BLANDFORD ST MARY HOMES Ltd

RESPONDENT ID No. 1596

ISSUE NO. 7

APPENDIX MDB 2

FLOOD RISK ASSESSMENT- DRAINAGE STRATEGY

akerman
INFRASTRUCTURE SOLUTIONS
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ST MARY'S HILL, BLANDFORD ST MARY
PROPOSED HOUSING DEVELOPMENT

Drainage Strategy

November 2013
Revision 00

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Rev	Revisions	Date	Author
00	First Issue	3/12/13	

1.0 INTRODUCTION

This report is part of a planning application package for the development of St Mary's Hill, Blandford St Mary. The development will comprise of residential housing and supporting infrastructure and community facilities.

The report explains how stormwater run-off from the site will be managed and discharged so as not to cause undue risk of flooding within and beyond the site. The risk of flooding to the development from flood risk areas outside the site has also been considered.

Figure 1.1 shows the location of the site. The site is located on the south western side of Blandford, adjacent to the A354 Blandford to Dorchester Road and the A350 Blandford to Poole Road. The site covers an approximate area of 10.2 hectares.

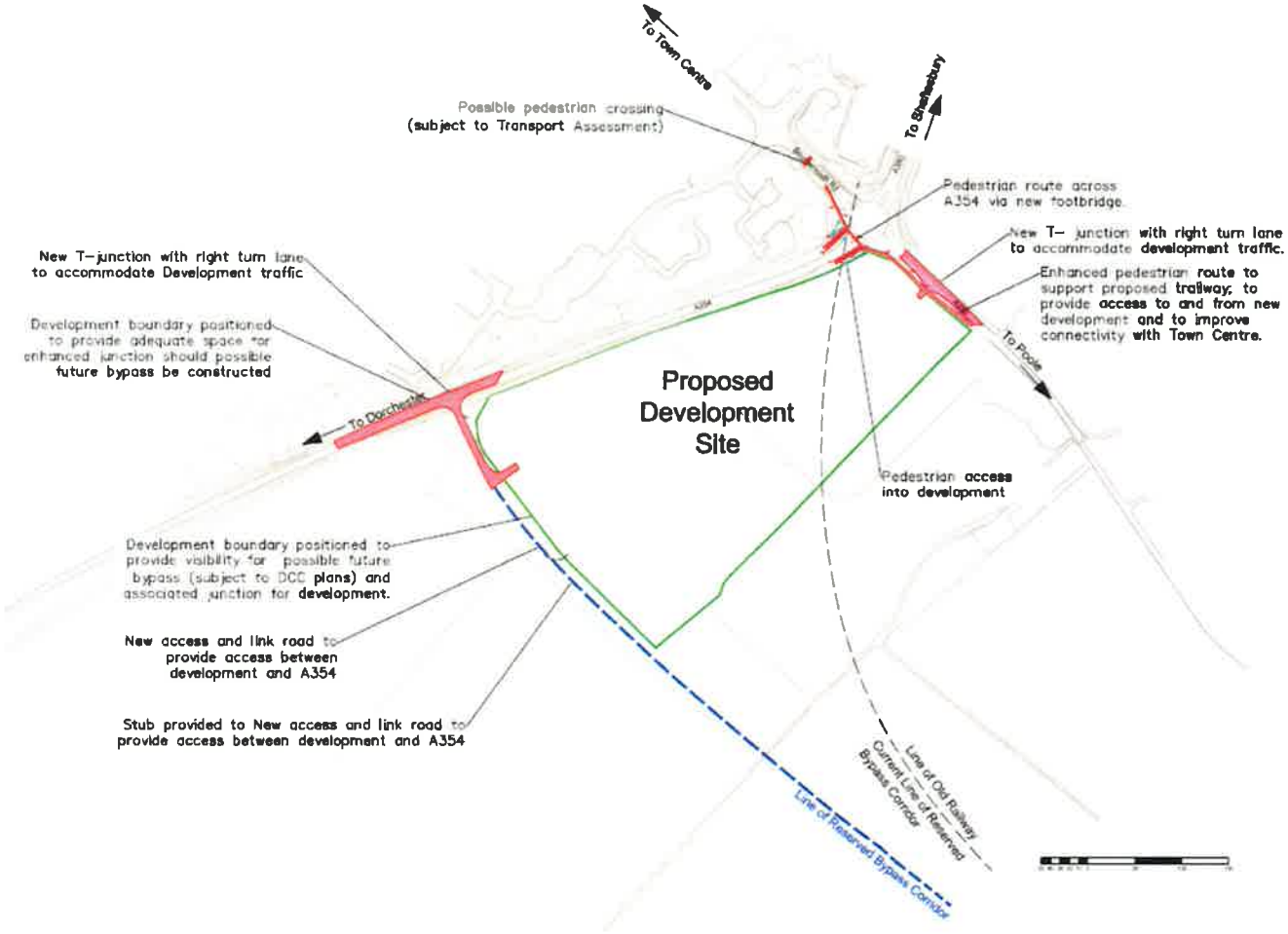

Figure 1.1 – Location Plan

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2.0 EXISTING CONDITION

2.1 Soil Properties

The site is currently used for arable agricultural purposes and is inclined towards the south west with a nominal gradient of 1 in 26. The highest level occurs in the south west corner whilst the lowest level (55. Occurs in the north west corner.

A ground investigation was carried out by Roger Locke Consulting on the 17 October 2013. Figure A1, in Appendix A, shows the location of the trial pits which were excavated. Infiltration tests were carried out on trial pit numbers P1, P2, P3, P6 and P7 as part of the investigation. The infiltration tests were carried out in accordance with BRE Digest 365 guidelines.

The investigation indicated that the site generally comprises of a 500mm topsoil layer overlying hard unweathered chalk. Infiltration rates for the site ranged between 167 x 10^{-6} m/s to 128 x 10^{-6} m/s. The results are considered high and suitable for infiltration drainage systems.

2.2 Flood Risk to Development

The River Stour, the nearest major watercourse, is situated approximately 600m to the north-west of the site. Although the River is categorized as a significant flood risk by the Environment Agency, the associated flood zone falls outside the development site. The lowest part of the site is also approximately 8m above the 0.1% (1 in 1000yr) flood level for the river. Therefore, the risk of flooding to the site from outside sources is insignificant.

3.0 PROPOSED DEVELOPMENT

The drainage strategy is based on the following development proposals:

1. Development will comprise of residential housing (2, 3, 4, and 5 bedroom houses), access infrastructure and supporting community facilities if required. Housing will be distributed at a rate of about 35 properties per hectare.

2. Access to the development will be via a ghost island right turn lane off the A350 and a ghost island right turn lane off the A354.

3. Distributor roads within the site will be 5.5m wide with 2m footways either side.

4. Where possible housing units will include permeable construction for external hard surfaces.

5. Construction will be phased to co-ordinate with infrastructure works. Both highway access points to the development (from the A354 and A350) will be completed on completion of the scheme.

6. A safe and accessible pedestrian route will be provided across the A354 to improve connectivity between the development and Blandford town centre. The pedestrian crossing over the A354 will likely be a grade separated crossing (a footbridge or subway). However, further study will be undertaken to determine the relative merits and disadvantages of an at grade crossing (Pelican or Toucan crossing) prior to selecting the preferred option.

4.0 DRAINAGE STRATEGY

The drainage design will use Sustainable Urban Drainage methods (SuDS) as the primary means of stormwater drainage.

4.1 Drainage for Private Areas

The existing ground conditions are suitable for drainage by infiltration. Therefore the site will comprise of two types of soakaway.

Individual houses will be provided with individual soakaways within their respective plot boundaries. In some cases, where suitable, slightly larger soakaways will be used to serve small groups of houses. Soakaways will either be lined (concrete chamber type) or unlined filled (excavation back filled with clean single sized aggregate). Figure B1 in Appendix B shows a typical detail for a soakaway.

Table 4.1 shows the approximate size of lined soakaways based on individual building footprint areas. They are sized to accommodate a 1 in precise size of soakaways will be determined following more detailed testing during design development.

Property Type	Lined Soakaway	Unlined Soakaway
Plot with 3 bedroom house (105sq.m) and parking area	1.2m diameter 2m deep chamber in 1.5m x 1.5m x 2m deep excavation backfilled with single sized aggregate.	2.5m x 2.5m x 2.0m deep excavation backfilled with single sized aggregate.
Plot with 3 bedroom house (125sq.m) and parking area	1.2m diameter 2m deep chamber in 1.5m x 1.5m x 2m deep excavation backfilled with single sized aggregate.	2.5m x 2.5m x 2.0m deep excavation backfilled with single sized aggregate.
Plot with 4 bedroom house (160sq.m)	1.2m diameter 2.2m deep chamber in 1.5m x 1.5m x 2.2m deep excavation backfilled with single sized aggregate. .	2.0m x 2.0m x 2.2m deep excavation backfilled with single sized aggregate.
Plot with 5 bedroom house (175sq.m)	1.2m diameter 2.5m deep chamber in 1.8m x 1.8m x 2.5m deep excavation backfilled with single sized aggregate.	2.3m x 2.3m x 2.2m deep excavation backfilled with single sized aggregate.

Table 4.1

The above soakaways will be privately owned and not adopted by the Highway Authority or Water Authority.

4.2 Drainage for Public Areas

Where appropriate, the internal road network will be adopted by the local highway authority. Therefore, drainage provision will be designed to meet Highway Authority approval.

Collection of surface run-off will be achieved using gullies and a positive drainage network. The drainage network will discharge into an infiltration facility (cellular type). Lined soakaways (as proposed for private drainage) would not be suitable due to their limited storage capacity.

It is likely that during certain storm events run-off will reach the filtration facility quicker than the rate of infiltration. Therefore, Infiltration facilities will include attenuation storage to hold run-off during storm events. Storage will be sufficient to contain a 1 in 30yr storm with a supplementary 20% to allow for climate change.

Additional temporary storage will be formed within the topography to accommodate more serious storm events (up to 1 in 100yr events plus 30% supplementary allowance for climate change).

The number and location of facilities will be dependent on the development layout. Table 4.2 shows the size of each respective size of soakaway based on a single facility being provided. The estimated drained area (highways, pedestrian areas and community hardsurfaces) will be approximately 2.7 hectares.

Infiltration Facility	Dimensions
Underground Cellular Storage	1 No. 1080cu.m void (30m long x 20m wide x 1.8m high) in an excavation 2.8m deep. Or 2 No. 540cu.m void (20m long x 15m wide x 1.8m high) in an excavation 2.8m deep.

Table 4.2

The infiltration facility would be located on lowest part of the site which is located in the north eastern corner. Figure B2, in Appendix B, show the possible location and extent of the infiltration facility.

Petrol interceptors may be required in communal parking areas and adjacent to the new junctions on the A350 and A354. The highway authority will be consulted as part of the Section 278 process to determine interceptor requirements prior to developing the detailed design for the site.

4.3 Drainage at Highway Interfaces

Access off the A350

The new junction serving the development from the A350 will result in the impermeable highway footprint increasing. Therefore, the existing drainage system will be revised to accept the additional run-off. This will be achieved by the construction of new soakaways; enlargement of existing soakaways or by using oversized pipework to increase attenuation storage within the system. Highway drainage improvements will be to adoptable standards and in accordance with the Highway Authorities requirements.

Based on an infiltration rate of 128 x 10^{-6} m/s, 1No. 1.8m diameter soakaway would be required for the A354 junction and link road to the development.

Access off the A354

A new drainage system will be provided to supplement the existing highway drainage for the proposed junction and associated link road off the A354. The drainage system will comprise of gullies and a positive drainage network discharging to small lined soakaways within the highway verge. The new link road and drainage network will be designed to minimise abortive work in the future should the proposed Spetsbury to Charlton Marshall bypass be developed.

Based on an infiltration rate of 128 x 10^{-6} m/s, 3 No. 1.8m diameter soakaways would be required for the A354 junction and link road to the development.

4.4 Flood Risk from the Development

As proposed above, all stormwater run-off will be contained and managed at source, thereby simulating the existing condition. All private infiltration facilities have been designed to contain run-off from a 1in 30yr storm event plus 20% climate change allowance. During a 1 in 100yr storm event (plus 30% climate change allowance) additional surcharge run-off will be contained within the drainage network for each property and within the topography of each plot.

The adoptable infiltration facilities will be designed to contain run-off from a 1 in 50year storm event plus 30% climate change without surcharging. The topography local to the infiltration facility will be designed to provide additional storage in order to contain surcharge run-off during a 1 in 100yr event surcharge (plus 30% climate change allowance).

Therefore, the risk of flooding to neighbouring property from the site will be insignificant.

APPENDIX A – GROUND INVESTIGATION

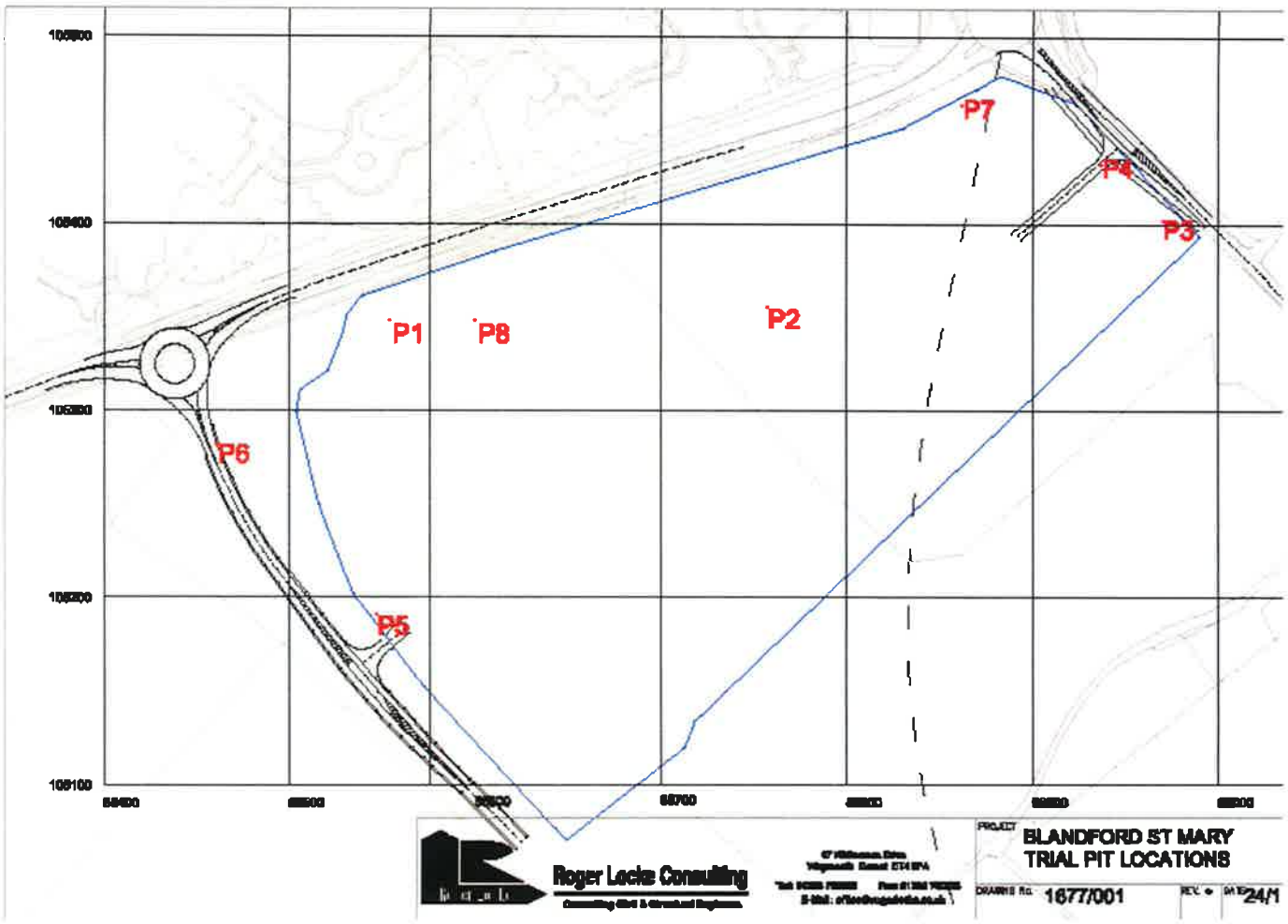
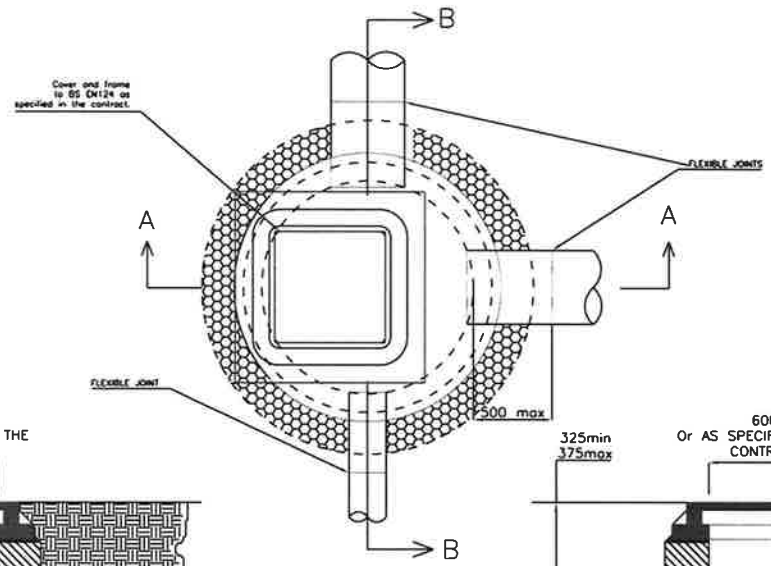


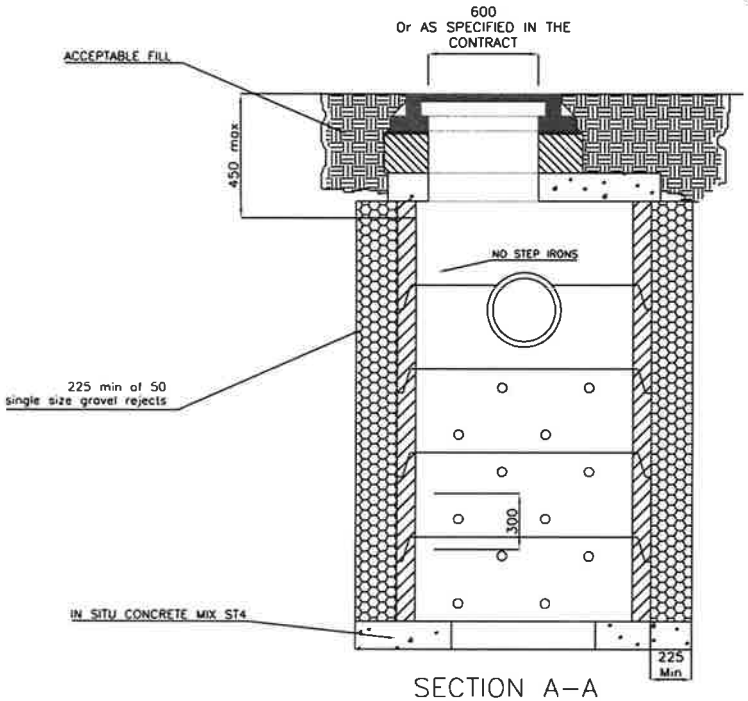
Figure A1 – Ground Investigation Trial Pit Locations

APPENDIX B – DRAINAGE DETAILS

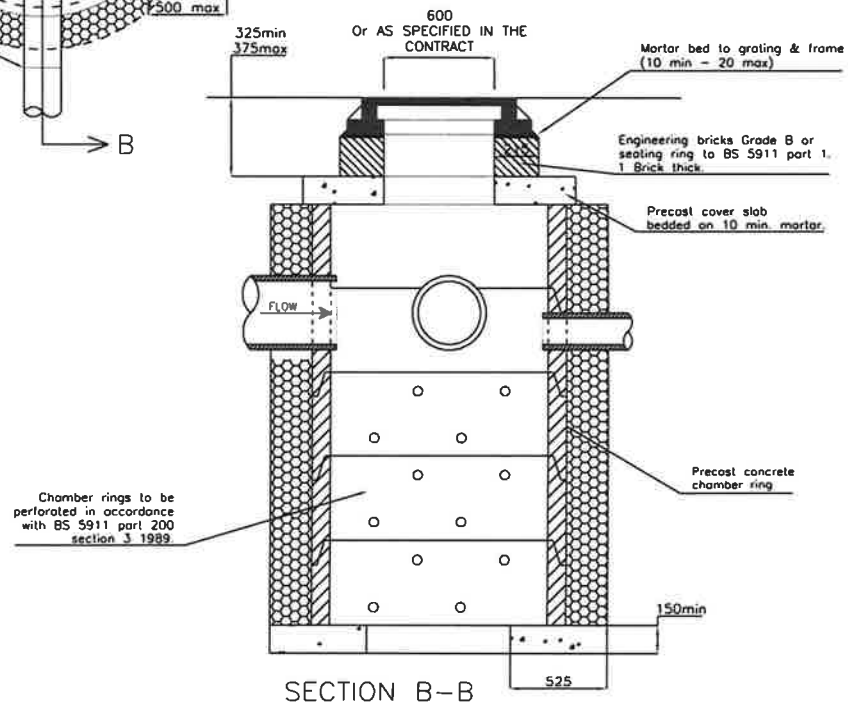
Chamber Sub Type	Chamber Ring Diameter
10a	1350
10b	1800



NOTES:
1. ALL DIMENSIONS IN MILLIMETRES.
2. Chambers to be constructed in precast concrete to BS5911.
3. For invert details, number of branches and type of chamber cover and frame, see the works schedule.
4. Mortar to be Class 1 to SHW series 2400.
5. Pipes to be built into the chamber with Class 1 mortar as detailed in the works schedule.
6. Maximum depth 4000mm.
7. Cover type and grade as specified in the contract.



SECTION A–A



SECTION B–B

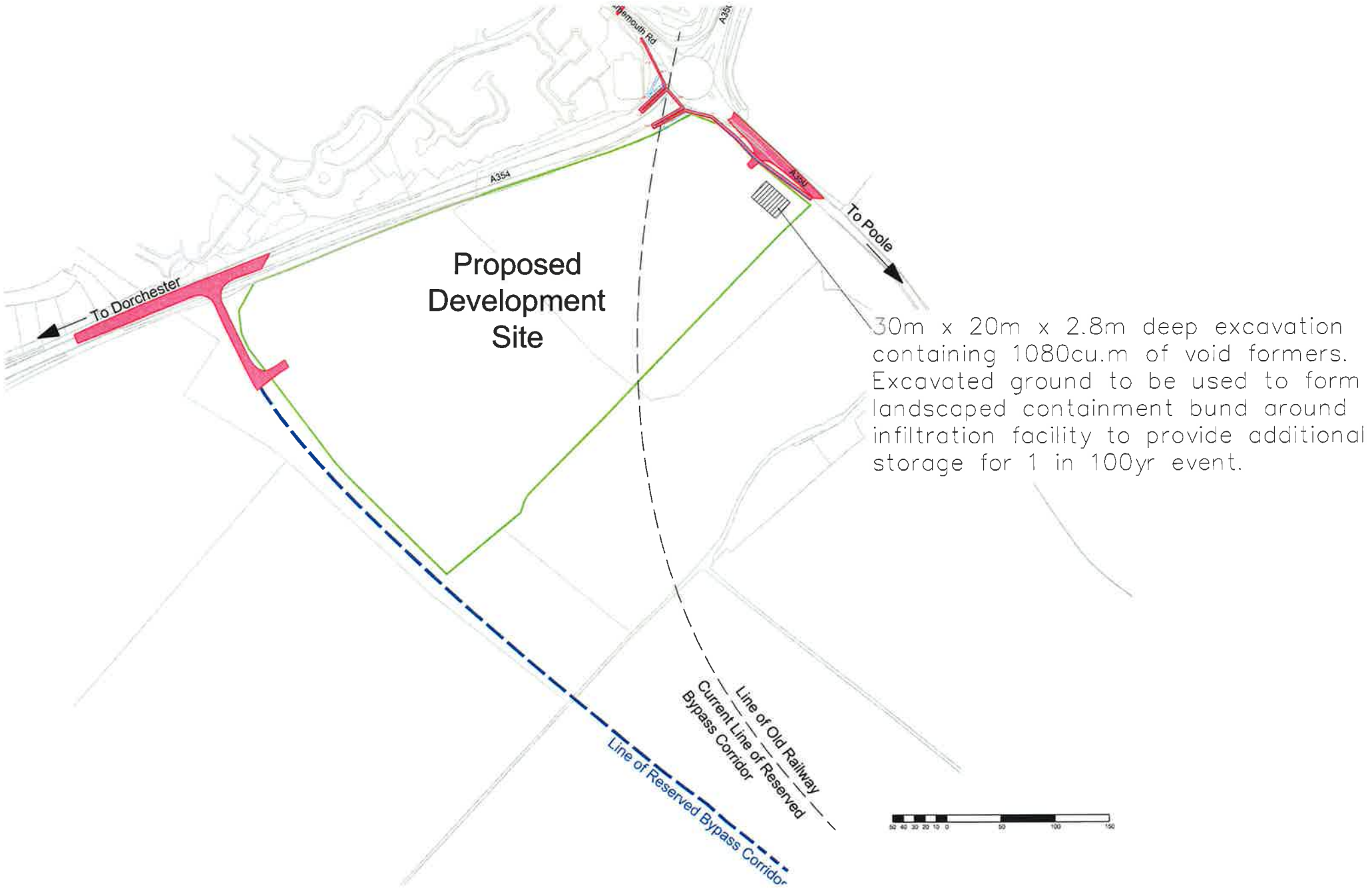


Figure B2 - Cellular Infiltration Facility