



Abbey Park
Humber Road
Coventry
CV3 4AQ
UK

Telephone: +44 (0)2476 505600
Fax: +44 (0)2476 501417
www.rsk.co.uk

RSK ref: 890365-R1(0)
LPA Application ref: APP/19/01101
Environment Agency ref: HA/2019/121846/01-L01

03rd March 2020

Havant Borough Council
Development Control
Civic Offices
Civic Centre Road
Havant
Hampshire
PO9 2AX

By email only

Dear Sir/Madam

Re: Land east of College Road, Campdown, Purbrook, Waterlooville
Response to offsite Watercourse Connectivity Enquiries

1. Background

Further to the comments received from the Environment Agency (EA) and Portsmouth Water (PW) regarding the potential risk posed to groundwater at the proposed development site, we write to provide additional information to address the issues raised in EA's letter dated 30th December 2019 (**Appendix A**) and PW's objection letter dated 20th December 2019 (**Appendix B**).

The proposed development's surface water drainage strategy will outfall into an unnamed watercourse that crosses the site's southern edge. At this point the watercourse is an open channel but is then culverted under the A3(M) motorway and runs east into the Portsdown View residential area. According to published Ordnance Survey (OS) mapping referenced by the EA, the watercourse then appears to flow into a 'sink' raising concerns that flows may connect directly to the underlying groundwater due to the region's karstic conditions.

For ease of reference we have copied the pertinent points from the objection's documents in blue text, however since both documents raise similar issues and recommendations, a joint response has been made: -

2. Objections

EA Position

We object to the application as submitted because the applicant has not supplied adequate information to demonstrate that the risks of pollution posed to groundwater quality in the underlying source protection zone and the associated drinking water supply can be safely managed.

To ensure development is sustainable, applicants must provide adequate information to demonstrate that the risks posed by development to groundwater can be satisfactorily managed. In this instance the applicant has failed to provide this information and we consider that the proposed development may pose an unacceptable risk of causing a detrimental impact to groundwater quality because:

The drainage plan shows the discharge going to a stream, which has been mapped as going to a stream sink within the Source protection zone 1.

Surface water drainage from this site may have the potential to impact on the underlying source protection zone 1 and associated strategically important public water supply.



INVESTORS
IN PEOPLE

RSK Land & Development Engineering Ltd

Registered office

Spring Lodge • 172 Chester Road • Helsby • Cheshire • WA6 0AR • UK

Registered in England No. 4723637

www.rsk.co.uk



We note that the surface water drainage discharges to a small stream to the south that is shown as going to a stream sink on OS mapping. At present, there has been no investigation into this mapped stream sink, present with the application.

Groundwater in the chalk aquifer beneath the site, is within a Source Protection Zone 1, for protection of strategically important water supply sources. It is essential that this supply is protected. Stream sink can represent rapid direct pathways to groundwater.

We would not accept any scheme that discharges surface water run off direct to groundwater in this location.

It is essential that this apparent stream sink is thoroughly investigated to determine if there is any connection to groundwater. Without this being undertaken we cannot assess the likely risks of the development to the underlying SPZ1 and associated strategically important public water supply.

The mapped stream sink should be thoroughly investigated to determine if there is any connection to groundwater. In the event of further information submitted in relation to this objection we would wish to be reconsulted.

Portsmouth Water's Position

Portsmouth Water object to the development based on the proposals provided. The site overlies a Source Protection Zone 1c and much of the site is located on geology designated as a Secondary A aquifer and there are mapped areas of Principal Aquifer within the site boundary.

The proposed surface water drainage strategy is to discharge to the stream to the south of the site. There is a BGS mapped stream sink located along this surface water discharge path which may act as a rapid conduit to the Havant and Bedhampton springs; a vital public water supply. Therefore, the springs are sensitive receptors and development on the site could pose a significant risk to groundwater quality at the Havant and Bedhampton Public Drinking Water Supply. At present, there has been no investigation(s) into this mapped stream sink and the potential risk to groundwater quality at the local public water supply source.

An investigation is required to assess the risks to groundwater quality from the site development works and the proposed surface water drainage. The investigation would need to include an examination into the presence of stream sinks along the discharge path and the risks posed to groundwater quality from the surface water discharge into the adjacent surface watercourse(s). This is to ensure that groundwater quality of the Havant and Bedhampton Springs is protected. We recommend that these investigations are used to produce a hydrogeological risk assessment which addresses the risks posed to our public water supply and if applicable, mitigation measures to prevent future pollution.

3. RSK Investigation and Technical Response

Both sets of objections are based on the assumption that the watercourse passes into a 'sink' directly underground. Given that the Bedhampton areas water supply is provided via groundwater taken from the underlying Chalk Aquifer, there is a concern of potential for contamination. Both responses request further investigation into the open watercourse, the 'sink' and 'issues' areas, and the Bedhampton Springs area to determine if the watercourse connects directly to groundwater and therefore whether water quality could be affected. Neither PW or the EA have referenced any onsite investigation work in their responses and the EA have subsequently clarified that their response was based on OS mapping alone.

To confirm the situation, a walkover of the area combined with an on-site floatation test was performed on 25th February. This located and traced the length of the culverted watercourse by using a floating device to confirm the watercourses connectivity. See survey area in **Figure 1** overleaf and site photographs are included in **Appendix C**.

The area marked as 'sinks' off Portsdown View was found to be a constructed culvert headwall and trash screen (see **Figure 2**) while the issuance point in the 'springs' area emerges in the gardens behind Brookside Road (see **Figure 3**).

A natural spring was found issuing water on the watercourses bank, but this was a short distance downstream from the culvert outlet (see **Figure 4**). The floatation device was introduced in the culvert off Portsdown View

and was later found emerged in the Brookside Road culvert after approximately 17/18 minutes confirming connectivity.

Figure 1 – Survey Location Area



Figure 2 – Watercourse Culvert Inlet adjacent to Portsdown View (Watercourse culverted underground)



Figure 3 – Culvert outlet point in private garden off Brookside Road



Figure 4 – Spring flowing into watercourse channel in gardens behind Brookside Road



A review of public sewer records from Southern Water (see **Appendix D**) did not show the culvert itself, however, we identified a series of details that suggest the presence of a culverted watercourse/surface water sewer in the area.

Our investigations have concluded that the unnamed watercourse does not in fact 'sink' as shown on OS mapping, but rather runs into a surface watercourse culvert that receives flow from several surface water sewers in the area, before outfalling into the downstream open channel in the private gardens adjacent to Brookside Road, approximately 600m downstream.

All of the findings described below are illustrated on an annotated drawing included as **Appendix E**.

- The floatation test proved connectivity between the culvert inlet and outlet with a travel time of approximately 17/18 minutes to cover an approximate distance of 600m.
- The culvert inlet structure located adjacent to Portsdown View had a concrete apron leading into the culvert and no signs of seepage to groundwater or springs were observed in the open channel area between the site itself and culvert inlet structure.
- Surface water outfalls from the attenuation basins constructed to drain the recent development immediately to the east of the A3(M) were observed as outfalling into the watercourse channel upstream of the culvert inlet.
- In areas around Brooklands Road and Penhurst Road, several existing public sewers appear to converge on the areas where the culverted watercourse most likely lies. No expressly identified "watercourse conveyance" culvert is identified in these records, however, most of the identified sewers simply end in these areas, implying they are connected to the culvert as their final outfall point.
- 100m downstream from the culvert inlet structure, the published sewer records show a 750mm surface water sewer starting and running between the properties to the north of Brooklands Road before running parallel with Brooklands Road, Maylands Road and Bedhampton Road. The final 85m of this culvert is not shown on the sewer record mapping but is believed to turn south and run beneath gardens to the east of Brookside Road before outfalling into the open channel shown in Figure 3 and Figure 4.
- The route of this culverted watercourse/surface water sewer is confirmed in **Appendix E**.

4. Conclusion

Our investigations have concluded that the unnamed watercourse does not in fact 'sink' as shown on OS mapping, but rather runs into a surface watercourse culvert that receives flow from several surface water sewers in the area, before outfalling into the downstream open channel in the private gardens adjacent to Brookside Road, approximately 600m downstream.

Given that the watercourse has been confirmed as flowing within a dedicated culvert system it is unlikely that any water or contamination from the proposed development in Campdown will actually enter groundwater in the Bedhampton area.

The desk study and site investigations have also concluded that:

- Downstream of the A3(M) the watercourse in question is classified as a Main River on the EA's mapping, and the EA have Health and Safety signage on the fencing around the culvert inlet structure (AIMS ID 305858).
- With the exception of the first 100m of culvert (downstream of the inlet) and the last 85m (upstream of the outlet) the culverted watercourse also appears as a surface water sewer on the Southern Water Asset Mapping.
- Given the visible increase in the stream discharge at the culvert outlet when compared to the inlet (circa 50% increase in flow) it is confirmed that the culverted watercourse receives inflows along its length which most likely comprise the various surface water sewers shown on Southern Water's asset maps.
- Therefore, far from losing flow to groundwater, it is confirmed that the streamflow receives inflow from the surface water sewer network.
- The water was observed as flowing clear on the day of the survey.



We trust that the above meets with your approval, but should you have any further queries, please do not hesitate to contact the writers.

Yours faithfully,

For RSK LDE Limited



Ben Donoghue
Flood Risk Consultant
Author



Matthew Cheeseman
Associate Director
Technical Reviewer

Enclosed:

- Appendix A:** Environment Agency Objection Letter
- Appendix B:** Portsmouth Water Objections
- Appendix C:** Site Photographs
- Appendix D:** Southern Water Asset Mapping
- Appendix E:** Watercourse Connectivity Annotated Drawing

Appendix A

Havant Borough Council
Development Control
Civic Offices
Civic Centre Road
Havant
Hampshire
PO9 2AX

Our ref: HA/2019/121846/01-L01
Your ref: APP/19/01101
Date: 30 December 2019

Dear Sir/Madam

HYBRID PLANNING APPLICATION COMPRISING; FULL PLANNING APPLICATION FOR THE ERECTION OF 130 DWELLINGS WITH THE CREATION OF NEW ACCESS ONTO COLLEGE ROAD, LANDSCAPE, DRAINAGE, CAR PARKING AND ASSOCIATED WORKS; AND OUTLINE PLANNING APPLICATION FOR UP TO 650 DWELLINGS, COMMUNITY AND NURSERY FACILITY (USE CLASS D1 AND D2), RETAIL UNIT (USE CLASS A1), PUBLIC OPEN SPACE, LANDSCAPING, DIVERSION OF PUBLIC RIGHT OF WAY AND ASSOCIATED WORKS AND INFRASTRUCTURE. LAND EAST OF, COLLEGE ROAD, CAMPDOWN, PURBROOK, WATERLOOVILLE

Thank you for the consultation on the above application, please quote our reference on all correspondence.

We have reviewed the information as submitted and have the following comments.

Environment Agency Position

We **object** to the application as submitted because the applicant has not supplied adequate information to demonstrate that the risks of pollution posed to groundwater quality in the underlying source protection zone and the associated drinking water supply can be safely managed.

Reason

To ensure development is sustainable, applicants must provide adequate information to demonstrate that the risks posed by development to groundwater can be satisfactorily managed. In this instance the applicant has failed to provide this information and we consider that the proposed development may pose an unacceptable risk of causing a detrimental impact to groundwater quality because:

The drainage plan show the discharge going to a stream, which has been mapped as going to a stream sink within the Source protection zone 1.

Environment Agency
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.
Customer services line: 03708 506 506
www.gov.uk/environment-agency
Cont/d..

Surface water drainage from this site may have the potential to impact on the underlying source protection zone 1 and associated strategically important public water supply. This objection is in line with paragraph 170 of the National Planning Policy Framework

Our approach to groundwater protection is set out in [‘The Environment Agency’s approach to groundwater protection’](#). In implementing the position statements in this guidance we will oppose development proposals that may pollute groundwater especially where the risks of pollution are high and the groundwater asset is of high value.

Overcoming our Objection

We note that the surface water drainage discharges to a small stream to the south that is shown as going to a stream sink on OS mapping. At present, there has been no investigation into this mapped stream sink, present with the application.

Groundwater in the chalk aquifer beneath the site, is within a Source Protection Zone 1, for protection of strategically important water supply sources. It is essential that this supply is protected. Stream sink can represent rapid direct pathways to groundwater. We would not accept any scheme that discharges surface water run off direct to groundwater in this location.

It is essential that this apparent stream sink is thoroughly investigated to determine if there is any connection to groundwater. Without this being undertaken we cannot assess the likely risks of the development to the underlying SPZ1 and associated strategically important public water supply.

The mapped stream sink should be thoroughly investigated to determine if there is any connection to groundwater. In the event of further information submitted in relation to this objection we would wish to be reconsulted.

In accordance with the Planning Practice Guidance (Ref. ID: 20150415), please notify us by email within 2 weeks of a decision being made or application withdrawn. Please provide us with a URL of the decision notice, or an electronic copy of the decision notice or outcome.

The Environment Agency will always support and substantiate its objections to major development proposals at appeal wherever a refusal is lodged in line with its advice. If you are minded to grant permission against the Environment Agency's advice, please contact the Planning Liaison Officer named below before making a formal decision to discuss the conditions and informatives that the Environment Agency would wish to apply to this proposal.

If you are minded to approve the application contrary to our objection, we would be grateful if you could re-notify the Environment Agency to explain why material considerations outweigh our objection, and to give us the opportunity to make further representations. Should our objection detailed above be removed, it is likely we will recommend planning conditions to be included on any subsequent approval.

Please do not hesitate to contact me on the number below should you have any queries on the above information.

Yours faithfully

Cont/d..

Mrs Sophie Brown
Sustainable Places Planning Advisor

Direct dial 02030 257250

Direct e-mail planningSSD@environment-agency.gov.uk

Appendix B



Registered Office:
Portsmouth Water Ltd
PO Box 8
Havant
Hampshire PO9 1LG

Tel: 023 9249 9888
Fax: 023 9245 3632
Web: www.portsmouthwater.co.uk

**CONSULTATION UNDER THE TOWN AND COUNTRY PLANNING
(DEVELOPMENT MANAGEMENT PROCEDURE ENGLAND) ORDER 2010**

Applicant:	Persimmon Homes Ltd
Planning Application Reference:	APP/19/01101
Proposal:	Hybrid planning application comprising; full planning application for the erection of 130 dwellings with the creation of new access onto College Road, landscape, drainage, car parking and associated works; and outline planning application for up to 650 dwellings, community and nursery facility (use class D1 and D2), retail unit (use class A1), public open space, landscaping, diversion of public right of way and associated works and infrastructure
Location:	Land East Of, College Road, Campdown, Purbrook, Waterloooville
Date:	20 December 2019

Portsmouth Water's Position

Portsmouth Water object to the development based on the proposals provided. The site overlies a Source Protection Zone 1c and much of the site is located on geology designated as a Secondary A aquifer and there are mapped areas of Principal Aquifer within the site boundary.

The proposed surface water drainage strategy is to discharge to the stream to the south of the site. There is a BGS mapped stream sink located along this surface water discharge path which may act as a rapid conduit to the Havant and Bedhampton springs; a vital public water supply. Therefore, the springs are sensitive receptors and development on the site could pose a significant risk to groundwater quality at the Havant and Bedhampton Public Drinking Water Supply. At present, there has been no investigation(s) into this mapped stream sink and the potential risk to groundwater quality at the local public water supply source.

An investigation is required to assess the risks to groundwater quality from the site development works and the proposed surface water drainage. The investigation would need to include an examination into the presence of stream sinks along the discharge path and the risks posed to groundwater quality from the surface water discharge into the adjacent surface watercourse(s). This is to ensure that groundwater quality of the Havant and Bedhampton Springs is protected. We recommend that these investigations are used to produce a hydrogeological risk assessment which addresses the risks posed to our public water supply and if applicable, mitigation measures to prevent future pollution.

Portsmouth Water will be able to review our position following review of this further information.

When the HRA is submitted, reviewed and accepted by Portsmouth Water, we may be in a position to accept the proposals. We would therefore be in a position to review the application again and recommend planning conditions to enable development.

If the planning authority does not object to the planning application based on our concerns above we wish to be reconsulted so that we can recommend planning conditions.

Notwithstanding our objection, the following recommendations are made in relation to the information provided in the application;

Foul Water Drainage

The proposed foul water drainage strategy will be the connection to an existing public foul main sewer. This is acceptable to Portsmouth Water in relation to groundwater protection, however we would require the use of the highest specification pipework and designs for schemes involving new sewerage systems in SPZ1 to minimise leakage.

Piling & Foundations

Limited information has been provided on the planned foundation design however based on the ground investigations the foundation solution assumed for the site is likely to be a mixture of shallow and deepened strip footings.

Portsmouth Water would welcome shallow foundations as the site lies in a Source Protection Zone 1c for an essential public water supply source. The SPZ1c relates to subsurface activity only, where the Chalk aquifer is confined and may be impacted by deep drilling activities. Subterranean activities such as deep foundation (i.e.) piling may pose a risk to groundwater quality and our local public water supply source.

Portsmouth Water would have a presumption against piling if the piles penetrate the full depth of the clay cover. We would have no objection to piled foundations that terminate within the Clay cover; in this instance we would expect a piling risk assessment and method statement (detailing the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including measures to prevent and minimise the potential for damage to subsurface water infrastructure, vibration and the programme for

the works) to be submitted to and approved in writing by the local planning authority in consultation with Portsmouth Water.

Any piling, if proposed, must be undertaken in accordance with the terms of the approved piling method statement.

Piling or any other foundation designs using penetrative methods can pose a risk to potable supplies from, for example, turbidity, mobilisation of historical contaminants, drilling through different aquifers and creation of preferential pathways.

Construction Environment Management Plan (CEMP)

A Construction Environmental Management Plan will be submitted as part of this application, Portsmouth Water would wish to be consulted on this plan. This plan should detail how all construction activities will be managed and all pollution mitigation measures to be adopted during the construction phase. This should include management of overland runoff, storage of hazardous materials, chemical and hydrocarbons on site and temporary drainage infrastructure to ensure that water resources are not put at risk from leaks or spillages.

Catchment Management Team

Portsmouth Water

catchment.management@portsmouthwater.co.uk

Appendix C

APPENDIX C – Site Photographs

Photo – Unnamed Watercourse within Development Area



Photos – Attenuation Basins off Portsdown View



Photo – Watercourse Culvert off Portsdown View



Photo – Culvert emergence point in gardens behind Brookside Road



Photo – Spring beside watercourse channel in gardens behind Brookside Road



Photo – Watercourse turn to south along Brookside Road



Photo – Watercourse beside Brookside Road



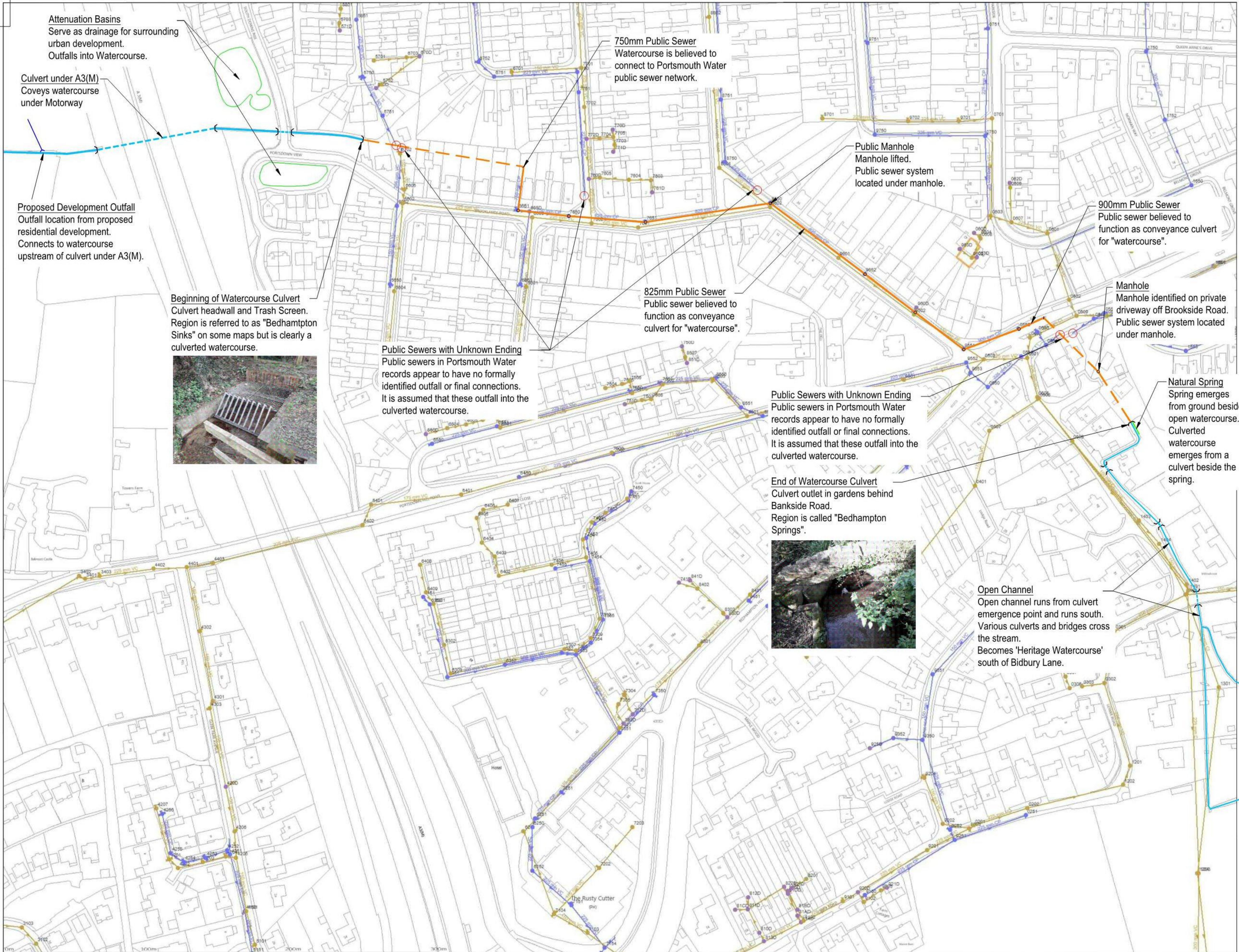
Appendix D

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0201	F	9.30	6.73	
0202	F	8.89	0.00	
0301	F	8.01	5.94	
0302	F	8.37	6.16	
0303	F	0.00	0.00	
0305	F	0.00	0.00	
0306	F	0.00	0.00	
0307	F	0.00	0.00	
0401	F	14.37	12.91	
0501	F	11.81	8.50	
0502	F	14.04	11.65	
0503	F	12.00	8.77	
0504	F	12.02	9.04	
0505	F	10.13	8.05	
0506	F	10.08	7.92	
0507	F	0.00	0.00	
0508	F	8.60	7.05	
0509	F	11.61	8.99	
0601	F	12.17	10.46	
0602	F	11.47	9.50	
0603	F	12.74	11.07	
0604	F	0.00	0.00	
0606	F	0.00	0.00	
0607	F	0.00	0.00	
0608	F	0.00	0.00	
060D	F	0.00	0.00	
062D	F	0.00	0.00	
063D	F	0.00	0.00	
0701	F	15.79	13.93	
1201	F	8.25	6.28	
1202	F	8.14	0.00	
1203	F	7.28	4.05	
1204	F	6.84	0.00	
1301	F	6.66	0.00	
1401	F	7.47	5.78	
1402	F	7.36	5.81	
1403	F	7.63	6.22	
1404	F	7.41	6.00	
1405	F	7.60	0.00	
1501	F	13.88	10.82	
1502	F	13.59	10.19	
1601	F	15.06	0.00	
1602	F	0.00	0.00	
1603	F	0.00	0.00	
1604	F	0.00	0.00	
1701	F	13.73	12.31	
2201	F	4.28	0.00	
2301	F	8.16	6.37	
2302	F	7.06	6.54	
2401	F	8.40	6.15	
2402	F	9.23	6.20	
2501	F	12.66	10.68	
2502	F	13.32	0.00	
2503	F	12.87	9.63	
2504	F	13.09	9.42	
2505	F	0.00	0.00	
2506	F	0.00	0.00	
2507	F	0.00	0.00	
2508	F	0.00	0.00	
2601	F	12.81	0.00	
2701	F	13.90	9.96	
2702	F	0.00	0.00	
2703	F	14.85	10.81	
2704	F	13.93	11.06	
2705	F	0.00	0.00	
2706	F	14.22	10.21	
2707	F	0.00	0.00	
2708	F	0.00	0.00	
2709	F	0.00	0.00	
272D	F	0.00	0.00	
2804	F	14.79	10.53	
2805	F	15.20	12.97	
3102	F	25.71	23.53	
3103	F	26.98	24.81	
3401	F	9.10	7.50	
3401	F	49.02	46.99	
3402	F	7.85	0.00	
3402	F	49.19	47.18	
3403	F	48.71	46.48	
3501	F	10.40	8.97	
3601	F	12.20	9.39	
3602	F	12.27	9.55	
3604	F	12.30	0.00	
3605	F	12.60	7.68	
3701	F	12.74	9.19	
3702	F	12.90	9.98	
4101	F	24.35	22.85	
4201	F	29.59	27.66	
4202	F	28.80	27.38	
4203	F	28.66	27.23	
4204	F	28.57	27.04	
4205	F	28.17	26.84	
4206	F	29.98	28.61	
4207	F	33.21	30.86	
420D	F	0.00	0.00	
4301	F	39.77	38.66	
4302	F	43.80	42.79	
4303	F	39.38	37.95	
4401	F	46.45	44.80	
4402	F	48.03	45.39	
4403	F	45.51	44.45	
5101	F	22.23	20.66	
5401	F	40.04	37.79	
5402	F	40.40	39.37	
5501	F	32.21	30.97	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
5701	F	0.00	0.00	
5702	F	0.00	0.00	
5703	F	0.00	0.00	
570D	F	0.00	0.00	
571D	F	0.00	0.00	
5801	F	0.00	0.00	
6201	F	20.65	0.00	
6301	F	24.90	22.85	
6302	F	24.70	22.67	
6303	F	24.75	22.53	
6401	F	34.86	33.16	
6402	F	24.75	22.89	
6403	F	24.85	23.11	
6404	F	24.80	23.27	
6405	F	24.92	23.48	
6406	F	25.00	23.57	
6407	F	25.12	23.79	
6408	F	24.77	23.06	
6409	F	0.00	0.00	
6501	F	34.26	32.79	
6502	F	28.61	26.58	
6503	F	0.00	0.00	
6504	F	0.00	0.00	
6505	F	0.00	0.00	
6506	F	0.00	0.00	
650D	F	0.00	0.00	
6601	F	23.55	21.66	
6602	F	22.25	19.84	
6603	F	20.19	18.48	
6604	F	25.95	24.04	
6605	F	21.72	19.98	
6701	F	21.43	20.45	
6702	F	0.00	0.00	
6703	F	0.00	0.00	
670D	F	0.00	0.00	
7103	F	14.66	11.26	
7104	F	16.70	14.14	
7202	F	16.59	14.87	
7203	F	0.00	0.00	
7301	F	22.40	21.21	
7304	F	0.00	0.00	
7305	F	0.00	0.00	
7307	F	24.67	22.00	
7308	F	24.65	21.93	
7309	F	24.85	22.03	
7310	F	0.00	0.00	
732D	F	0.00	0.00	
733D	F	0.00	0.00	
7401	F	25.95	24.00	
7402	F	25.82	23.53	
7403	F	25.45	23.23	
7404	F	24.94	22.56	
7405	F	24.62	22.48	
7406	F	24.62	22.64	
741D	F	0.00	0.00	
7501	F	27.88	26.42	
7502	F	26.36	24.87	
7503	F	26.00	23.25	
7504	F	0.00	0.00	
7505	F	0.00	0.00	
7506	F	0.00	0.00	
7507	F	0.00	0.00	
7508	F	0.00	0.00	
750D	F	0.00	0.00	
751D	F	0.00	0.00	
7601	F	18.53	17.08	
7602	F	19.26	17.24	
7603	F	0.00	0.00	
7604	F	0.00	0.00	
7605	F	0.00	0.00	
760D	F	0.00	0.00	
761D	F	0.00	0.00	
7701	F	21.14	19.24	
7702	F	20.24	18.21	
7703	F	0.00	0.00	
7704	F	0.00	0.00	
7705	F	0.00	0.00	
770D	F	0.00	0.00	
771D	F	0.00	0.00	
772D	F	0.00	0.00	
8102	F	0.00	0.00	
810D	F	0.00	0.00	
811D	F	0.00	0.00	
812D	F	0.00	0.00	
813D	F	0.00	0.00	
814D	F	0.00	0.00	
81AD	F	10.32	8.85	
81BD	F	10.35	0.00	
81CD	F	11.03	0.00	
81DD	F	10.67	9.37	
8201	F	10.92	10.43	
820D	F	10.62	9.36	
821D	F	10.81	9.68	
822D	F	10.91	10.91	
8301	F	23.19	22.09	
8302	F	18.89	0.00	
8303	F	0.00	0.00	
830D	F	0.00	0.00	
8401	F	22.57	21.26	
8402	F	0.00	0.00	
841D	F	0.00	0.00	
8501	F	21.50	19.18	
8502	F	19.73	18.11	
8503	F	24.24	22.01	
8504	F	0.00	0.00	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
8505	F	0.00	0.00	
8506	F	0.00	0.00	
8507	F	0.00	0.00	
8508	F	0.00	0.00	
8509	F	0.00	0.00	
850D	F	0.00	0.00	
8510	F	0.00	0.00	
851D	F	0.00	0.00	
8601	F	17.06	15.51	
8602	F	16.47	15.41	
8701	F	16.78	15.11	
8802	F	20.07	18.41	
9101	F	9.19	7.13	
9102	F	0.00	0.00	
9201	F	9.22	6.95	
9202	F	9.81	8.07	
9203	F	9.22	6.79	
9204	F	11.56	8.76	
9205	F	0.00	0.00	
920D	F	0.00	0.00	
921D	F	0.00	0.00	
9301	F	0.00	0.00	
9401	F	19.58	0.00	
9402	F	19.66	18.62	
9501	F	15.76	13.89	
9502	F	16.41	14.85	
9601	F	16.50	15.06	
9602	F	0.00	0.00	
960D	F	0.00	0.00	
963D	F	0.00	0.00	
9701	F	16.03	14.41	
9702	F	16.28	14.68	
0251	S	8.80	8.29	
0350	S	13.40	12.79	
0550	S	14.11	11.68	
0551	S	11.85	10.20	
0552	S	12.32	10.17	
0558	S	11.85	10.89	
0559	S	11.68	9.45	
0560	S	11.98	11.14	
0561	S	12.09	10.58	
0750	S	15.65	13.75	
0751	S	17.23	15.68	
1551	S	13.55	10.64	
1552	S	13.91	10.56	
1553	S	13.64	10.45	
1554	S	12.26	10.32	
1555	S	12.20	0.00	
1650	S	16.65	13.46	
1651	S	0.00	0.00	
1750	S	15.89	13.82	
1751	S	13.73	12.59	
1752	S	0.00	0.00	
2450	S	10.27	8.77	
2550	S	12.60	11.23	
2551	S	12.80	0.00	
2552	S	13.26	0.00	
2553	S	12.66	10.96	
2554	S	11.32	10.20	
2650	S	0.00	0.00	
2651	S	0.00	0.00	
2652	S	12.84	11.44	
2750	S	13.62	11.99	
2751	S	13.95	12.50	
2752	S	12.77	11.89	
2753	S	13.97	12.99	
2754	S	13.86	12.19	
2855	S	14.93	13.89	
3451	S	9.76	7.83	
3452	S	9.12	8.08	
3653	S	12.14	10.64	
3654	S	12.34	10.92	
3750	S	12.94	11.77	
3751	S	12.89	11.78	
3753	S	12.70	11.64	
3754	S	12.59	11.52	
4150	S	24.48	23.52	
4251	S	28.44	27.64	
4252	S	28.61	27.71	
4253	S	28.66	27.77	
4254	S	28.76	27.81	
4255	S	29.70	28.12	
4256	S	32.76	30.68	
5151	S	21.98	21.06	
5650	S	25.64	24.08	
5750	S	22.89	0.00	
5751	S	22.23	0.00	
5851	S	24.48	0.00	
6250	S	20.69	19.83	
6251	S	20.78	19.86	
6252	S	19.34	18.10	
6350	S	0.00	0.00	
6351	S	24.71	23.12	
6352	S	24.40	22.36	
6450	S	30.84	29.34	
6451	S	24.81	23.52	
6550	S	37.11	35.74	
6551	S	34.33	33.15	
6651	S	20.40	18.24	
6652	S	22.36	0.00	
6653	S	23.33	21.89	
665D	S	0.00	0.00	
6751	S	21.57	20.11	
6752	S	22.06	20.58	
7151	S	16.53	15.05	

Appendix E



CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing. Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

KEY:

Proposed Site Boundary

Headwalls / Culvert Inlet and Outlet

Open Channel Watercourse

Culverted Watercourse

Assumed Course of Underground Culvert

Course of Underground Culvert (Public Sewers)

Area of Natural Spring

Existing Attenuation Structures

Public Sewers with Unknown End points that are assumed to outfall into Underground culvert

Proposed Development Surface Water Outfall

P01	03.03.20	Preliminary Issue.	BTD	MEC	MEC
Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

LAND & DEVELOPMENT ENGINEERING LTD

Abbey Park
Humber Road
Coventry
CV3 4AQ
United Kingdom

Tel: +44 (0) 24 7650 5000
Fax: +44 (0) 24 7650 1417
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

PERSIMMON HOMES

Project Title

LAND OFF COLLEGE ROAD
CAMPDOWN, PURBROOK
WATERLOOVILLE

Status

FOR INFORMATION

Drawing Title

ANNOTATED
WATERCOURSE CONNECTIVITY
DRAWING

Drawn	Date	Checked	Date	Approved	Date
BTD	03.03.20	MEC	04.03.20	MEC	04.03.20
Scale	Orig Size	Dimensions	Revision		
1:1250	A1	M	P01		

Drawing File

2020-02-27 RSK 890365 ANNOTATED DRAWING.DWG

Project No.	Originator	Unit	Site Area	Series	Number	Sheet
890365	RSK	C	ALL	SK	01	01

0 25 50 75 100m

Scale 1:1250

Our Ref: 364173 - 1

(c) Crown copyright and database rights 2020 Ordnance Survey 100031673 Date: 22/01/20 Scale: 1:1250 Map Centre: 469845,106485 Data updated: 18/12/19 Our Ref: 364173 - 1

File location: D:\PLD\PROJECTS\890365 - CAMPDOWN, PURBROOK\GRAPH\2020-02-27 RSK 890365 ANNOTATED DRAWING.DWG