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Environmental Statement Addendum – Appendix 7 Supplementary Karst Report

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1. SUPPLEMENTARY KARST REPORT

1.1. INTRODUCTION

1.1.1.1. Following the submission of the Application, Portsmouth Water ('PW') and the Environment Agency ('EA') responded with a series of comments to the Environmental Statement ('ES'). Several of the comments related to the known karst landscape and associated dissolution features, which the Order Limits cross. Portsmouth Water and the EA raised concerns that risks associated with the karst landscape had not been considered fully in the ES. In particular, the potential for the presence of karst dissolution features (e.g. sinkhole, conduits) which may connect to springs or abstractions used for public water supply, therefore resulting in an impact to these sources. These are the Lovedean source and also the Havant and Bedhampton ('H&B') source, which are both protected by groundwater Source Protection Zones ('SPZ').

1.1.1.2. As not all information related to other studies was originally submitted with the Application, the concern raised was that issues related to the potential presence of dissolution features had been underestimated in the risk assessment.

1.2. AIMS/SCOPE

1.2.1.1. The aims of this report are to:

- present in detail all information presently available on the karst dissolution features in the Order Limits and the catchment(s) in Onshore Cable Corridor Sections 1, 2 and 3 and the catchment(s), including the Converter Station Area;
- expand upon the hydrogeological conceptual model to include these features and present a more detailed model;
- state the current understanding of the potential impact of the Proposed Development with respect to potential pathways for groundwater pollution via karst dissolution features;
- present groundwater level and water quality data;
- discuss the proposed mitigation measures with respect to the findings and current understanding, and suggest further actions (if necessary); and
- summarise the findings.

1.2.1.2. The scope of the report is to focus on covering the above aims, while addressing matters raised in the Relevant Representations by Portsmouth Water and the EA (RR-005 and RR-165 respectively). Portsmouth Water's specific concerns (as provided in the Relevant Representation) were as follows:

- Comment 2.1 - That insufficient weight/importance was assigned to the potential for solution features in this (ES) Chapter and their role in the risk assessment (Comment 2.1);
- Comment 3.3 - That interpretation of the Hydrogeological Map for Hampshire & Isle of Wight was incorrect and this section, along with the Conceptual Site Model ('CSM') required revision to address solution features. The CSM should represent the regional understanding as a whole and with these inaccuracies and the exclusion of solution features, anticipated groundwater levels and water quality, the CSM was said not to represent the catchment adequately;
- Comment 3.13 - There was no reference to a solution feature database or similar. There are products available, known to Portsmouth Water, that provide information on the Karstic nature and landforms present within this catchment. Without this information significant pathways and linkages are missing and the assessment weakened;
- Comment 3.14 - The paragraph correctly states that Section 1 is in a Source Protection Zone 1 ('SPZ1') for our Lovedean Source but omits it is also in the SPZ1 for the H&B Springs. It is acknowledged that the report does refer to the SPZs for the H&B Springs elsewhere, but this should be addressed in this section;
- Comment 3.20 - The Lovedean Public Supply Borehole may provide water quality data for Section 1 and is likely to be representative, as the proposed convertor station falls within its SPZ1. This information should be requested from Portsmouth Water and the details incorporated in the assessment;
- Comment 3.28 - Any impacts on groundwater quality will be, dependent on the nature of the impact, long term, possibly permanent, direct and the mitigation measures outlined in 19.6.1 and 19.8 are said not to cover all the potential sources/pathways of pollution/contamination and therefore do not cover off all the potential risks.

1.2.1.3. The aim is not to repeat the contents of the ES, but to add to and expand upon what was already presented within the ES, and address the comments raised by Portsmouth Water as listed above.

1.4. DISSOLUTION FEATURES

1.4.1.1. Dissolution features are aspects of karst landscapes, which can include sinkholes, dry valleys, sinking streams, conduits, vertical shafts, caves and springs. Where present, such features can offer a fast pathway for groundwater pollution from the ground surface.

1.4.1.2. Further Information related to the presence of karstic dissolution features near to the area of the Proposed Development are available. The additional data sources were reviewed against geotechnical and project information contain in submitted Chapter 19 (Groundwater) paragraph 19.5.1.1 paragraph (APP-134). Additional baseline sources of information were:

- Site walkover observations (Appendix A.2 of UK Converter Station Ground Investigation Geotechnical Interpretative Design Development report); and
- Peter Brett Associates ('PBA') Natural and Mining Cavities Dataset (Appendix B of UK Converter Station Ground Investigation Geotechnical Interpretative Design Development report).

1.4.1.3. The karstic dissolution features identified in the Geophysical Report and also the PBA Natural and Mining Cavities Dataset are considered confirmed features. Those recorded on the site walkover are observed features which may be karstic dissolution features. These have been identified as areas of depression or apparent infilling. All of the recorded, confirmed and potential karst dissolution features are shown on Plate 1.1 (below).

1.4.1.4. Plate 1.1 also includes the Order Limits, the Converter Station Area (Converter Station Options B(i) and B(ii)), and areas of Source Protection Zones and the distribution of Head deposits (British Geological Survey ('BGS') map data).

1.4.1.5. Plate 1.1 shows that there are at least two karstic dissolution features, identified using Geophysical investigation techniques, within the Converter Station Area. These are identified as features S2 (at approx. British National Grid Reference SU 67173 13467) and S3 (at approx. SU 67216 13649) on Plate 1.1, and which are both located in Section 1 of the Onshore Cable Corridor. Ground Investigation ('GI') works (undertaken in October 2018), which included cone penetration testing ('CPT'), indicated that both of these features had been naturally infilled with chalk. The tests indicated that this was Grade D (structureless) Chalk.

1.4.1.6. There is an additional feature, S1, further south (at approximately SU 67390 13049), which is outside of the Order Limits (Onshore Cable Corridor, Section 1), approximately 50 m south of it. The CPT test also indicated that it was filled with Grade D (structureless) Chalk.

1.4.1.7. There are also several potential karstic dissolution features, which are areas of depression or apparent filling, and are therefore potentially solution features (potentially they are historical man-made chalk pits). Only one of these is located within the Order Limits at the Converter Station Area, approximately 15 m south east of S3.

1.4.1.8. A further six of these features are located to the south, however none of these are within the Order Limits.

1.4.1.9. The PBA dataset information was also included on Plate 1. Most of these features identified in the PBA dataset were outside of the Order Limits, however one swallow hole, no. 3711, was found to be located within the existing Lovedean Substation (at approx. SU 67502 13498). The nearest features identified on the PBA dataset were two swallow holes to the east, 3710 (at approx. SU 67809 13599) and 3709 (at approx. SU 67904 13603). There was one other swallow hole, 3712, approximately 615m south (at approx. SU 67802 12990).

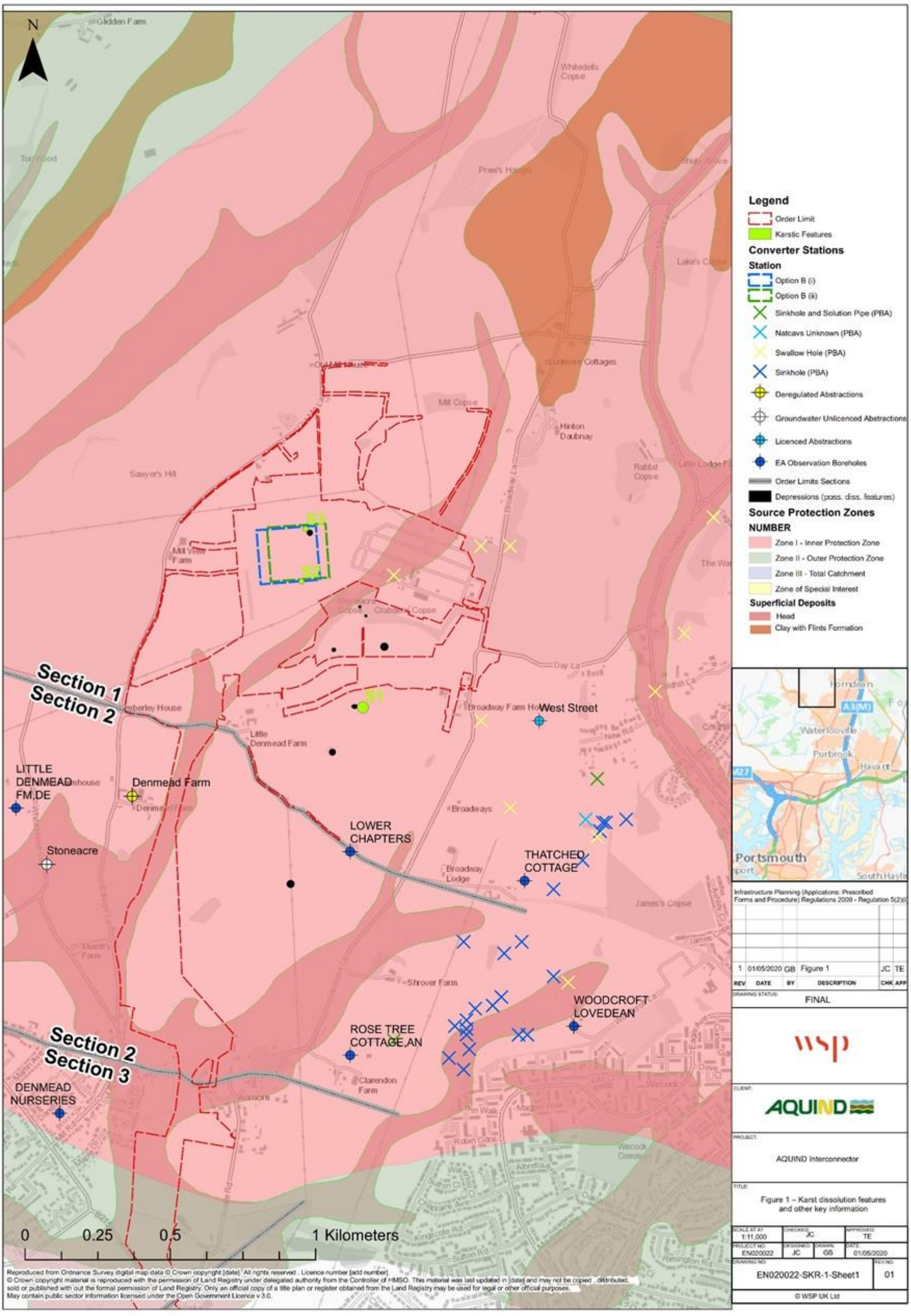

Plate 1 - Karst dissolution features and other key information

1.4.2. SUPERFICIAL DEPOSITS AND ONSHORE CABLE ROUTE TRENCH EXCAVATION WORKS – SECTIONS 1, 2 AND 3 ONLY

1.4.2.1. There are superficial deposits which are Head deposits located within the Order Limits. Head is poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes (BGS Lexicon of Named Rock Units - Result Details, 2020).

1.4.2.2. A potential mitigation strategy for reducing the risk of the cable trench excavation works interacting with karst dissolution features is for the trench excavation works to only be undertaken at shallow (<1.5 metres below ground level ('mbgl')) depth and in the Head deposits, and not in the Chalk. Plate 1.1 shows the distribution of the Head deposits with respect to the Order Limits. The plate shows that according to the BGS the Head deposits should be present for much of the area within Onshore Cable Corridor Sections 1, 2 and 3, however that there are also areas within those sections where the deposits are not present according to BGS data. Twelve boreholes were drilled for the 2018 GI, which suggest a far more widespread cover of Head deposits. The borehole logs for the boreholes indicate a thickness of the Head deposits of between 1.7 and 3.7 m. This is comparable to the borehole logs available on the BGS GeoIndex at the location of the existing Lovedean Substation, from a GI which was undertaken in 1964 (13 boreholes were drilled). These boreholes indicate a Head deposit thickness of between 1.5 and 7.0 m (though 7.0 m was at only one borehole, the remainder show less than 4 m). This shows that there is up to 5.5 m variability in thickness of the Head deposits. In the available borehole logs for the area, Head deposits are described as a slightly sandy slightly gravelly clay (with a low cobble content).

1.4.2.3. The available GI information suggests that it may be possible to install the Onshore Cable Route entirely within the Head deposits in Section 1, 2 and 3 (where trenching is proposed) to avoid the Chalk. The contractor may decide to undertake more GI to confirm that this is feasible prior to construction starting (if required to support the discharge of Requirement 13). Regardless, if the installation of Onshore Cables has to be undertaken locally in the Chalk, mitigation measures will be in place. The Applicant will discuss these further with PW and EA to agree outline mitigation measures in the course of Examination. Examples of such mitigation measures are discussed later in this report (Section 1.7).

1.5. ESTABLISHED FACTS AND UNCERTAINTIES

Table 1 describes the established facts regarding the karst dissolution features and superficial deposits and also the current uncertainties regarding these.

Table 1 - Established Facts and Uncertainties

Established Facts	Uncertainties	Resolutions
Karst dissolution features are locally present within the Order Limits, and within the Converter Station Area but a higher density of such features has been observed only outside the Order Limits (to the east).	Despite the investigations undertaken so far it cannot be excluded that other features will be encountered during construction.	This is primarily a concern in areas where the cable trench may need to be excavated in Chalk outcrop. Mitigation measures will be in place which provide a catalogue of actions should previously unknown karst dissolution features be encountered.
Confirmed dissolution features within the Order Limits were identified as infilled, i.e. at least at shallow to medium depth not offering effective quick pathways for potential pollution spread.	The true extent of the infilling of the known karst features, designated as S1, S2 and S3, deeper below ground. The geophysical surveys did indicate that there were no void spaces (to a maximum survey depth of 25 to 30m, however below this depth is not known).	The known karst dissolution features in the Converter Station Area are proposed to be sealed with inert grout prior to construction works starting.
The underlying Chalk aquifer is within SPZ 1, hence the Lovedean and H&B springs public water supply abstractions are expected to be the receptor for groundwater recharge in this area.	The degree of connectivity (fast flowpath) of the identified karst dissolution features with respect to the underlying Chalk aquifer and consequently the public water supply abstractions at Lovedean and H&B springs.	There are proposed mitigation measures for both Horizontal Directional Drilling ('HDD') and cable trench excavation works to address the issue of the karstic dissolution features and potential fast flow paths to the abstractions at Lovedean and H&B springs.
The Head deposits are present in most areas, within the Order Limits, at a thickness of between 1.5 m and 7 m. The logs of the 2018 boreholes and some of the 1964 boreholes indicate that Head deposits are present in areas where they are not	The GI work undertaken to date indicates that there should be a covering of Head deposits across Sections, 1, 2 and 3. However, it is unclear whether the Head deposits are present everywhere in sufficient thickness to accommodate the cable trench.	Regardless, if the installation of Onshore High Voltage Direct Current ('HVDC') Cables, cable excavation has to be undertaken locally in the Chalk, mitigation measures will be in place. The Applicant will discuss these further with PW and EA to

Established Facts	Uncertainties	Resolutions
indicated on the BGS geological map.		agree [outline] mitigation measures in the course of Examination.

1.6. WATER LEVELS AND GROUNDWATER QUALITY

1.6.1. EA GROUNDWATER LEVEL DATA

1.6.1.1. Groundwater level data recorded in several observation boreholes was received from the EA. This is shown on Plate 2. Plate 2 also includes rainfall data from the weather station at Hurn, located approximately 57 km to the west (source: Met Office). The period covered is 1967 to 2018.

1.6.1.2. The locations of the boreholes are shown on Plate 1. The water levels in the majority of the boreholes are shown to fluctuate predominantly due to seasonal variations. The range varies at different boreholes but is generally between 45 and 30 metres Above Ordnance Datum ('mAOD') at most locations. The borehole at Sheepwash Lane showed a significant variation, in one year ranging from a high of 40 mAOD to a low of slightly under 24 mAOD. Other years showed a less significant change. This may be due to some years being significantly drier than others, however this is not completely clear when comparing rainfall to water levels as shown on Plate 2. This may be explained by the data being monthly manual dip data, which would not show short-term responses to rainfall, but are indicative of long-term changes in groundwater level. Abstractions may also be having an impact on regional water levels.

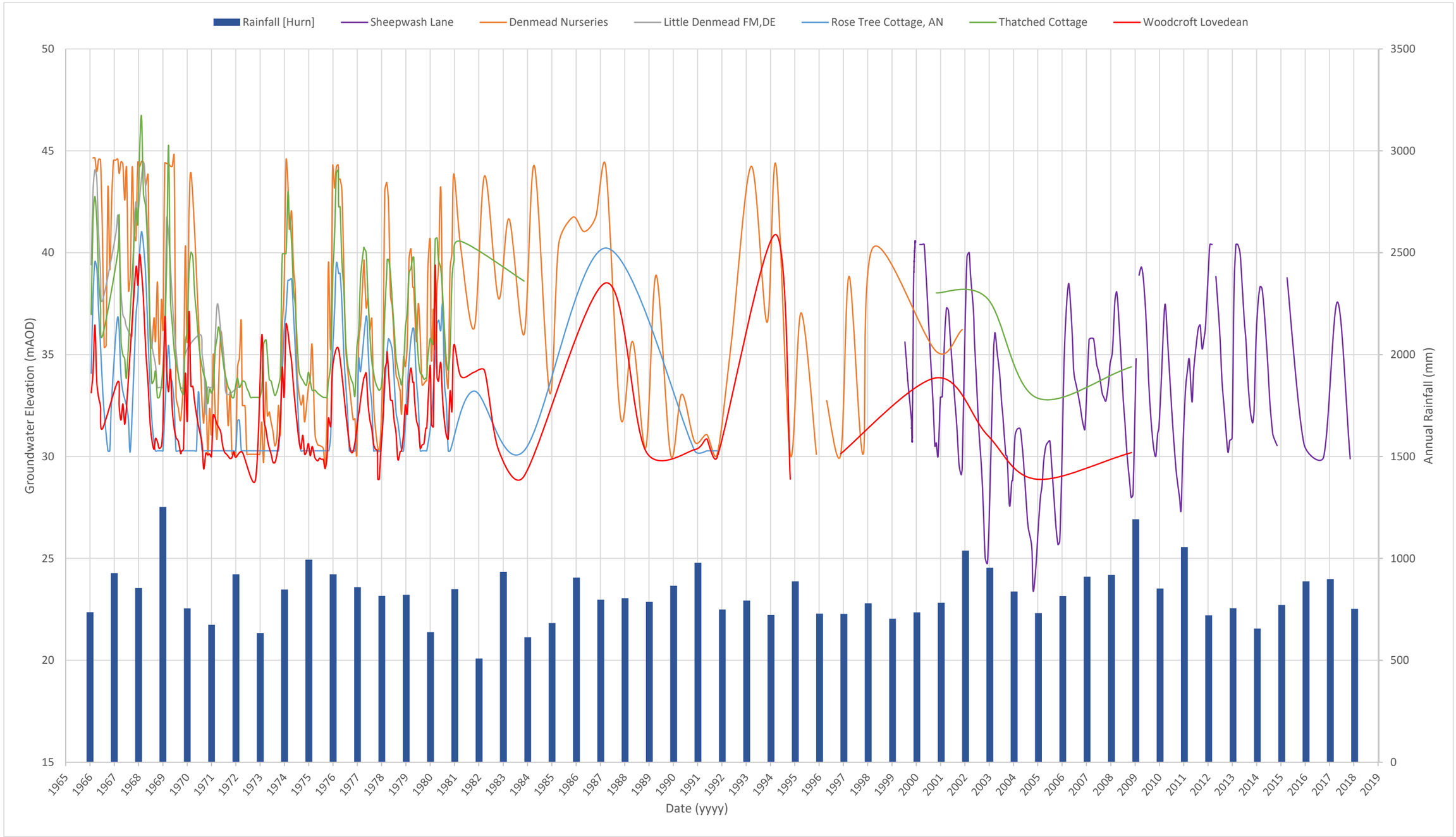

Plate 2 - Groundwater level data (and rainfall) from EA observation boreholes 1967 to 2018

1.6.2. HYDROGEOLOGICAL MAP

1.6.2.1. The Hydrogeological Map of Hampshire and the Isle of Wight (Institute of Geological Sciences, Southern Water Authority, 1979) provides information on water levels in the area of the Proposed Development. The water levels presented are based on water level data collected in October 1973. In Onshore Cable Corridor Sections 1, 2 and 3, the potentiometric surface of the Chalk (aquifer) is given as between 40 mAOD (approx. 40 mBGL) (Section 1) and 20 mAOD (approx. 20 mBGL) (Section 3). This then gradually lowers to less than 10 mAOD (approx. 0 mBGL) further south at H&B Springs. This indicates a groundwater flow direction from north to south. At the Lovedean public water supply source, the water level is shown at approximately 30 mAOD (approx. 35 mAOD). These water levels tie in with those recorded at the EA observation boreholes shown on Plate 2.

1.6.3. PORTSMOUTH WATER CHEMISTRY DATA

1.6.3.1. In addition to the water quality data discussed in ES Chapter 19 (Groundwater) of the 2019 ES (APP-134, Section 19.5.5.9), water quality data for the Lovedean Source was provided to WSP by Portsmouth Water. The data covers the period from 4 January 2017 to 20 March 2020. The suite of determinants included major ions, heavy metals and others such as benzene, ammonium (as N and NH4), nitrates, Polycyclic Aromatic Hydrocarbons ('PAHs'), total alkalinity (as CaCO, $CaCO_3$ and HCO_3), total hardness (as CaCO and $CaCO_3$ and Ca), and turbidity (the measure of the relative clarity of a liquid).

1.6.3.2. It is not expected that the works would have potential to impact on concentrations of most of these determinants in the water at the Lovedean Source or at the H&B Springs source. Table 2 presents some key determinants which could have the potential to be impacted by the works in the event of a pollution incident.

Table 2 - Concentrations of key determinants at the Lovedean Source

	Turbidity (NTU)	Benzene (ug/l)	Nitrate (mg/l as NO_3)
Minimum	0.09	<0.02	34.0
Maximum	0.80	<0.02	48.8
Average	**0.26**	**<0.02**	40.1

1.6.3.3. Turbidity is the most obvious example, which is shown to range from 0.09 Nephelometric Turbidity Units ('NTU') to 0.8 NTU, with an average of 0.26 NTU. The trench excavation or drilling works have the potential to cause an increase in turbidity, should (inert) drilling fluids (mixed with obliterated rock material) or run-off be inadvertently discharged into a karst dissolution feature such as a swallow hole or sinkhole.

1.6.3.4. Benzene has also been included in Table 2, as a mobile constituent of petroleum fuel, and a fuel leakage or spillage directly on the ground which then enters the underlying aquifer (through fissures) may result in an increase in benzene concentrations at the source (a vehicle/plant fuel spill kit/drip tray would mitigate this risk).

1.6.3.5. Nitrate concentrations are also shown in Table 2, which range from 34.0 to 48.8 Milligrams per litre ('mg/l'), at an average concentration of 40.1 mg/l. It is not expected that the works would cause an increase in nitrate concentrations directly. However, should the proposed works cause existing karst dissolution features which are currently filled with chalk to be opened, this may make it easier for nitrates (from agricultural fertilizers) to be directed into dissolution features and reduce travel time to the source.

1.6.3.6. The potential issues described above are theoretical issues not taking into account requirements for good practice construction methods and proposed mitigation measures as discussed in and secured by the Onshore Outline Construction Environmental Management Plan ('CEMP') (APP-505).

1.7. IMPLICATIONS FOR CONCEPTUAL SITE MODEL

1.7.1.1. The information presented in this report adds further detail to the hydrogeological conceptual model presented and described in Section 19.5.6 of the ES Chapter 19 (Groundwater). It is not intended to repeat the detailed assessments which have been undertaken previously in the ES. The assessments presented in the ES chapter had taken into account proposed mitigation measures, including the avoidance of previously mapped dissolution features.

1.7.1.2. The available information shows that there are karst dissolution features present in both the Converter Station Area and Lovedean Substation. Currently, no karst dissolution features have been identified in the area within the Order Limit to the south of the proposed Converter Station options, in which the Onshore Cable Corridor is located. Mitigation measures for dealing with unexpected karst dissolution features are discussed in a later section of this report and included in the updated Onshore Outline CEMP (APP-505 Rev002, Section 5.6). Mitigation measures for the Converter Station have been discussed in the ES (Chapter 19 (Groundwater), Section 19.6).

1.7.2. ASSESSMENT OF POTENTIAL PATHWAYS FOR GROUNDWATER POLLUTION VIA KARST DISSOLUTION FEATURES

1.7.2.1. Rapid flow connections between these particular karst dissolution features and the public water supply abstractions at Lovedean and H&B Springs are not known. It is sensible to assume that there are connections between the features and the sources as indicated by the SPZ1, as defined by the EA. This could potentially make transport times between a dissolution feature and the sources very rapid (as indicated by tracer tests referred to in the ES) and hence requires mitigation as described in the Chapter 19 (Groundwater) (Section 19.7) and the updated Onshore Outline CEMP (APP-505 Rev002, section 6.2.5). Considering the collected information and proposed mitigation such risks are considered to be managed down to a **Negligible** risk.

1.7.2.2. The Principal Aquifer (Chalk) including areas designated SPZ1, and public water supply sources at Lovedean and H&B Springs have a **High** Sensitivity. This sensitivity rating is derived using the matrix shown in Table 19.3 of Chapter 19 (Groundwater).

1.7.2.3. There is a potential for the proposed cable trench laying works to result in an increase in turbidity at the Lovedean and H&B Springs sources. Without environmental management and proposed mitigation measures the displacement of soil overburden could result in overland runoff carrying a significant amount of suspended sediments. Unchecked, this could then flow into one or some of the karst dissolution features which may have a very fast travel time to the Lovedean and H&B Springs Sources. An increase in turbidity at these sources above the permitted turbidity threshold would cause the supply to shut down, at least temporarily. This would be an impact Magnitude of **Major**, and therefore would be of **Major Significance** (see Table 19.4 of Chapter 19 (Groundwater) of the 2019 ES.

1.7.2.4. Similarly, in the unlikely event of an untreated fuel spillage, which in theory could enter karst dissolution features causing hydrocarbon concentrations to rise above the permitted concentration at the source, e.g. for benzene. This would also result in an impact of **Major Significance** without mitigation.

1.7.2.5. The potential opening of karst dissolution features (currently filled with structureless chalk) by the works resulting in an increased transportation of nitrates to the sources and potentially impacting on them is potentially a more long-term risk. Without mitigation the impact of increased nitrate concentrations due to opening of karst dissolution features by the works is also **Major Significance**.

1.7.2.6. It should be noted that the proposed works are undertaken only in a very small area of the overall water supply catchment areas and that the results of the studies described in this Technical Note were used to actively avoid karstic dissolution features in the design and to propose detailed mitigation measures (Converter Station). As stated in the ES, when taking the implemented and proposed mitigation measures (Chapter 19 (Groundwater), Section 19.7) (outlined in Section 1.7 below) into account, the Magnitude of the impacts for the contaminant sources discussed above (turbidity spikes, fuel spillages/Benzene, and nitrate concentrations) is substantially reduced, and therefore can be downgraded to **Negligible**, resulting in a **Negligible Significant** residual effect.

1.7.2.7. There is also the possibility that the HDD works will encounter karst dissolution features, which can be present in materials overlying the Chalk, where a feature in the Chalk has caused some movement of material in the overlying strata. This issue is discussed further in greater detail in Chapter 19 (Groundwater) of the 2019 ES, section titled “HDD Groundwater Level and Flow Embedded Mitigation Measures” (pages 19-40), and also the updated Onshore Outline CEMP (APP-505 Rev002), section titled ‘HDD Groundwater Level and Flow’ within Section 6.2.5.

1.7. MITIGATION

1.7.1.1. The mitigation strategy for the Construction Stage (and Operational Stage) aims to mitigate any potential impacts to the groundwater receptors. The mitigation measures for dealing with the presence of karst dissolution features are discussed in detail in the updated Onshore Outline CEMP (APP-505 Rev002) however key elements are summarised here:

- The Onshore Cable Route trench excavation works will be undertaken in the superficial Head deposits in Sections 1, 2 and 3, and not the Chalk unless head deposits are of insufficient thickness (or not present);
    - If the Head deposits are of insufficient thickness (or not present), making excavating in the Chalk unavoidable, care will be taken to avoid fracture zones and karst features. The appearance of any sudden increase in thickness of Head deposits during trenching could indicate the presence of a karst dissolution feature.
- During the construction works a watching brief will be employed to detect any unknown karst dissolution features;
- Any detection of karst dissolution features, (during cable trench excavation works) may result in a temporary pause in the works on site for the engineer on site to determine which of the actions in the catalogue of mitigations agreed with PW and the EA should be applied;
    - PW and the EA will be notified should such an instance occur;
    - The engineer on site may determine that the karst dissolution feature is sufficiently filled by low-permeability overburden that it presents little or no risk of acting as a pathway for potential contaminants during construction, and therefore works can continue.
    - A potential option where risk of the karst dissolution feature acting as a pathway for potential contaminants during construction is identified would be to alter the course of the Onshore Cable Route within the Order limits to avoid the dissolution feature.
    - In the alternative the karst dissolution feature may be filled with impermeable grout before continuing the works.
- A drainage strategy will be put in place during the works, which will ensure that no untreated runoff is allowed to runoff freely and potentially enter karst dissolution features. All runoff from the site during works is to be treated;
- Drip trays and spill kits will be utilised throughout the works to prevent fuel spillages, and;

- If required to support the discharge of Requirement 13, more GI may be undertaken to confirm ground conditions and identify the Onshore Cable Route (i.e. trenching strategy by the contractor as part of detailed design) in Sections 1, 2 and 3 to determine the thickness of the Head superficial deposits and check for the presence of karst dissolution features.

1.7.1.2. There are also mitigation actions for HDD. These are summarised as follows (covered in greater detail in the ES, Chapter 19 (Groundwater), section titled “HDD Groundwater Level and Flow Embedded Mitigation Measures” (page 19-40), and also the updated Onshore Outline CEMP (APP-505 Rev002), section titled ‘HDD Groundwater Level and Flow’ within Section 6.2.5.

- HDD-5 (near Kings Pond) will be installed within the Lambeth Group geology to avoid the Chalk;
- Karst dissolution features can be present in ground materials overlying the Chalk and if any voided overburden is encountered, drilling fluid control measures will be implemented to prevent drilling fluid losses;
- the drillers will receive specific training to detect karst dissolution features and will be constantly monitoring for a loss of drilling fluid, which may indicate that drilling fluid has been lost to a dissolution feature, and
- a watching brief will be employed to detect any unknown karst dissolution features.

1.8. SUMMARY TABLE AND CONCLUSION

1.8.1.1. A summary table of the effects related to the karst dissolution features both before and after mitigation is shown in Table 3 below.

Table 3 - Summary Table of Effect Significance Before and After Mitigation

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/ Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Increase in turbidity due to cable trench layering	Principal Aquifer SPZ1 Lovedean and H&B Springs sources	Major (adverse)	Onshore Cable Route trench excavation works will only be undertaken in the superficial Head deposits Where excavation in the Chalk is unavoidable extra care will be taken to avoid fracture zones and karst features. A sudden increase in the thickness of Head deposits could indicate a karst dissolution feature.	Negligible
Untreated fuel spillage entering karst dissolution features, causing hydrocarbon concentrations to rise above the permitted concentration	Principal Aquifer SPZ 1 Lovedean and H&B Springs sources	Major (adverse)		Negligible

Potential opening of karst dissolution features by the works resulting in an increased transportation of nitrates	Principal Aquifer SPZ1 Lovedean and H&B Springs sources	Major (adverse)	A watching brief will be employed to detect any unknown karst dissolution features HDD works drillers will be constantly monitoring for a loss of drilling fluid Works will pause temporarily if any karst dissolution feature is detected, whilst the engineer on site determines which of the pre-agreed mitigations measures is most appropriate PW and EA to be notified Potential courses of action could be to alter the course of the Onshore Cable Route locally, to avoid the dissolution feature, but still remain within the Order Limits. Alternatively, the karst dissolution feature can be filled with impermeable grout before continuing the works.	Negligible

1.8.1.2. Detailed studies have previously been undertaken and results have been assessed by the Applicant to avoid karstic dissolution features. A low number of karst dissolution features have been detected within the Order Limits, specifically in the Converter Station Area and the existing Lovedean Substation. A higher density of such features is confirmed to be present only to the east (outside the Order Limits). This does not necessarily mean that there are no other dissolution features within the Order Limits, i.e. which have not been detected previously. Without mitigation measures to deal with the presence of karst dissolution features forming a potentially fast connection to the nearby Public Water Sources at Lovedean and H&B Springs, the impact is considered potentially to be of **Major Adverse Significance**.

1.8.1.3. The avoidance of dissolution features and proposed mitigation measures designed to mitigate any potential impacts on the karst dissolution features are expected to change (reduce) the potential impact Significances relating to these features from **Major Adverse** to **Negligible**.

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