8.925	0.0	2092.4	862.9	470
960 min Winter	7.173	0.0	2238.9	910.3	606
1440 min Winter	5.260	0.0	2445.4	921.1	852
2160 min Winter	3.849	0.0	2733.8	851.0	1232
2880 min Winter	3.079	0.0	2913.7	760.5	1616
4320 min Winter	2.243	0.0	3171.8	571.2	2380
5760 min Winter	1.790	0.0	3399.7	389.5	3168
7200 min Winter	1.504	0.0	3569.6	231.2	4040
8640 min Winter	1.305	0.0	3713.5	101.0	4928
10080 min Winter	1.157	0.0	3835.4	12.0	5856

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.331	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.360

Time (mins) From:	To:	Area (ha)
0	4	2.360

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1230.0	1.300	1230.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0142-7900-0220-7900
Design Head (m)	0.220
Design Flow (l/s)	7.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	142
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.220	7.9
Flush-Flo™	0.181	7.9
Kick-Flo®	0.215	7.8
Mean Flow over Head Range	-	4.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	17.6	3.000	27.2	7.000	41.8
0.200	7.9	1.400	19.0	3.500	29.4	7.500	43.3
0.300	9.1	1.600	20.2	4.000	31.5	8.000	44.7
0.400	10.5	1.800	21.4	4.500	33.4	8.500	46.1
0.500	11.6	2.000	22.5	5.000	35.3	9.000	47.5
0.600	12.7	2.200	23.5	5.500	37.0	9.500	48.8
0.800	14.5	2.400	24.2	6.000	38.7		
1.000	16.1	2.600	25.3	6.500	40.3		

Orifice Overflow Control

Diameter (m) 0.205 Discharge Coefficient 0.600 Invert Level (m) 99.232

Appendix G Utility Supply Sheet

Utility Supply Summary Sheet

Job Number:	0657
Revision - Date:	B - 17/07/17

Purbeck Promotion Sites for Wyatt

Utility	Company	Quote	Reinforcement	Provider Contact Details	Summary/Comments	Lead in time
Gas	Scotia Gas Networks (SGN)	£144,282 (exc. VAT)	Reinforcement: None specified Supply: Only Specified Diversion: Not Included	Will Tambrescu will.tambrescu@sgn.co.uk Tel: 01293 818380 Ref: 1411459	SGN to connect from existing 90mmm Low Pressure Main in Wareham Road and install appropriately sized gas infrastructure to suitable locations for 170 domestic properties. SGN will carry out excavation and reinstatement of trenches within public road to the site boundary, however it is the customer's responsibility to ensure excavation and reinstatement of trenches on private land. No meter / housing or meter work is included.	Not Specified
Electricity	Scottish & Southern Electricity (SSE)	£212,000 (exc. VAT)	Reinforcement: None specified Supply: Only Specified Diversion: Not Included	Graham Bendall graham.bendall@sse.com Ref: EJR782-EJR799-EJR814	It is estimated that each potential development site will require the installation of a 11 kV feeder from the network. It is also estimated that one sub-station per site will be required. The preliminary estimates have been based on the assumption that homes will not be electrically heated and no diversion/reinforcement will be required at the sites (however correspondence from SSE suggests that diversion is likely).	Not Specified
Water	Wessex Water (WW)	£TBC (in/exc. VAT)	Reinforcement: None specified Supply: N/A Diversion: None required			X weeks
Telecoms	Openreach	£0 (inc. VAT) (No Charge)	Reinforcement: None specified Supply: Only Specified Diversion: None required	Aaron Leverett aaron.leverett@openreach.co.uk Ref: Form 9964-7221	Openreach will deploy FTTP, free of charge, into all new housing developments of 30 houses of more. Fibre-optic cabling within the development will also be provided free of charge. This does not appear to include diversion of their network (if required).	Not Specified
	Virgin Media	£TBC (in/exc. VAT)	Reinforcement: None specified Supply: N/A Diversion: None required			X weeks