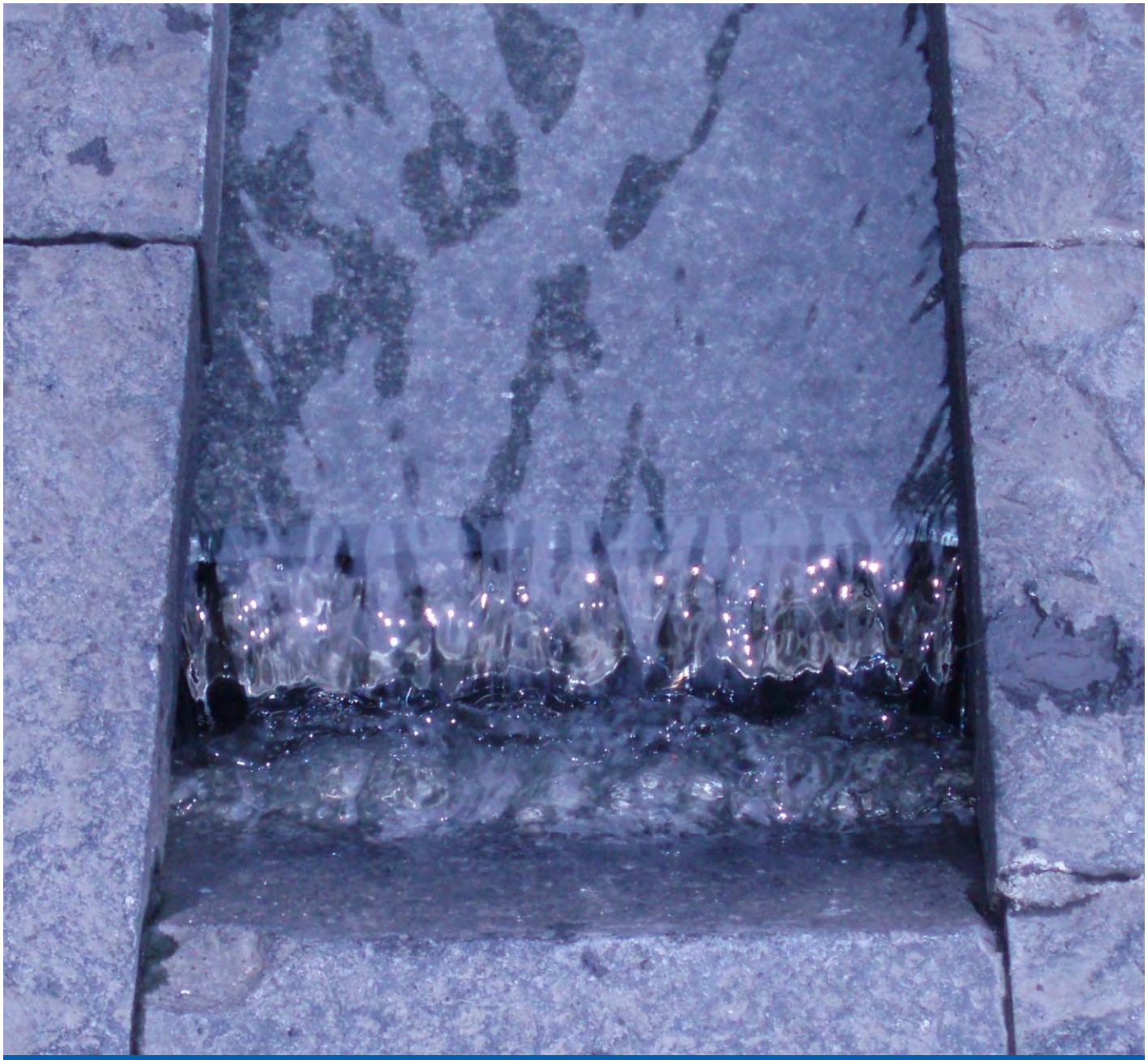

UNITED BY OUR DIFFERENCE

WSP

Salisbury Square, Hatfield, Hertfordshire

PPS25 Flood Risk Assessment

J B Planning

September 2011

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	**1st Draft**	**Issue 1**	**Issue 2**	**Issue 3**
Date	March 2011	March 2011	April 2011	September 2011
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Contents

Executive Summary

	Item	Comment	Reference
1	Development Description	Residential, Office and Retail	Section 1
2	Location X Y	 612870 310912	Appendix A
3	Scale of Development	Minor < 1 ha	Section 2
4	Land Use	Brownfield	Section 2 & 3
5	Type of Application	Full Planning	Section 1
6	Planning Status		Section 1
7	History of Flooding	None	Appendix B
8	EA Flood Zone Classification	Flood Zone 1	Section 2 Appendix B
9	EA Modelled Flood Level	Not applicable	Section 4 and Appendix B and C
10	Existing Site Level	70.98m AOD to 78.03m AOD	Section 2
11	Allowance for Climate Change	Yes – included in onsite attenuation	Section 6
12	Impact on Floodplain	Not applicable	Section 8
13	Safe Access and Egress	Not applicable	Section 8
14	Drainage	Underground attenuation to reduce flooding and discharge rates in accordance with the SFRA for the area.	Section 5 & 8

1 Introduction

1.1 APPOINTMENT AND BRIEF

1.1.1 This Flood Risk Assessment has been commissioned to determine the existing constraints relating to flood risk and drainage at Salisbury Square, Hatfield in Hertfordshire.

1.1.2 The Environment Agency (EA) has been contacted regarding the proposed development at the site and they have confirmed that a PPS25 Flood Risk Assessment is not required for the proposed scheme. This report has therefore been produced to support a planning application and a Code for Sustainable Homes assessment.

1.1.3 This report deals with the proposed surface water management of the site.

1.1.4 This report should be read in conjunction with the full drawings and other statement submitted as part of the application.

1.2 OBJECTIVE OF THE STUDY

1.2.1 The following objectives and scope of this study are outlined below to meet the requirements of Planning Policy Statement 25:

- Identify the flood risk to the site in both existing and proposed scenarios;
- Suitably address flood risk issues for the development proposals; and
- Mitigate the impact of flood risk

1.3 LIMITATIONS

1.3.1 The information within this document is reliant on third party information from The Environment Agency, J B Planning, RSK, Brooks Murray, Thames Water, the Flood Risk Assessment (SFRA) dated May 2009, and P J Dunphy (producers of the topographical survey). WSP are not liable for any errors resulting from any of these information sources.

2 Existing Site

2.1 SITE LOCATION

2.1.1 The site is located in Hatfield in Hertfordshire; a site location plan is contained in Appendix A.

2.1.2 The boundaries of the site are as follows:

- North - Old Hatfield Viaduct
- East – Park Street
- South – Batterdale Road
- West – Great North Road

2.1.3 The site is currently occupied by 'The Parade', a row of 7 retail units of approximately 630m^2 gross floor area (GFA), with 7 maisonettes above. There is an area of open space to the south of The Parade and a surface car park to the north providing 109 car parking spaces.

2.1.4 The redevelopment proposals comprise the replacement of The Parade and the 109 parking spaces with 4 retail units providing 1,235m^2 GFA, as well as a private housing scheme incorporating 19 apartments (4 No. one bed and 15 No. two bed) and 5 houses (5 No. three bed). The development would be provided with a total of 141 car parking spaces over two levels. The red line boundary of the site is less than 1ha.

2.1.5 A topographical survey has been undertaken by P J Dunphy for the site and is contained in Appendix B.

2.2 EXISTING DRAINAGE

2.2.1 The topographical survey has not recorded the positions of manhole covers or sewerage network located within the site therefore assumptions have been made as to where the drainage discharges to. These assumptions have been based on the information received from Thames Water and a site walkover.

2.2.2 A fully detailed design of the foul and surface water drainage scheme will be submitted as a planning condition.

2.2.3 Thames Water sewer records show numerous foul and surface sewers within the site which may be utilised for the development drainage.

2.2.4 The assumptions made within the drainage strategy will form the principles of the detailed drainage design.

2.2.5 Thames Water records are contained in Appendix C of this report.

2.3 EXISTING WATERCOURSES

2.3.1 The EA have confirmed that a culverted watercourse bisects the existing site along the western perimeter. Refer to Appendix D for all EA correspondence.

2.3.2 Thames Water Sewer records for the site shows the culvert to be 1125mm in diameter and approximately 3m deep below ground level.

2.4 EXISTING FLOOD DEFENCES AND OTHER STRUCTURES

2.4.1 According to the EA's Flood Zone map the entire site is located in Flood Zone 1 and does not benefit from any formal flood defences.

2.5 GEOLOGY AND HYDROGEOLOGY

2.5.1 British Geological Survey (BGS) maps for the area show the site is located in an area with Sands and Gravels overlaying chalks.

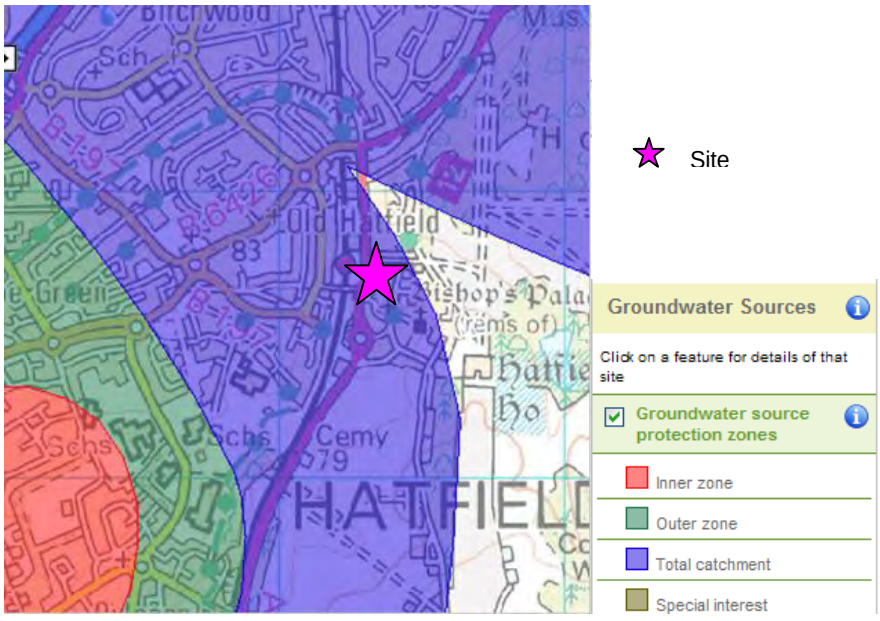
2.5.2 A geotechnical survey completed by RSK has shown that the site is made up of a variable thickness of made ground underlain by a sequence of both cohesive and granular Glacial Deposits. This included an initial thickness of gravelly sands, overlying a stiff to very stiff gravelly clay, further underlain by sandy gravels. London clay underlies the cohesive soils at the site. Depths of made ground were generally over 1.0m with the greatest depth recorded being 4.9m. The presence of made ground to such depths prevents the use of infiltration devices being used on the site.

2.5.3 Chemical tests undertaken as part of the survey indicate that contaminants tested were below the relevant assessment criteria for all the samples tested with the exception of elevated PAH compounds within the made ground soils in one trial pit at 0.5m depth. However, the elevated concentrations encountered coincide with a localised increase in clinker and fragments of bitumen within the soils, commonly associated with increased PAH levels. Furthermore, it is likely that these soils will be excavated as part of the proposed basement construction and, as such, are not likely to pose a risk to sensitive receptors.

2.5.4 Groundwater was found in borehole BH2 to a depth of 4.9m below ground level. This would suggest a perched water table at the site. Borehole logs and location plan can be found in Appendix E.

2.5.5 EA Groundwater Source Protection maps on the EA website show that the site is located within Zone 3 of the ground water source protection zone. Zone 3 is classified by the EA as "(Total Catchment) - The total catchment is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole. Refer to Figure 1 below:

FIGURE 1: EA GROUNDWATER PROTECTION ZONE MAPPING



2.6 HISTORICAL FLOOD RECORDS

2.6.1 The EA have confirmed that they do not have any record of specific issues with groundwater flooding at the site.

2.7 SITE TOPOGRAPHY

2.7.1 The topographical survey shows ground levels on site to vary from 78.03m (AOD) in the west to 70.98m (AOD) in the north.

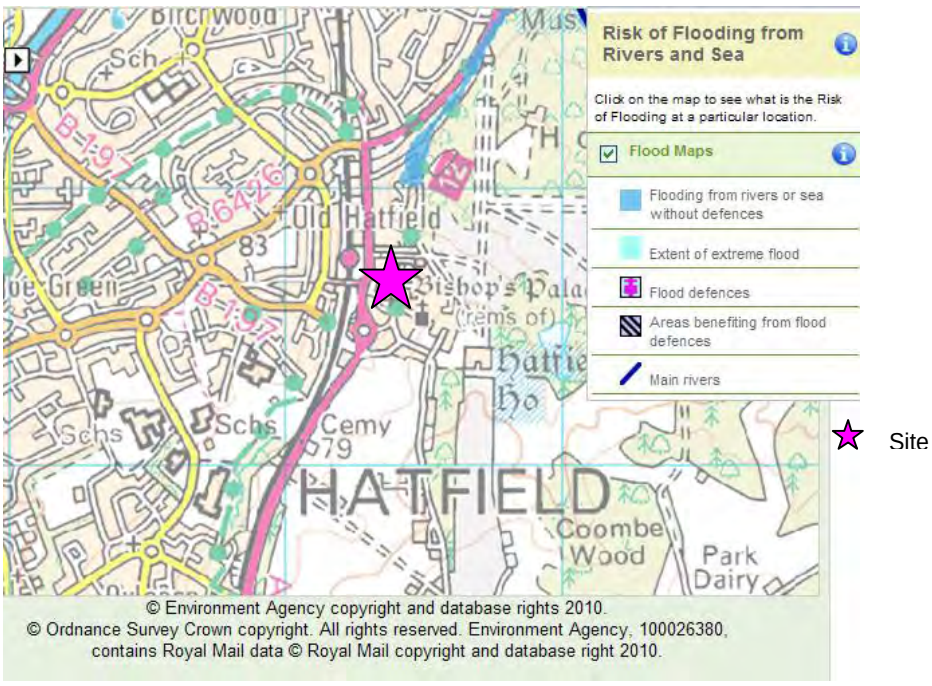
2.7.2 Topographical survey information for the site is provided in Appendix B.

2.8 FLOOD MAPPING

2.8.1 The EA have published Flood Zone Maps (FZM), which show areas potentially deemed to be at risk of flooding. The FZM have been produced using appropriate good quality mapping and modelling data, where available, supplemented with data derived from national generalised modelling and appropriate good quality local data which conforms to the EA's acceptable criterion. The nationally generalised modelling utilises a Digital Terrain Model (DTM) which excludes the presence of man-made features such as flood defences and road and railway embankments. Fluvial flood zone outlines were produced using a 2D raster floodplain model (Jflow) and show the probability of flooding without the presence of defences. Whilst the modelling methodology used to produce FZM's excludes the presence of flood defences, (in order to ensure that the extent of the functional floodplain is delineated, the FZM also show the area of benefit provided by modern flood defences (less than 5 years old) where they are present.

2.8.2 The FZM shows the entire site to be located in Flood Zone 1 which is an area of Low Flood Risk, see Figure 2 below. This zone comprises of land assessed as having a less than a 1 in 1000 annual probability of river or sea flooding in any year.

FIGURE 2: EA FLOOD ZONE MAPPING



3 Proposed Development - Description and Location

3.1 Q1A PART 1 - DESCRIPTION – WHAT TYPE OF DEVELOPMENT IS PROPOSED AND WHERE WILL IT BE LOCATED WITHIN THE OVERALL SITE?

3.1.1 The proposed site is for mixed use development of residential and retail on the ground. A basement car park is also proposed at the site.

3.1.2 See Appendix F for the proposed site layout.

3.2 Q1A PART 2 – IS THE PROPOSED DEVELOPMENT NEW, EXTENSION OR CHANGE OF USE?

3.2.1 The proposed development options will be a re-development of the existing site but is not deemed to be a change of land use. The development proposals will involve the demolition of existing buildings.

3.3 Q1B WHAT IS ITS VULNERABILITY CLASSIFICATION?

3.3.1 According to PPS25, development located in Flood Zone 1 is deemed appropriate for 'Less Vulnerable' land uses such as office and retail buildings and 'More Vulnerable' for facilities such as residential.

Flood Risk Vulnerability classification (see Table D2)		**Essential Infrastructure**	**Water compatible**	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**
Flood Zone (See Table D1)	Zone 1	✔	✔	✔	✔	✔
	Zone 2	✔	✔	Exception Test required	✔	✔
	Zone 3a	Exception Test required	✔	**X**	Exception Test required	✔
	Zone 3b 'Functional Floodplain'	Exception Test required	✔	**X**	**X**	**X**

Table 1: Flood risk vulnerability and flood zone 'compatibility' table taken from Table D.3 of PPS25

✔ Development is appropriate

3.4 Q1D - PLEASE PROVIDE EVIDENCE THAT THE SEQUENTIAL TEST AND WHERE NECESSARY THE EXCEPTIONS TEST HAS BEEN APPLIED IN THE SELECTION OF THIS SITE FOR THIS TYPE OF DEVELOPMENT

3.4.1 The Sequential Test gives preference to locating new development in Flood Zone 1. If there is no reasonably available site in Flood Zone 1, the flood vulnerability of the proposed development can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3.

3.4.2 As the entire site is located in Flood Zone 1 the Sequential Test does not need to be undertaken for the development proposals.

3.5 EXCEPTION TEST

3.5.1 PPS25 states that for the Exception Test to be passed:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared. If the DPD has reached 'submission' stage – see Figure 4 of PPS12: Local Development Frameworks – the benefits of the development should contribute to the Core Strategy's Sustainability Appraisal;
- The development should be on developable previously-developed land. If it is not on previously developed land, that there are no reasonable alternative sites on developable previously-developed land; and
- A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

3.5.2 As the entire site is located in Flood Zone 1 'Less Vulnerable' and 'More Vulnerable' development (as classified on table D.3 of PPS25) is deemed appropriate. Under these circumstances the Exception Test does not need to be satisfied.

4 Definition of the Flood Hazard

4.1 Q2A - WHAT SOURCES OF FLOODING COULD AFFECT THE SITE?

4.1.1 The table below summarises the likelihood of potential sources of flooding which may effect the site:

SOURCE	**LIKELIHOOD – Very Likely, Possible, Insignificant**
Fluvial	Insignificant
Coastal - Sea	N/A
Coastal - Estuarine	N/A
Pluvial / sheet run off	Possible
Sewer - SWS, FWS, , CS, CSO	Insignificant
Groundwater	Approx. 4.1m below ground level - Insignificant
Dam/Flood Defence breach	N/A
Canal	Insignificant
Major Water Main	Insignificant
Other sources	N/A
See also Section 5.2.2 Q3C	

4.2 Q2B - FOR EACH IDENTIFIED SOURCE DESCRIBE HOW FLOODING WOULD OCCUR, WITH REFERENCE TO ANY HISTORIC RECORDS WHEREVER THESE ARE AVAILABLE

Fluvial Flooding

4.2.1 As the site is located entirely in Flood Zone 1, the site is deemed to be at a low risk of fluvial flooding.

Pluvial/Sheet Flooding

4.2.2 The site levels vary across the site and any over land flow routes will be directed to natural low spots located to the north, east and south. This could affect off site areas in these locations as the natural topography falls away from the site and is therefore considered an existing flood risk.

Sewers

4.2.3 The Thames Water sewer records show that there are existing sewers at the site. They also show a culvert (which the EA have confirmed to be a culverted watercourse) as bisecting the site. The culvert has been shown on the Thames Water records to be 1125mm in diameter and approximately 3m deep below ground level.

Water Mains

4.2.4 Any failure of water mains within the site is likely to lead to localised flooding, however it is likely that the flows generated from this would be channelled along the proposed site infrastructure (roads) away from the site and into the highway drainage until remediation and repairs are undertaken.

Groundwater Flooding

4.2.5 The EA have confirmed that they do not have any record of specific issues with groundwater flooding at the site therefore the risk is insignificant.

Flood Defence breach

4.2.6 The EA have confirmed that the site is located in Flood Zone 1 and therefore not subject to a flood defence breach.

4.3 Q2C – WHAT ARE THE EXISTING SURFACE WATER DRAINAGE ARRANGEMENTS FOR THE SITE?

4.3.1 For details of existing drainage refer to section 2.3 above.

5 Probability

5.1 Q3A – WHICH FLOOD ZONE IS THE SITE WITHIN?

5.1.1 The Environment Agency Flood Zone Maps are highly indicative but show the site to lie within Flood Zone 1. The EA have confirmed in their correspondence that the site lies in Flood Zone 1.

5.1.2 The EA was contacted by WSP to determine the need for undertaking a PPS 25 Flood Risk Assessment at the site. The EA have requested the following:

As the site is now less than 1 hectare we can confirm that a Flood Risk Assessment is not required. The principles of Sustainable Drainage Systems (SuDS) should still however be considered using the SuDS hierarchy and run off rates reduced to create a sustainable development as possible in this location.

We would expect opportunities to open up the culvert that runs just to the west of the site to be explored as part of the development proposals. Deculverting offers the opportunity to restore lost habitat, enhance biodiversity and create a positive feature on the site. If there are any barriers to the deculverting of this channel we would expect these to be clearly justified. If the channel cannot be deculverted, all development must be set at least five metres away from the culverted watercourse. This is to ensure that any future maintenance works are not impeded by the proposed development and to preserve any potential overland flow routes. The five metres must be measured from the outside wall of the culvert and be free of any permanent structures.

As mentioned in my previous letter the site is located in Source Protection Zone 3. It is important to ensure no contamination reaches groundwater from surface water disposal. We would need a Preliminary Risk Assessment (PRA) submitted with the planning application to assess if land contamination may be present at the site.

The PRA needs to include information on past and current uses, if sensitive controlled waters receptors are present and if the site could pose a pollution risk. The PRA should also consider if any aspects of the proposed development could pose a pollution risk should contamination be present (i.e. deep drilling to facilitate the installation of foundation piles, site drainage). Further work such as an intrusive site investigation may be required depending on the findings of the PRA.

5.2 Q3B- IF THERE IS A STRATEGIC FLOOD RISK ASSESSMENT COVERING THIS SITE WHAT DOES IT SHOW?

5.2.1 A Level 1 SFRA was produced in May 2009 for the Hatfield Area.

5.2.2 Within the SFRA it provides guidance for Development Control and potential developers required to produce site specific Flood Risk Assessments, these are in line with PPS25.

5.2.3 Based on the SFRA the following requirements are listed:

- Require sustainable drainage design to take account of the impacts of climate change for the lifetime of the development at the site and downstream.
- Consider the potential benefits an appropriately designed Sustainable Drainage System could have for the biodiversity, amenity value, water quality and resource value of a development and/or surrounding area.
- Consider the vulnerability and importance of local water resources and key infrastructure when determining the suitability of drainage strategies/SUDS. The use

of SUDS should be considered on all development sites, unless the underlying geology or other conditions precludes their use.

- Developments that are greater than 1 hectare in area should restrict discharge rates to greenfield rates up to and including the 1 in 100 year rainfall event, accounting for climate change, through the use of SUDS.
- On sites which are less that 1 hectare, SUDS should also be incorporated. A reduction in runoff rates during the 1 in 100 year storm event plus climate change to greenfield rates is the ideal, however, where space does not allow for greenfield rates to be attenuated, the development must prove that a betterment has been achieved in the reduction of runoff rates, with SUDS being utilised where possible.
- Seek opportunities to contribute to the goal of improving the quality of local watercourses in line with the Water Framework Directive through improving the quality of storm water discharges from developments to watercourses.
- Seek opportunities to utilise SUDS in areas shown to be potentially at risk of overland flow flooding.

5.3 Q3C – WHAT IS THE PROBABILITY OF THE SITE FLOODING TAKING INTO ACCOUNT THE CONTENTS OF THE SFRA AND OF ANY FURTHER SITE SPECIFIC ASSESSMENT?

5.3.1 The site has a low risk of flooding as it is located within flood zone 1 (does not flood from fluvial sources during a 1 in 1000 year event). No historical events are shown on the site in the SFRA.

5.4 Q3D – WHAT ARE THE EXISTING RATES AND VOLUMES OF RUN-OFF GENERATED BY THE SITE

5.4.1 Assumptions have been made as to the likely catchment areas to the sewers identified on the Thames Water asset plans. Four outfalls have been identified, all of which discharge into the Thames Water Culvert. A full drainage and CCTV survey will be undertaken prior to the detail design stage.

5.4.2 The discharge rates for the four sewers/outfalls have been calculated using the software MicroDrainage WinDES suite. These rates are tabulated in the table below.

Table 1 – Existing Run-off Rates

Pipe Run	**Discharge Rate (l/s) for Return Period (1 in x years)**			
	2	**30**	**100**	**100 + 30%**
S1	77	152	153	153
S2	35	95	129	149
S3	47	123	188	227
S4	7	19	26	30
Total discharge rate for the site	166	389	496	559

5.4.3 Existing flood volumes have also been investigated at the site and are listed in Table 2 below.

Table 2 – Existing Flood Volumes

Pipe Run	Existing Flood Volumes (m^3) for Return Period (1 in x years)			
	2	30	100	100 + 30%
S1	0	3	44	90
S2	0	0	2	10
S3	0	0	0	0
S4	0	0	0	0
Total Flood Volume for the site	0	3	46	100

5.4.4 The proposed development does not result in an increase of impermeable area.

5.4.5 The MicroDrainage calculations for the existing sewers are in Appendix G.

6 Climate Change

6.1 DEVELOPMENT LIFESPAN

6.1.1 Based on a typical lifespan for this type of development of 60 years for commercial, retail and 100 years for residential facilities, the contingency allowances for climate change set out in Table B.2 of PPS25 recommends a 20% increase in peak rainfall intensity for up to the year 2085 and 30% increase in peak rainfall intensity for up to the year 2115.

6.1.2 Because the site incorporates residential and will be utilising outfalls which both the commercial and office will also use 30% climate change will be applied to the site.

6.2 Q 4A - HOW IS FLOOD RISK LIKELY TO BE AFFECTED BY CLIMATE CHANGE?

6.2.1 The quantification of the effects of climate change are included in section 5 above.

7 Detailed Development Proposals

7.1 Q5A - DEVELOPMENT LAYOUT PROPOSALS AND DRAWINGS

7.1.1 The proposed masterplan options plan can be found in Appendix F.

7.1.2 The land use and vulnerability for the proposed development land uses is established in section 3 above.

8 Flood Risk Management Measures

8.1 Q6A - HOW WILL THE SITE BE PROTECTED FROM FLOODING, INCLUDING THE POTENTIAL IMPACTS OF CLIMATE CHANGE, OVER THE DEVELOPMENT'S LIFETIME?

8.1.1 SUDS PROPOSALS

8.1.2 A SUDS hierarchy has been followed in applying the use of sustainable drainage techniques into the proposed development. This has been set out in the table below with justifications provided where particular techniques are not deemed feasible.

SUDS Technique	Can they be feasibly incorporated into the site?	Reason
Green Roofs	**X**	Due to the pitched roofs and structures proposed at the site these devices will not be suitable
Basins and Ponds	**X**	The site is high density and these devices are not suitable.
Filter Strips and Swales	**X**	The current proposals will not allow for implementation for filter strips or swales within the design.
Infiltration techniques	**X**	Infiltration will not be possible at the site due to the inert variability of the soils, existing made ground depths and perched water table.
Permeable surfaces and filter drains	**X**	Infiltration will not be possible at the site due to the inert variability of the soils, existing made ground depths and perched water table.
Rainwater Harvesting	✓	Rainwater butts will be implemented on the terraced residential properties.
Tanked Systems	✓	To provide betterment in comparison with the existing situation in accordance with the SFRA for the area tanked systems are proposed for the site.

FLOOD WATER MANAGEMENT ACT 2010

8.1.3 The Flood Water Management Act 2010 provides duties on the Environment Agency, Local Authorities, Developers and other bodies to manage flood risks.

8.1.4 The Act requires SUDS to be designed, constructed, maintained and operated in accordance with National Standards.

8.1.5 The sustainable drainage strategy proposed in support of this FRA will be submitted to the relevant Approval Body for consent in accordance with the requirements of the Act.

GENERAL

8.1.6 Due to the existing made ground depths, presence of a perched water table and inert variability of the glacial soils, the site would not be suitable for the use of infiltration device.

8.1.7 At the time of writing this report a CCTV and on-site drainage survey had not been undertaken at the site; therefore assumptions have been made as to the current drainage arrangement. The existing site is assumed to drain via a series of private and public surface water sewers.

8.1.8 Based on the information currently available it is assumed all of the existing site discharges to the Thames Water culvert. The Thames Water sewer records are contained in Appendix C.

8.1.9 The proposed development areas will discharge either direct to the existing sewers or via a new private drainage system, depending on locations of the proposed development and topography. The recommendation from the EA and the SFRA is for the proposed development to be discharged at reduced run off rates.

8.1.10 It is proposed to utilise the existing outfall locations from the site. Some of the sewers will also be upgraded in accordance with Building Regulation Part H and Sewers for Adoption 6th Edition.

8.1.11 The EA have requested deculverting of the existing watercourse. Due to the exiting topography and depth of the culvert (3m to 5m deep) the introduction of a minimum 1 in 4 side slope would make the channel excessively wide preventing the future development of the site. The existing buildings and services that are to be retained which will also prevent deculverting, thus making this proposal impractical.

8.1.12 The EA have also requested a 5m offset from the culvert. The site is a high density site with buildings and development already located over the culvert. To incorporate a 5m offset in all areas will result in large areas of the site being left undeveloped, making the proposed development unsustainable. A neighbouring site to the north has achieved consent from Thames Water for a build over of the culvert.

8.1.13 Thames Water has been contacted for comments on the proposed works and have confirmed that the surface water discharge rates are acceptable. A build over approval will be subject to a formal application being submitted. Please refer to Appendix C for Thames Water correspondence.

8.1.14 The existing site drainage has been reviewed in section 5.4 of the FRA. Flooding has been determined as possible in some areas of the site during the 1 in 30, 100 and 100 plus climate change event.

8.1.15 To ensure the recommendations of the SFRA and EA are adhered, a reduction in rates and flood volumes has been achieved through the introduction of 90m^3 of underground storage within landscaped and car parking areas.

8.1.16 Refer to drawing 1458-D-001 in Appendix H for the proposed outline drainage strategy for the site.

PROPOSED DISCHARGE RATES

8.1.17 Proposed discharge rates for the site are listed in the table 3 below.

Table 3 – Proposed Discharge Rates

Peak rates of flow at discharge point - litres per second				
Return Period	2	30	100	100 + 30%
Run S1 (l/s)	61	106	130	150
Run S2 (l/s)	49	30	194	235
Run S3 (l/s)	31	92	142	171
Proposed Total	141	228	466	556
Existing Total	166	389	496	559

8.1.18 The proposed discharge rates for the site show a reduction for all rainfall events. Proposed calculations show a benefit to the site by reducing flooding by 15% in the 1 in 2 year event and 41% in the 1 in 30 year event. The sewers have been sized in accordance with Sewers for Adoption; therefore they are sized to accommodate the 1 in 2 year and 30 year events. Because of the Sewers for Adoption criteria the impact on discharge rates during the extreme events are limited. A benefit is however provided during the extreme rainfall events by significantly reducing the flood volumes at the site through the implementation of underground attenuation systems.

8.1.19 The attenuation has been sized to accommodate above ground flooding during the 1 in 100 year and 1 in 100 year plus climate change event. Refer to Table 4 below for a comparison of the proposed and the existing.

Table 4 – Existing and Proposed Flood Volumes

Flood Volumes (m3)				
Return Period	2	30	100	100 + 30%
Run S1 (m3)	0	0	4	15
Run S2 (m3)	0	0	0	4
Run S3 (m3)	0	0	0	0
Proposed Total	0	0	4	19
Existing Total	0	3	46	100

8.1.20 The proposals result in no flooding during the 1 in 30 year event and a 91% reduction in the 1 in 100 year and 81% reduction in the 1 in 100 year plus climate change event.

8.1.21 Please refer to Appendix I for MicroDrainage WinDES calculations of the proposed surface water drainage system.

8.1.22 CHANGES IN LEVELS

8.1.23 The development is located entirely within Flood Zone 1, therefore the finished floor levels of all proposed buildings will be at or close to the existing ground levels.

8.1.24 FLOOD COMPENSATION

8.1.25 The proposed development is located outside flood zones 2 and 3 and will not displace any flood waters in a 1% annual probability event; therefore no flood compensation is required.

8.1.26 FLOOD CONVEYANCE ROUTES

8.1.27 The proposed levels for both schemes ensure that flood waters can access and egress the site without causing flood waters to enter proposed building FFL levels.

8.2 FOUL FLOWS

8.2.1 Thames Water has been contacted regarding the proposed foul flows at the site and have confirmed that the increase in foul water flows can be accommodated into the existing drainage network.

9 Offsite Impacts

9.1 Q7A - HOW WILL YOU ENSURE THAT YOUR PROPOSED DEVELOPMENT AND THE MEASURES TO PROTECT YOUR SITE FROM FLOODING WILL NOT INCREASE FLOOD RISK ELSEWHERE?

9.1.1 Section 8 above identifies the Flood Risk Management Measures to be deployed on this development

9.1.2 To ensure a robust FRA and Sustainable Drainage Strategy all designs, where appropriate, are in accordance with Sewers for Adoption 6th edition, BS EN 752, PPS25, CIRIA C697 and best practice procedures.

9.1.3 To ensure the effectiveness of the proposed drainage arrangement a robust maintenance regime will be implemented to ensure future performance of all SUDS and drainage components.

9.2 Q7B – HOW WILL YOU PREVENT RUN-OFF FROM THE COMPLETED DEVELOPMENT CAUSING IMPACT ELSEWHERE?

9.2.1 The proposals result in a significant decrease in flood volumes during the 1 in 100 year and 1 in 100 plus climate change event. No flooding occurs during the 1 in 30 year event.

10 Residual Risks

10.1 Q8A - WHAT FLOOD–RELATED RISKS REMAIN AFTER YOU HAVE IMPLEMENTED THE MEASURES TO PROTECT THE SITE FROM FLOODING?

10.1.1 The remaining residual risk to the development as a result of the proposals will be a result of storm events greater than the sewer design criteria.

10.1.2 Overland flow routes will be maintained and a reduction in flood volumes will provide betterment compared to the existing situation.

10.2 Q8B – HOW, AND BY WHOM, WILL THESE RISKS BE MANAGED OVER THE LIFETIME OF THE DEVELOPMENT?

10.2.1 To ensure the effectiveness of the proposed drainage arrangement a maintenance regime will be implemented to ensure future performance of all SUDS and drainage components.

10.2.2 It is envisaged that the proposed drainage network will revert back to public ownership as it is at present. This will be confirmed at the detail design stage.

11 Conclusions

11.1 SUMMARY

11.1.1 Based on the information provided within this report it is concluded that:

- The site lies in Flood Zone 1 i.e. outside the 0.1% annual probability floodplain for the nearest watercourse.
- All proposed land use at the site is compatible for the flood risk classification of the site.
- Safe access and egress can be maintained for the lifetime of the development.
- The proposed drainage strategy is to incorporate underground attenuation to a maximum volume of 90m^3, reducing above ground flooding significantly during the 1 in 30, 100 year and 100 year plus climate change event.
- Overland flow routes will be maintained for the site. The reduction in flood volumes at the site provides a significant betterment and reduces the risk to off-site areas.
- To ensure the effectiveness of the proposals a maintenance regime will be in place to ensure the future performance of the all SUDS devices. It will also be necessary to implement treatment devices such as trapped gullies and catchpit manholes to prevent any contamination and silt ingress into the drainage system.

11.1.2 The site is therefore presented as sustainable in terms of flood risk and compliant with the criteria set out in PPS25.

12 Recommendations for Further Work

12.1 RECOMMENDATIONS

12.1.1 During the detailed design we recommend that further investigation of the existing system is carried out to confirm details.

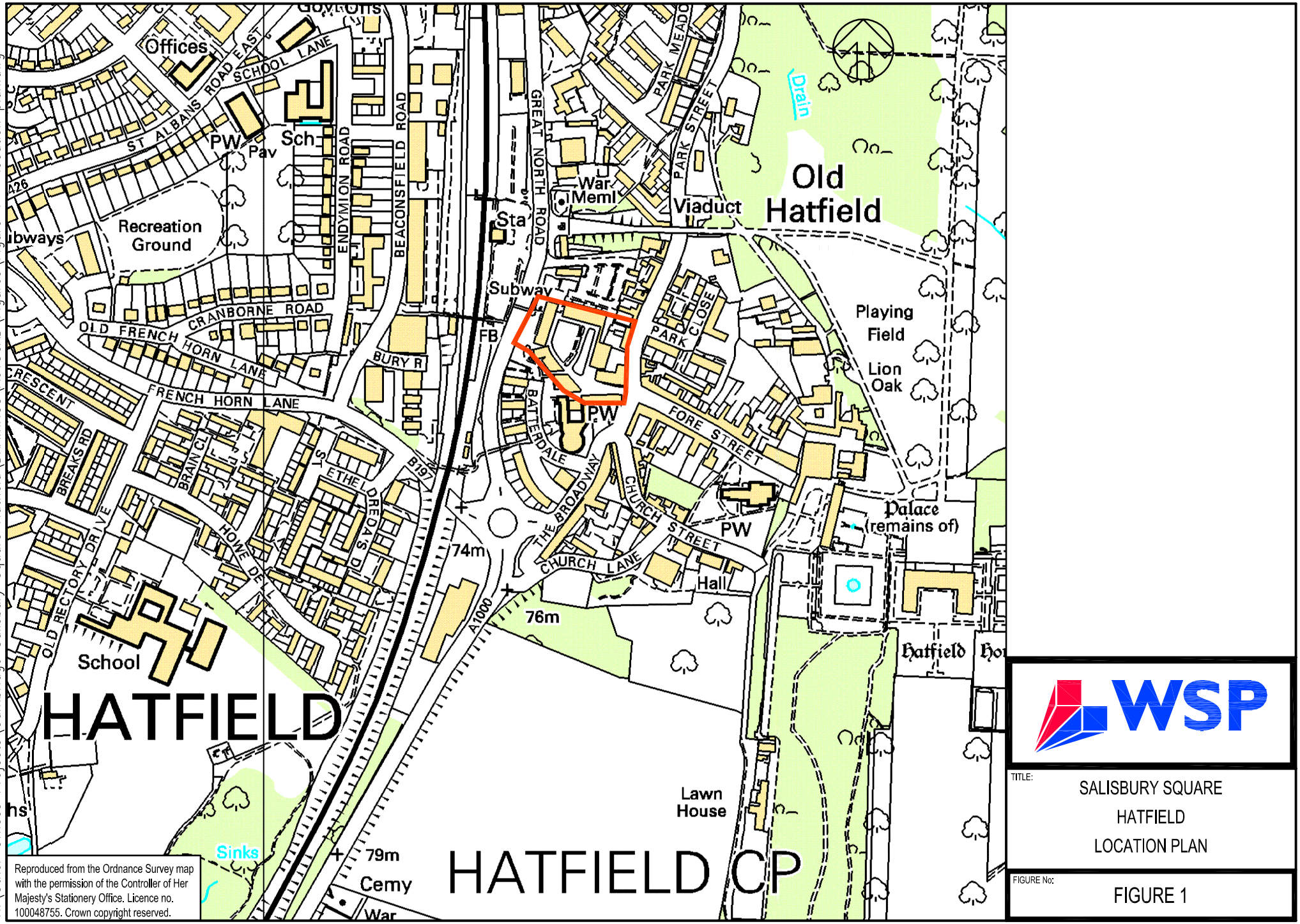
12.1.2 Based on the information received it has been concluded that existing drainage discharges via four outfalls to the Thames Water culvert. The outline drainage strategy will be updated to reflect information received from the CCTV and drainage survey.

12.1.3 Approval from Thames Water will be required for build over and works within proximity of the culvert.

12.1.4 The development of detailed drainage designs should be on the basis of the mitigation measures and parameters identified in the report.

Appendices, Figures & Tables

Appendix A Site Location Plan



WSP

TITLE:

SALISBURY SQUARE
HATFIELD
LOCATION PLAN

FIGURE No:

FIGURE 1

N:\Other Offices Projects\Cambridge Salisbury Square Hatfield\DRAWINGS\AUTOCAD\Figures\Figure 1 – location plan.dwg

Appendix B Topographical Survey

LEVEL NOTE.

ALL LEVELS RELATE TO OSBM LOCATED ON BRICK WALL IN SALISBURY SQUARE AS SHWON ON SURVEY VALUE = 72.70

CONTROL SCHEDULE

STN.	EASTING	NORTHING	LEVEL
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806	142.076	181.494	80.944
807	155.291	171.387	83.130
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TREE SCHEDULE

No	DIA	SPR	HGT	SPECIES
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3	0.1	5	5	SILVER BIRCH
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5	0.25	8	6	ASH
6	0.25	8	6	ASH
7	0.35	9	5	UNKNOWN
8	0.3	9	6	UNKNOWN
9	0.4	12	14	SYCAMORE
10	0.3	10	10	SYCAMORE
11	0.35	11	12	SYCAMORE
12	0.25	4	12	CYPRESS
13	0.25	4	12	CYPRESS
14	0.2	3	7	CYPRESS
15	0.3	6	8	CYPRESS
16	0.2	4	7	SYCAMORE
17	0.2	4	7	SYCAMORE
18	0.3	6	7	SYCAMORE
19	0.3	6	5	LABURNUM
20	0.3	6	5	LABURNUM
21	0.1	3	4	ROWAN
22	0.15	4	4	ROWAN
23	0.15	4	4	ROWAN
24	0.15	4	4	ROWAN
25	0.15	3	3	SYCAMORE
26	0.2 MB	5	6	PLUM
27	0.1 MB	3	5	PLUM
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66	0.15 2B	6	5	UNKNOWN
67	0.15	6	4	UNKNOWN
68	0.1 3B	8	6	UNKNOWN
69	0.15	6	9	UNKNOWN
70	0.2	6	7	ELDER
71	0.3	6	9	ASH
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KEY PLAN

S1

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Revisions	Date

Date	MAY 2008	Drawn	GF
Scale	1:200	Checked	JGR
Dwg. No.	S1	Job No.	08501

Client

GASCOYNE CECIL ESTATES

Dwg. Title

LAND SURVEY

Project Title

HATFIELD OLD TOWN
HERTFORDSHIRE

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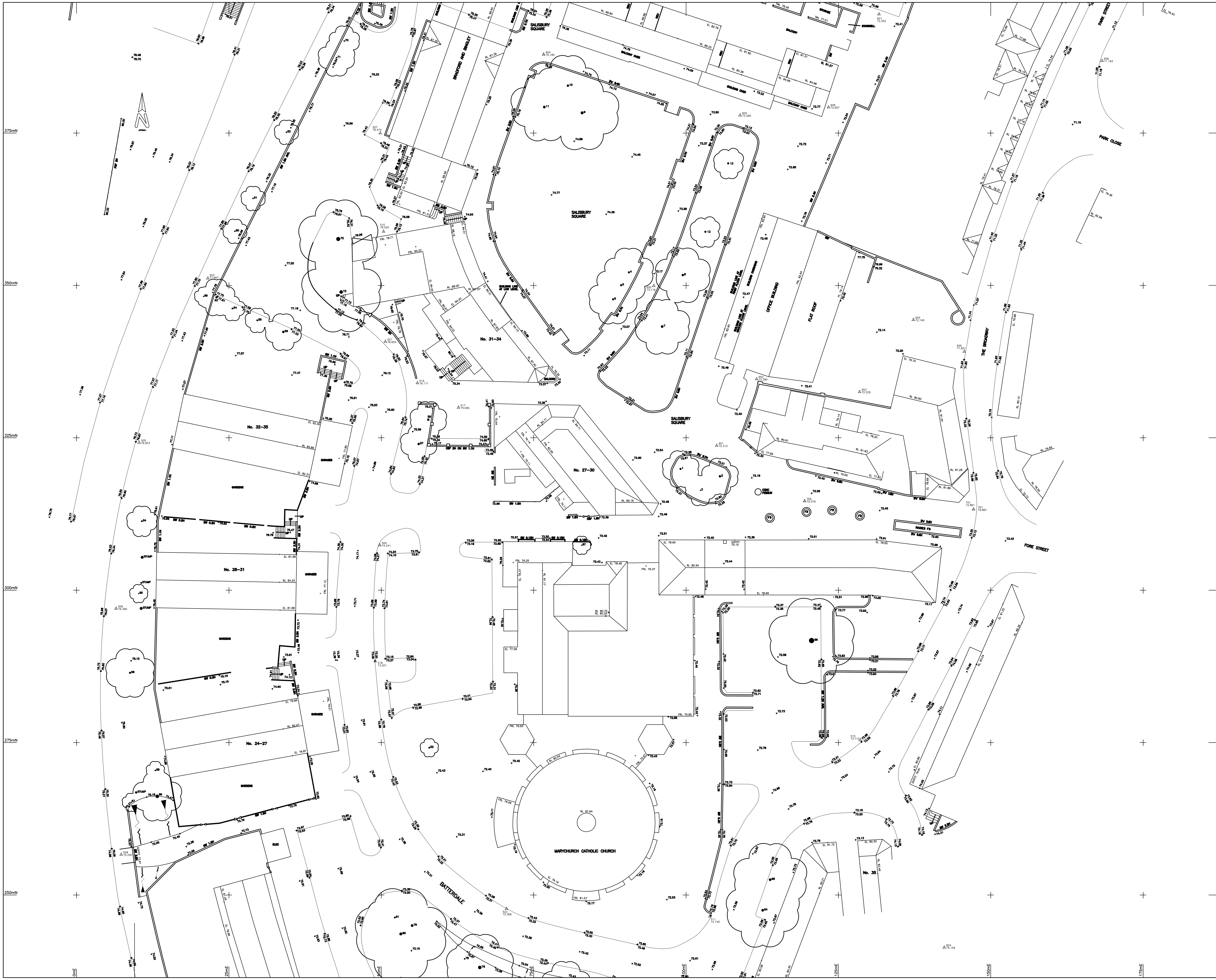

ABBREVIATIONS

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Overhead Detail
Change in Elevation
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Overhead Cables
Change in Surface
Edge of Vegetation
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3.28 F False Ceiling Height
Gate
Survey Station
Foul Water Sewer
Surface Water Sewer
Combined Sewer

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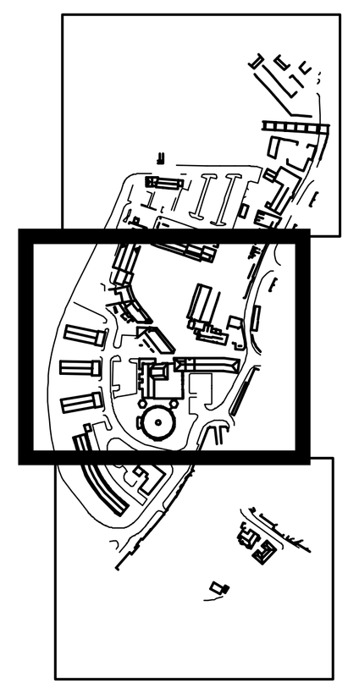

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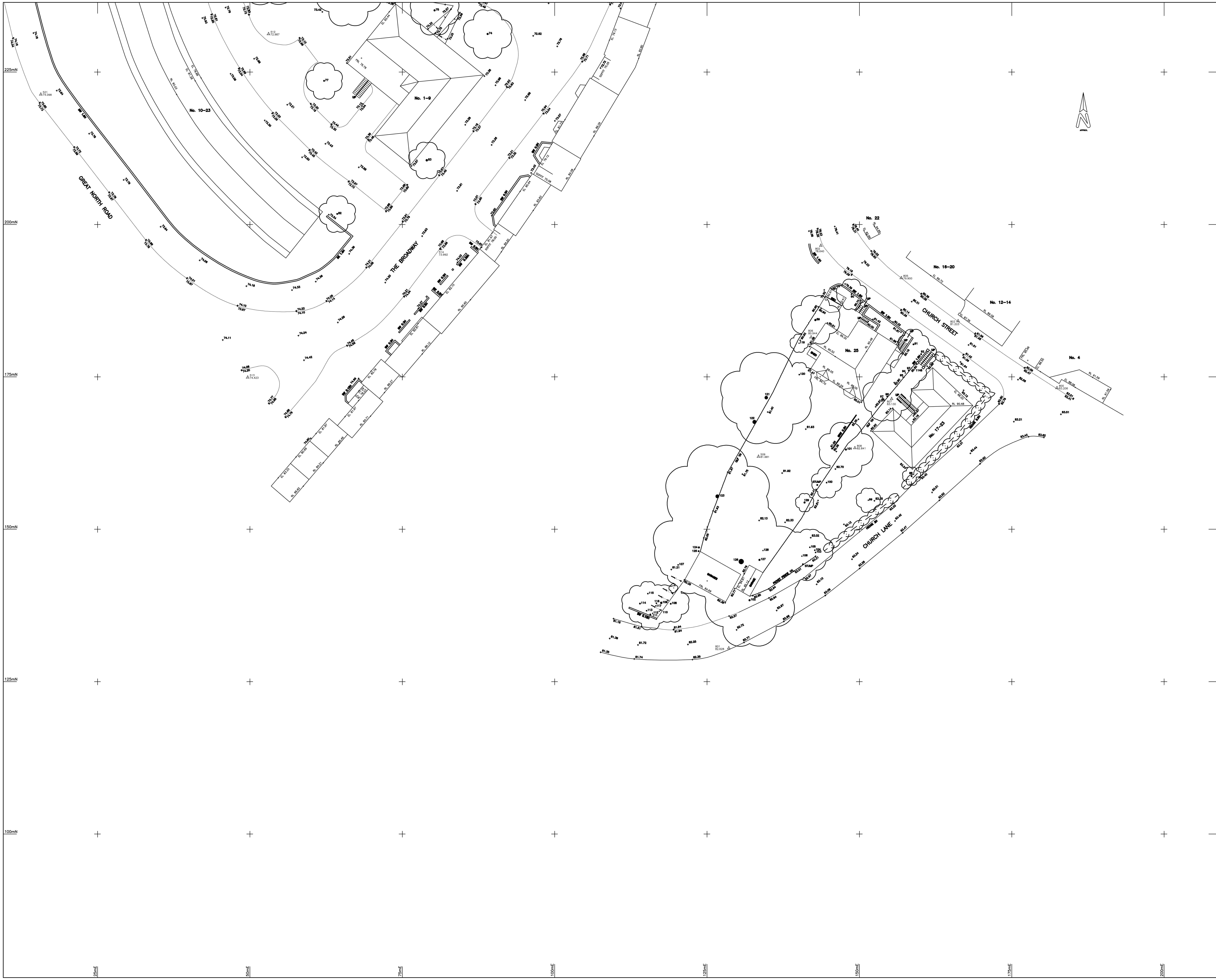

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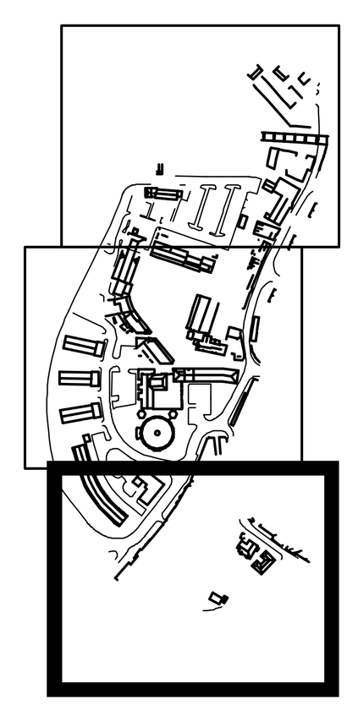
71	0.3	6	9	ASH
72	0.1 MB	3	4	UNKNOWN
73	0.2	5	6	ELDER
74	0.1	2	3	UNKNOWN

KEY PLAN



S3

All underground services information shown on this plan cannot be guaranteed and users should satisfy themselves of the type, size and route before commencing work on site. All pipes 100ø unless otherwise stated.
Tree types shown on this drawing cannot be guaranteed and if critical should be verified by an arboriculturist.
Tree spreads and diameters are averages unless otherwise indicated.
Roof lines are indicative only.
This plan has been produced for the client detailed below or their appointed agent to an agreed specification and defines the limit of PJ Dunphy (Construction Services) Ltd liability.

Revisions		Date

Date	MAY 2008	Drawn	GF
Scale	1:200	Checked	JGR
Dwg. No.	S3	Job No.	08501

Client
GASCOYNE CECIL ESTATES

Dwg. Title
LAND SURVEY

Project Title
HATFIELD OLD TOWN
HERTFORDSHIRE

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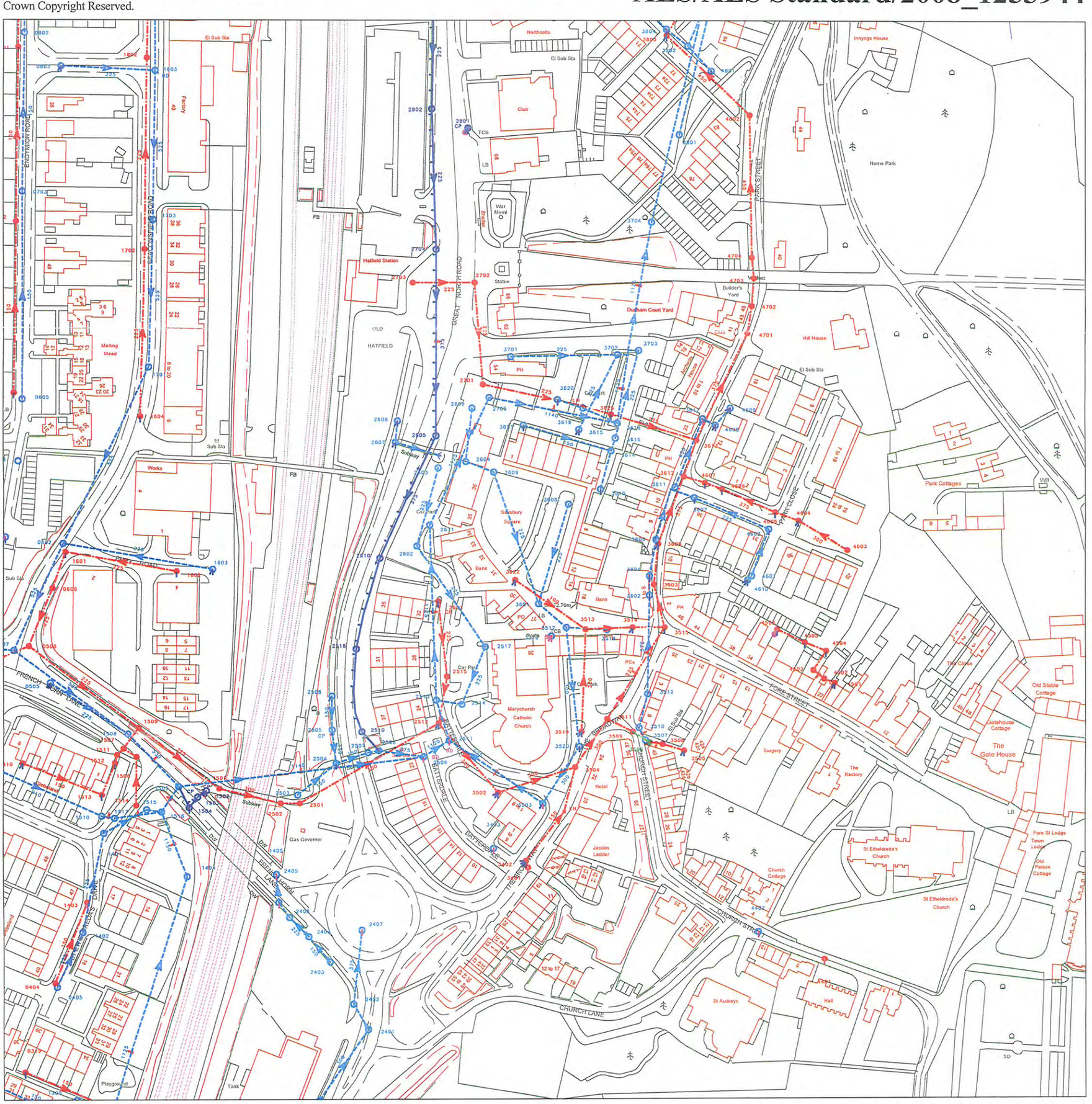
Appendix C Thames Water Sewer Records and Correspondence

ALS/ALS Standard/2008_1253944



The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

100 metre intervals

EAGLE hardcopy facility - Normal Map.
The plot is centred on (523325 , 208624), which is in TL2308NW. Printed on 31 July 2008 at 11:09:34 by RIMISSON.

Comments:
Sewer plan

Printbox (523071,208370) -> (523579,208878)
Central Mapsheet : TL2308NW
User : RIMISSON
Time : Thu Jul 31 11:09:48 2008

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

At (523145,208505)	there is a MANHOLE with SHORT NUMBER=1516	COVER=	74.42	INVERT=	68.66
At (523142,208854)	there is a MANHOLE with SHORT NUMBER=1803	COVER=	79.55	INVERT=	75.56
At (523280,208539)	there is a MANHOLE with SHORT NUMBER=2511	COVER=	72.58	INVERT=	68.06
At (523275,208547)	there is a MANHOLE with SHORT NUMBER=2512	COVER=	72.86	INVERT=	71.29
At (523274,208558)	there is a MANHOLE with SHORT NUMBER=2513	COVER=	73.06	INVERT=	67.98
At (523286,208556)	there is a MANHOLE with SHORT NUMBER=2514	COVER=	72.77	INVERT=	70.70
At (523279,208569)	there is a MANHOLE with SHORT NUMBER=2515	COVER=	73.51	INVERT=	71.95
At (523297,208583)	there is a MANHOLE with SHORT NUMBER=2517	COVER=	0.00	INVERT=	-9999.00
At (523275,208604)	there is a MANHOLE with SHORT NUMBER=2601	COVER=	75.48	INVERT=	72.85
At (523275,208667)	there is a MANHOLE with SHORT NUMBER=2603	COVER=	76.24	INVERT=	74.61
At (523288,208670)	there is a MANHOLE with SHORT NUMBER=2604	COVER=	75.68	INVERT=	73.00
At (523274,208682)	there is a MANHOLE with SHORT NUMBER=2605	COVER=	78.30	INVERT=	73.55
At (523291,208695)	there is a MANHOLE with SHORT NUMBER=2609	COVER=	76.31	INVERT=	74.80
At (523296,208706)	there is a MANHOLE with SHORT NUMBER=2701	COVER=	76.67	INVERT=	73.46
At (523292,208754)	there is a MANHOLE with SHORT NUMBER=2702	COVER=	76.85	INVERT=	75.43
At (523274,208770)	there is a MANHOLE with SHORT NUMBER=2704	COVER=	76.80	INVERT=	74.28
At (523299,208700)	there is a MANHOLE with SHORT NUMBER=2705	COVER=	76.54	INVERT=	67.84
At (523289,208827)	there is a MANHOLE with SHORT NUMBER=2801	COVER=	76.22	INVERT=	75.12
At (523303,208514)	there is a MANHOLE with SHORT NUMBER=3502	COVER=	72.56	INVERT=	70.78
At (523374,208538)	there is a MANHOLE with SHORT NUMBER=3506	COVER=	74.28	INVERT=	73.33
At (523372,208539)	there is a MANHOLE with SHORT NUMBER=3507	COVER=	74.21	INVERT=	73.25
At (523380,208537)	there is a MANHOLE with SHORT NUMBER=3508	COVER=	75.65	INVERT=	75.25
At (523366,208543)	there is a MANHOLE with SHORT NUMBER=3509	COVER=	73.96	INVERT=	72.42
At (523369,208545)	there is a MANHOLE with SHORT NUMBER=3510	COVER=	74.08	INVERT=	73.04
At (523373,208561)	there is a MANHOLE with SHORT NUMBER=3512	COVER=	0.00	INVERT=	-9999.00
At (523366,208592)	there is a MANHOLE with SHORT NUMBER=3514	COVER=	72.75	INVERT=	69.85
At (523381,208592)	there is a MANHOLE with SHORT NUMBER=3515	COVER=	73.22	INVERT=	69.77
At (523374,208607)	there is a MANHOLE with SHORT NUMBER=3602	COVER=	72.51	INVERT=	71.31
At (523376,208612)	there is a MANHOLE with SHORT NUMBER=3603	COVER=	72.31	INVERT=	69.71
At (523374,208616)	there is a MANHOLE with SHORT NUMBER=3604	COVER=	72.11	INVERT=	70.95
At (523378,208631)	there is a MANHOLE with SHORT NUMBER=3605	COVER=	71.56	INVERT=	69.46
At (523377,208633)	there is a MANHOLE with SHORT NUMBER=3606	COVER=	71.42	INVERT=	70.24
At (523301,208665)	there is a MANHOLE with SHORT NUMBER=3609	COVER=	75.39	INVERT=	72.76
At (523386,208658)	there is a MANHOLE with SHORT NUMBER=3611	COVER=	71.08	INVERT=	70.10
At (523311,208614)	there is a MANHOLE with SHORT NUMBER=3622	COVER=	73.02	INVERT=	71.97
At (523309,208719)	there is a MANHOLE with SHORT NUMBER=3701	COVER=	76.64	INVERT=	73.37
At (523369,208722)	there is a MANHOLE with SHORT NUMBER=3703	COVER=	72.26	INVERT=	68.98
At (523375,208783)	there is a MANHOLE with SHORT NUMBER=3704	COVER=	70.74	INVERT=	66.96
At (523388,208824)	there is a MANHOLE with SHORT NUMBER=3801	COVER=	70.72	INVERT=	67.97
At (523382,208871)	there is a MANHOLE with SHORT NUMBER=3803	COVER=	70.43	INVERT=	68.09
At (523382,208874)	there is a MANHOLE with SHORT NUMBER=3804	COVER=	70.71	INVERT=	69.05
At (523461,208566)	there is a MANHOLE with SHORT NUMBER=4501	COVER=	0.00	INVERT=	-9999.00
At (523456,208568)	there is a MANHOLE with SHORT NUMBER=4502	COVER=	0.00	INVERT=	-9999.00
At (523451,208572)	there is a MANHOLE with SHORT NUMBER=4503	COVER=	0.00	INVERT=	-9999.00
At (523457,208581)	there is a MANHOLE with SHORT NUMBER=4504	COVER=	0.00	INVERT=	-9999.00
At (523447,208585)	there is a MANHOLE with SHORT NUMBER=4505	COVER=	0.00	INVERT=	-9999.00
At (523434,208591)	there is a MANHOLE with SHORT NUMBER=4506	COVER=	0.00	INVERT=	-9999.00
At (523467,208628)	there is a MANHOLE with SHORT NUMBER=4603	COVER=	75.75	INVERT=	73.13
At (523444,208642)	there is a MANHOLE with SHORT NUMBER=4604	COVER=	73.35	INVERT=	71.62
At (523288,208825)	there is a MANHOLE with SHORT NUMBER=	COVER=	0.00	INVERT=	-9999.00
At (523133,208531)	there is a MANHOLE with SHORT NUMBER=1506	COVER=	74.02	INVERT=	73.17

Printbox (523071,208370) -> (523579,208878)
Central Mapsheet : TL2308NW
User : RIMISSON
Time : Thu Jul 31 11:09:48 2008

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

At	(523129,208542)	there is a MANHOLE with SHORT NUMBER=1508	COVER=	74.30	INVERT=	70.53
At	(523134,208545)	there is a MANHOLE with SHORT NUMBER=1509	COVER=	75.39	INVERT=	72.71
At	(523133,208508)	there is a MANHOLE with SHORT NUMBER=1514	COVER=	75.09	INVERT=	73.53
At	(523138,208506)	there is a MANHOLE with SHORT NUMBER=1515	COVER=	74.76	INVERT=	72.92
At	(523135,208691)	there is a MANHOLE with SHORT NUMBER=1604	COVER=	80.86	INVERT=	78.90
At	(523139,208714)	there is a MANHOLE with SHORT NUMBER=1701	COVER=	80.68	INVERT=	74.95
At	(523137,208770)	there is a MANHOLE with SHORT NUMBER=1702	COVER=	80.15	INVERT=	78.30
At	(523141,208784)	there is a MANHOLE with SHORT NUMBER=1703	COVER=	80.10	INVERT=	75.34
At	(523138,208860)	there is a MANHOLE with SHORT NUMBER=1802	COVER=	79.55	INVERT=	77.63
At	(523210,208509)	there is a MANHOLE with SHORT NUMBER=2501	COVER=	73.70	INVERT=	71.71
At	(523227,208528)	there is a MANHOLE with SHORT NUMBER=2504	COVER=	72.12	INVERT=	71.02
At	(523225,208544)	there is a MANHOLE with SHORT NUMBER=2505	COVER=	73.27	INVERT=	72.34
At	(523225,208560)	there is a MANHOLE with SHORT NUMBER=2506	COVER=	74.55	INVERT=	73.79
At	(523242,208533)	there is a MANHOLE with SHORT NUMBER=2507	COVER=	71.85	INVERT=	70.58
At	(523247,208534)	there is a MANHOLE with SHORT NUMBER=2508	COVER=	72.30	INVERT=	69.97
At	(523268,208531)	there is a MANHOLE with SHORT NUMBER=2509	COVER=	72.84	INVERT=	68.08
At	(523239,208543)	there is a MANHOLE with SHORT NUMBER=2510	COVER=	75.41	INVERT=	70.69
At	(523236,208582)	there is a MANHOLE with SHORT NUMBER=2516	COVER=	76.43	INVERT=	73.24
At	(523265,208630)	there is a MANHOLE with SHORT NUMBER=2602	COVER=	77.17	INVERT=	74.33
At	(523255,208679)	there is a MANHOLE with SHORT NUMBER=2607	COVER=	75.25	INVERT=	74.27
At	(523256,208689)	there is a MANHOLE with SHORT NUMBER=2608	COVER=	76.14	INVERT=	74.98
At	(523248,208624)	there is a MANHOLE with SHORT NUMBER=2610	COVER=	77.68	INVERT=	73.32
At	(523271,208640)	there is a MANHOLE with SHORT NUMBER=2611	COVER=	76.43	INVERT=	67.88
At	(523263,208754)	there is a MANHOLE with SHORT NUMBER=2703	COVER=	77.42	INVERT=	75.71
At	(523272,208836)	there is a MANHOLE with SHORT NUMBER=2802	COVER=	76.47	INVERT=	74.69
At	(523339,208526)	there is a MANHOLE with SHORT NUMBER=3504	COVER=	72.62	INVERT=	70.52
At	(523354,208549)	there is a MANHOLE with SHORT NUMBER=3511	COVER=	73.16	INVERT=	70.30
At	(523344,208591)	there is a MANHOLE with SHORT NUMBER=3513	COVER=	72.38	INVERT=	70.09
At	(523354,208591)	there is a MANHOLE with SHORT NUMBER=3518	COVER=	72.35	INVERT=	71.35
At	(523342,208543)	there is a MANHOLE with SHORT NUMBER=3519	COVER=	72.76	INVERT=	70.50
At	(523341,208536)	there is a MANHOLE with SHORT NUMBER=3520	COVER=	72.67	INVERT=	69.64
At	(523351,208657)	there is a MANHOLE with SHORT NUMBER=3610	COVER=	72.63	INVERT=	71.74
At	(523356,208675)	there is a MANHOLE with SHORT NUMBER=3614	COVER=	72.49	INVERT=	71.49
At	(523341,208685)	there is a MANHOLE with SHORT NUMBER=3615	COVER=	73.44	INVERT=	71.15
At	(523358,208681)	there is a MANHOLE with SHORT NUMBER=3616	COVER=	71.90	INVERT=	69.62
At	(523359,208688)	there is a MANHOLE with SHORT NUMBER=3618	COVER=	71.66	INVERT=	67.57
At	(523343,208695)	there is a MANHOLE with SHORT NUMBER=3619	COVER=	73.57	INVERT=	-9999.00
At	(523356,208692)	there is a MANHOLE with SHORT NUMBER=3625	COVER=	71.41	INVERT=	70.15
At	(523359,208720)	there is a MANHOLE with SHORT NUMBER=3702	COVER=	73.09	INVERT=	70.37
At	(523422,208616)	there is a MANHOLE with SHORT NUMBER=4601	COVER=	73.67	INVERT=	72.38
At	(523430,208638)	there is a MANHOLE with SHORT NUMBER=4602	COVER=	73.07	INVERT=	72.07
At	(523433,208646)	there is a MANHOLE with SHORT NUMBER=4605	COVER=	73.16	INVERT=	71.30
At	(523420,208614)	there is a MANHOLE with SHORT NUMBER=4610	COVER=	73.71	INVERT=	72.50
At	(523420,208730)	there is a MANHOLE with SHORT NUMBER=4701	COVER=	70.39	INVERT=	68.80
At	(523422,208743)	there is a MANHOLE with SHORT NUMBER=4702	COVER=	70.38	INVERT=	68.71
At	(523423,208756)	there is a MANHOLE with SHORT NUMBER=4703	COVER=	70.45	INVERT=	68.57
At	(523422,208766)	there is a MANHOLE with SHORT NUMBER=4704	COVER=	70.61	INVERT=	68.52
At	(523421,208833)	there is a MANHOLE with SHORT NUMBER=4802	COVER=	71.65	INVERT=	68.40
At	(523433,208589)	there is a MANHOLE with SHORT NUMBER=	COVER=	0.00	INVERT=	-9999.00
At	(523081,208383)	there is a MANHOLE with SHORT NUMBER=0319	COVER=	79.27	INVERT=	77.81
At	(523093,208566)	there is a MANHOLE with SHORT NUMBER=0505	COVER=	76.11	INVERT=	73.38

Printbox (523071,208370) -> (523579,208878)
Central Mapsheet : TL2308NW
User : RIMISSON
Time : Thu Jul 31 11:09:48 2008

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

At (523083,208583) there is a MANHOLE with SHORT NUMBER=0506 COVER= 77.18 INVERT= 73.09
At (523076,208581) there is a MANHOLE with SHORT NUMBER=0507 COVER= 77.42 INVERT= 72.07
At (523080,208528) there is a MANHOLE with SHORT NUMBER=0510 COVER= 78.18 INVERT= 77.24
At (523072,208634) there is a MANHOLE with SHORT NUMBER=0601 COVER= 81.28 INVERT= 79.22
At (523099,208631) there is a MANHOLE with SHORT NUMBER=0602 COVER= 79.85 INVERT= 74.48
At (523078,208670) there is a MANHOLE with SHORT NUMBER=0603 COVER= 81.75 INVERT= -9999.00
At (523080,208699) there is a MANHOLE with SHORT NUMBER=0605 COVER= 81.83 INVERT= 80.59
At (523094,208610) there is a MANHOLE with SHORT NUMBER=0606 COVER= 78.69 INVERT= 76.12
At (523076,208702) there is a MANHOLE with SHORT NUMBER=0701 COVER= 81.85 INVERT= 80.48
At (523077,208783) there is a MANHOLE with SHORT NUMBER=0702 COVER= 81.31 INVERT= 79.64
At (523080,208797) there is a MANHOLE with SHORT NUMBER=0703 COVER= 81.29 INVERT= 79.99
At (523078,208865) there is a MANHOLE with SHORT NUMBER=0801 COVER= 81.16 INVERT= 78.82
At (523081,208872) there is a MANHOLE with SHORT NUMBER=0802 COVER= 81.10 INVERT= 79.39
At (523098,208856) there is a MANHOLE with SHORT NUMBER=0803 COVER= 80.63 INVERT= 77.81
At (523172,208516) there is a MANHOLE with SHORT NUMBER=1501 COVER= 74.44 INVERT= 72.56
At (523166,208515) there is a MANHOLE with SHORT NUMBER=1502 COVER= 74.14 INVERT= 71.87
At (523162,208512) there is a MANHOLE with SHORT NUMBER=1503 COVER= 72.24 INVERT= 69.49
At (523158,208507) there is a MANHOLE with SHORT NUMBER=1504 COVER= 72.34 INVERT= 69.40
At (523153,208517) there is a MANHOLE with SHORT NUMBER=1505 COVER= 72.74 INVERT= 68.28
At (523127,208535) there is a MANHOLE with SHORT NUMBER=1507 COVER= 74.28 INVERT= 73.21
At (523117,208503) there is a MANHOLE with SHORT NUMBER=1510 COVER= 76.72 INVERT= 73.82
At (523124,208532) there is a MANHOLE with SHORT NUMBER=1511 COVER= 74.75 INVERT= 74.26
At (523123,208528) there is a MANHOLE with SHORT NUMBER=1512 COVER= 76.05 INVERT= 74.69
At (523117,208513) there is a MANHOLE with SHORT NUMBER=1513 COVER= 76.60 INVERT= 75.77
At (523123,208502) there is a MANHOLE with SHORT NUMBER=1517 COVER= 76.13 INVERT= 72.08
At (523100,208627) there is a MANHOLE with SHORT NUMBER=1601 COVER= 79.64 INVERT= 77.72
At (523152,208618) there is a MANHOLE with SHORT NUMBER=1602 COVER= 80.32 INVERT= 78.08
At (523169,208619) there is a MANHOLE with SHORT NUMBER=1603 COVER= 80.40 INVERT= 77.81
At (523201,208509) there is a MANHOLE with SHORT NUMBER=2502 COVER= 74.08 INVERT= 72.34
At (523209,208513) there is a MANHOLE with SHORT NUMBER=2503 COVER= 73.92 INVERT= 73.02
At (523324,208509) there is a MANHOLE with SHORT NUMBER=3503 COVER= 72.75 INVERT= 68.97
At (523390,208534) there is a MANHOLE with SHORT NUMBER=3505 COVER= 76.52 INVERT= 75.71
At (523328,208588) there is a MANHOLE with SHORT NUMBER=3516 COVER= 72.41 INVERT= 70.53
At (523335,208592) there is a MANHOLE with SHORT NUMBER=3517 COVER= 72.29 INVERT= 70.80
At (523322,208603) there is a MANHOLE with SHORT NUMBER=3601 COVER= 72.56 INVERT= 71.20
At (523395,208653) there is a MANHOLE with SHORT NUMBER=3607 COVER= 71.48 INVERT= 70.40
At (523336,208650) there is a MANHOLE with SHORT NUMBER=3608 COVER= 73.54 INVERT= 71.70
At (523390,208663) there is a MANHOLE with SHORT NUMBER=3612 COVER= 71.08 INVERT= 69.28
At (523396,208680) there is a MANHOLE with SHORT NUMBER=3613 COVER= 70.96 INVERT= 69.20
At (523399,208690) there is a MANHOLE with SHORT NUMBER=3617 COVER= 70.85 INVERT= 69.65
At (523331,208699) there is a MANHOLE with SHORT NUMBER=3620 COVER= 74.47 INVERT= 71.29
At (523315,208687) there is a MANHOLE with SHORT NUMBER=3621 COVER= 75.01 INVERT= 74.30
At (523392,208866) there is a MANHOLE with SHORT NUMBER=3802 COVER= 70.06 INVERT= 66.95
At (523408,208657) there is a MANHOLE with SHORT NUMBER=4606 COVER= 71.86 INVERT= 70.05
At (523400,208660) there is a MANHOLE with SHORT NUMBER=4607 COVER= 71.49 INVERT= 69.78
At (523405,208687) there is a MANHOLE with SHORT NUMBER=4608 COVER= 71.14 INVERT= 69.86
At (523412,208695) there is a MANHOLE with SHORT NUMBER=4609 COVER= 71.14 INVERT= 70.20
At (523403,208854) there is a MANHOLE with SHORT NUMBER=4801 COVER= 69.56 INVERT= 67.54
At (523095,208425) there is a MANHOLE with SHORT NUMBER=0404 COVER= 78.48 INVERT= 77.56
At (523096,208423) there is a MANHOLE with SHORT NUMBER=0405 COVER= 78.45 INVERT= 77.10
At (523105,208370) there is a MANHOLE with SHORT NUMBER=1305 COVER= 77.54 INVERT= 76.74

Printbox (523071,208370) -> (523579,208878)
Central Mapsheet : TL2308NW
User : RIMISSON
Time : Thu Jul 31 11:09:48 2008

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At	(523118,208495)	there is a MANHOLE with SHORT NUMBER=1401	COVER=	77.00	INVERT=	74.10
At	(523108,208449)	there is a MANHOLE with SHORT NUMBER=1402	COVER=	78.14	INVERT=	76.27
At	(523110,208463)	there is a MANHOLE with SHORT NUMBER=1403	COVER=	78.09	INVERT=	77.09
At	(523157,208475)	there is a MANHOLE with SHORT NUMBER=1404	COVER=	76.02	INVERT=	72.23
At	(523199,208476)	there is a MANHOLE with SHORT NUMBER=1405	COVER=	72.50	INVERT=	70.50
At	(523219,208370)	there is a MANHOLE with SHORT NUMBER=2301	COVER=	75.51	INVERT=	72.49
At	(523242,208403)	there is a MANHOLE with SHORT NUMBER=2401	COVER=	74.81	INVERT=	71.86
At	(523235,208415)	there is a MANHOLE with SHORT NUMBER=2402	COVER=	74.12	INVERT=	71.60
At	(523224,208435)	there is a MANHOLE with SHORT NUMBER=2403	COVER=	73.53	INVERT=	71.88
At	(523214,208447)	there is a MANHOLE with SHORT NUMBER=2404	COVER=	73.31	INVERT=	71.84
At	(523200,208463)	there is a MANHOLE with SHORT NUMBER=2405	COVER=	72.90	INVERT=	70.69
At	(523239,208450)	there is a MANHOLE with SHORT NUMBER=2407	COVER=	70.73	INVERT=	67.59
At	(523205,208456)	there is a MANHOLE with SHORT NUMBER=2408	COVER=	72.84	INVERT=	71.38
At	(523317,208479)	there is a MANHOLE with SHORT NUMBER=3401	COVER=	73.79	INVERT=	71.96
At	(523316,208482)	there is a MANHOLE with SHORT NUMBER=3402	COVER=	73.70	INVERT=	70.97
At	(523301,208488)	there is a MANHOLE with SHORT NUMBER=3403	COVER=	73.22	INVERT=	71.73
At	(523456,208436)	there is a MANHOLE with SHORT NUMBER=4401	COVER=	85.77	INVERT=	85.11
At	(523425,208449)	there is a MANHOLE with SHORT NUMBER=4402	COVER=	83.93	INVERT=	81.71

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Joint
- Trunk Surface Water
- Storm Relief
- Vent Pipe
- Proposed Thames Surface Water Sewer
- Gallery
- Surface Water Rising Main
- Sludge Rising Main
- Vacuum
- Trunk Foul
- Trunk Combined
- Bio-solids (Sludge)
- Trade Effluent
- Proposed Thames Water Foul Sewer
- Foul Rising Main
- Combined Rising Main
- Proposed Thames Water Rising Main
- Syphon

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- AV Air Valve
- BS Blind Shaft
- CP Catch Pit
- DC Dam Chase
- DF Double Flushing Tank / Chamber
- SF Single Flushing Tank / Chamber
- HB Hatch Box
- Other (specified on plan)
- LH Lamp Hole
- LS Lifting Shaft
- ME Meter
- RE Rodding Eye
- VC Vent Column
- VT Vent
- WO Washout

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- BD Backdrop Manhole
- BV Butterfly Valve
- CL Clough
- DB Dam Board
- DP Drop Pipe
- DS Drop Shaft
- FL Flume
- FV Flap Valve
- HW Headwall
- HY Hydrobrake
- PI Petrol Interceptor
- PS Penstock
- RV Reflux Valve
- ST Step
- SV Sluice Valve
- TA Tank
- WW Weir
- Other (specified on plan)

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- STW Effluent Discharge
- SA / SA Soakaway
- Outfall
- Undefined End
- GU Gulley
- Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

- Public/ Private Pumping Station
- Change of characteristic indicator (C.O.C.I.)
- Sewage Treatment Works
- IL Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Building over Case (BOC No.) or Low Lying Land (LLL No.)
- Sewage Treatment Works or Pumping Station
- Area under Adoption Agreement
- Drawing Area or chamber
- Area pending Adoption Agreement
- Survey Area
- Licence Area
- Other Area (specified on plan)

Other Sewer Types (Not Operated or Maintained by Thames Water)

- Foul Sewer
- Combined Sewer
- Culverted Watercourse
- Status Unknown
- Surface Water Sewer
- Highway Drain
- Proposed
- Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) For symbols referred to as 'Other' on this key, please see the plan for further information.
5) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
6) -9999.00 or 0 on a manhole level indicates that data is unavailable.
7) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. When cover and invert levels appear on a plan they are clearly prefixed by 'CL' and 'IL'. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0118 925 1504.

Palmer, Howard

From: Geoff.Nokes@thameswater.co.uk
Sent: 18 March 2011 13:50
To: Palmer, Howard
Subject: Re: Salisbury Square, Old Hatfield, Herts

Howard

The like for like discharge would be acceptable to us but the EA may require a betterment and the possible foul increase would be acceptable to our network.

Consent to connect and Build Over/close to is by application and with notes available on our Developer.Services website

Regards
Geoff
Development Engineer - Waste
01183738252

|---------->
| From: |
|---------->
>----------|
|"Palmer, Howard" <Howard.Palmer@WSPGroup.com> |
>----------|
|---------->
| To: |
|---------->
>----------|
|<geoff.nokes@thameswater.co.uk> |
>----------|
|---------->
| Cc: |
|---------->
>----------|
|"Knowles, Stephanie" <Stephanie.Knowles@WSPGroup.com>, "Duke, Dominic" <Dominic.Duke@WSPGroup.com>
|
>----------|
|---------->
| Date: |
|---------->
>----------|
|17/03/2011 16:15 |
>----------|
|---------->
| Subject: |
|---------->
>----------|
|Salisbury Square, Old Hatfield, Herts |
>----------|

Geoff,

With reference to our telephone conversation this afternoon, please find attached our draft surface water and foul water drainage strategy for the above scheme.

The surface water networks have been designed to discharge to the culverted watercourse at the existing site discharge rate for a 1 in 100 year plus climate change event. The existing and proposed discharge rates for the 1 in 100 year plus climate change event are listed below:

Existing discharge rate: 559 l/s from 4 networks (S1 to S4);
Proposed discharge rate: 556 l/s from 3 networks (S1 to S3).

The foul water networks have been designed to Sewers for Adoption criteria and have the following peak flows:

- Network F1 = 0.5l/s
- Network F2= 1.0l/s

We do not have any data on the existing foul water flows of the sewers we are connecting into, so we may need capacity checks from you on these items.

Two of the proposed buildings will require build-over agreements/consents as they are positioned over the culverted watercourse. Can you please advise us as to the procedures for obtaining these consents.

We look forward to hearing from you.

Regards

Howard

Howard Palmer
Principal Engineer, Property & Development

Unit 9, The Chase, Foxholes Business Park, John Tate Road, Hertford, SG13 7NN
Tel: +44(0)1992 526032
Fax: +44(0)1992 526001

Website: www.wspgroup.com

Find juggling your finances a struggle? Spread your bill payments by setting up a Direct Debit . You stay in control with advance notice of your payments and a choice of payment dates. Visit http://www.thameswater.co.uk

For more information on Thames Water visit our web site at http://www.thameswater.co.uk.

Our vision: If customers had a choice, they would choose Thames Water.

Appendix D EA Correspondence

Palmer, Howard

From: planning, colne <colneplanning@environment-agency.gov.uk>
Sent: 04 January 2011 16:00
To: Palmer, Howard
Subject: FW: NE26016/BC: Salisbury Square, Old Hatfield, Hertfordshire

Dear Howard

Thank you for your email regarding the above application.

You should receive our response by 10/01/2011. If you wish to contact us prior to this our reference is NE/2010/110911

Kind Regards

Sarah Smith
Planning Liaison Technical Assistant

From: Customer Contact, Thames Northeast
Sent: 23 December 2010 15:07
To: Howard.Palmer@WSPGroup.com
Cc: planning, colne
Subject: NE26016/BC: Salisbury Square, Old Hatfield, Hertfordshire

This should be logged on. The probable issues are;- site over 1ha, close to an extended culvert which runs under the road past the station and check potential contamination/SPZ - Nick 24/12/10

Dear Mr Palmer

Salisbury Square, Old Hatfield, Hertfordshire

Thank you for your enquiry. The site in question is outside any known main river flood plain. This means that the chance of river flooding is less than 0.1% in any given year. I have no record of river flooding at this site and we have no apparatus in the vicinity.

We have no history of groundwater flooding in the vicinity of this site.

We advise you to contact the local water company regarding previous or potential flooding from sewers. You may also wish to contact the local authority regarding flooding from any non-main rivers or surface water runoff.

I have forwarded your pre-planning form to our Planning team. They will contact you within 21 days.

Our Planning team offer a free Pre-Planning Service, and can give you advice on any major environmental issues relating to your development site.

Using this service could help you design a more environmentally sustainable site, and help to ensure you have included all of the relevant information in your application - saving you time and money.

You can contact the Planning team directly by emailing them at colneplanning@environment-agency.gov.uk or by phone on 01707 632332.

If I can be of any further help, please contact me.

Yours sincerely

Becki Clark
External Relations Officer
Direct dial 01707 632302
Direct fax 01707 632 610
Direct email thnortheast@environment-agency.gov.uk

From: Palmer, Howard [redacted]
Sent: 21 December 2010 16:37
To: Enquiries, Unit
Subject: Salisbury Square, Old Hatfield, Herts - Request for data

Dear Sir/Madam,

RE: Salisbury Square, Old Hatfield, Herts

Attached is a pre planning application form for the above site along with a site location plan. The Flood Maps on the EA's website show the site to be located in Flood Zone 1.

We are currently undertaking a Flood Risk Assessment as part of an Outline planning application for the site, and require the EA to provide an initial view on what the requirements would be for a Flood Risk Assessment. As the site is located in Flood Zone 1, the focus of the FRA will be based on the surface water drainage aspects of the proposed development.

Our data requests relating to the production of Flood Risk Assessments are set out below. Please can you contact me as soon as possible to provide a quote for the costs for requesting this data. Based on the information on your website, we would require Product 3, however I have set out a list of the information below;

- Classification and location of watercourses in the area.
- Confirmation that the entire site is in Flood Zone.
- Details of any existing constraints in relation to runoff rates.
- Historical flood records for the area (with corresponding return periods for flood events).
- Details of any groundwater flooding issues.
- Details of any EA apparatus within the site boundary.

We would be grateful of an early response, therefore if you require any further information regarding the site, please do not hesitate to contact me.

Regards,

Howard Palmer

Principal Engineer
WSP UK
Development & Transportation
Unit 9, The Chase, Foxholes Business Park, John Tate Road, Hertford, SG13 7NN
Tel: +44(0)1992 526032
Fax: +44(0)1992 526001
Website: www.wspgroup.com

creating a better place

Environment Agency

Howard Palmer
W S P Development Environmental
9 The Chase John Tate Road
Hertford
Hertfordshire
SG13 7NN

Our ref: NE/2011/110911/01-L01

Date: 10 January 2011

Dear Howard

Salisbury Square, Old Hatfield, Herts, AL9 5BT.

Enquiry regarding the re-development of Sailsbury Square in Old Hatfield including new commercial and residential development.

Thank you for consulting us at this early stage with regard to requirements for your Flood Risk Assessment (FRA).

We would be happy to see a draft before you formally submit to the council to enable an agreed plan to be in place, making the application phase a smooth process.

The FRA will need to consider flood risk from all sources. Information on other sources of flooding can be found in the Welwyn Hatfield Strategic Flood Risk Assessment (SFRA).

In line with the requirements of the SFRA we would expect the FRA to:

• show how the Sustainable Drainage Systems (SuDS) hierarchy has been used and maximised on the site, with any obstacles to the use of SuDs clearly justified. (The hierarchical approach is explained in the attached document SUDS - A Practical Guide.)

SuDs achieve the three main goals of attenuation, improved water quality and amenity and should be included from the outset of the development design.

• provide a plan indicating how the greenfield run off rate will be achieved and show how it would be feasible to balance surface water run-off to the greenfield run off rate for all events up to the 1 in 100 year storm (including climate change). Greenfield run off rate is normally between 2 and 8 litres per second per hectare.
• provide a plan indicating volumes of attenuation and show how attenuation storage of surface water will be provided. The drainage system must be able to accommodate any storm event up to the critical duration 1 in 100 year storm event for the site, including an additional allowance for climate change, without the flow balancing system being bypassed.

Rainfall rates should be taken from the Flood Estimation Handbook (FEH) data and sufficient information must be provided to demonstrate that the critical duration storm event has been used in the design and that flow by-passing does not occur.

A culverted watercourse runs along the western boundary of the site. We always look to get de-culverting of rivers to achieve river improvements. If de-culverting can't take place we would expect to see justification for this. Development needs to be set at least five metres away from the culverted watercourse. This is to ensure that any future maintenance works are not impeded by the proposed development and to preserve any potential overland flow routes.

Please be aware that the site is located in Source Protection Zone 3. This is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. It is important to ensure no contamination reaches groundwater from surface water disposal.

If you have any queries please do not hesitate to contact me.

Yours sincerely

Miss Eleri Randall
Planning Liaison Officer

Direct dial 01707 632491
Direct e-mail colneplanning@environment-agency.gov.uk

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Environment Agency

Stephanie Knowles
W S P Development Environmental
9 The Chase John Tate Road
Hertford
Hertfordshire
SG13 7NN

Our ref: NE/2011/110911/02-L01

Date: 11 February 2011

Dear Stephanie

Salisbury Square, Old Hatfield, Herts, AL9 5BT.

Enquiry regarding the re-development of Sailsbury Square in Old Hatfield including new commercial and residential development.

Thank you for your emails on 25 and 27 January. As the site is now less than 1 hectare we can confirm that a Flood Risk Assessment is not required. The principles of Sustainable Drainage Systems (SuDS) should still however be considered using the SuDS hierarchy and run off rates reduced to create a sustainable development as possible in this location.

We would expect opportunities to open up the culvert that runs just to the west of the site to be explored as part of the development proposals. Deculverting offers the opportunity to restore lost habitat, enhance biodiversity and create a positive feature on the site. If there are any barriers to the deculverting of this channel we would expect these to be clearly justified.

If the channel cannot be deculverted, all development must be set at least five metres away from the culverted watercourse. This is to ensure that any future maintenance works are not impeded by the proposed development and to preserve any potential overland flow routes. The five metres must be measured from the outside wall of the culvert and be free of any permanent structures.

As mentioned in my previous letter the site is located in Source Protection Zone 3. It is important to ensure no contamination reaches groundwater from surface water disposal. We would need a Preliminary Risk Assessment (PRA) submitted with the planning application to assess if land contamination may be present at the site.

The PRA needs to include information on past and current uses, if sensitive controlled waters receptors are present and if the site could pose a pollution risk. The PRA should also consider if any aspects of the proposed development could pose a pollution risk should contamination be present (i.e. deep drilling to facilitate the installation of foundation piles, site drainage). Further work such as an intrusive site investigation may be required depending on the findings of the PRA.

We recommend that developers should:

1. Follow the risk management framework provided in CLR11, 'Model Procedures for the Management of Land Contamination', when dealing with land potentially affected by contamination;

2. Refer to our 'Guiding Principles for Land Contamination' documents for the type of information that should be included in a PRA;

3. Refer to our 'Groundwater Protection: policy and practice (GP3)' documents.

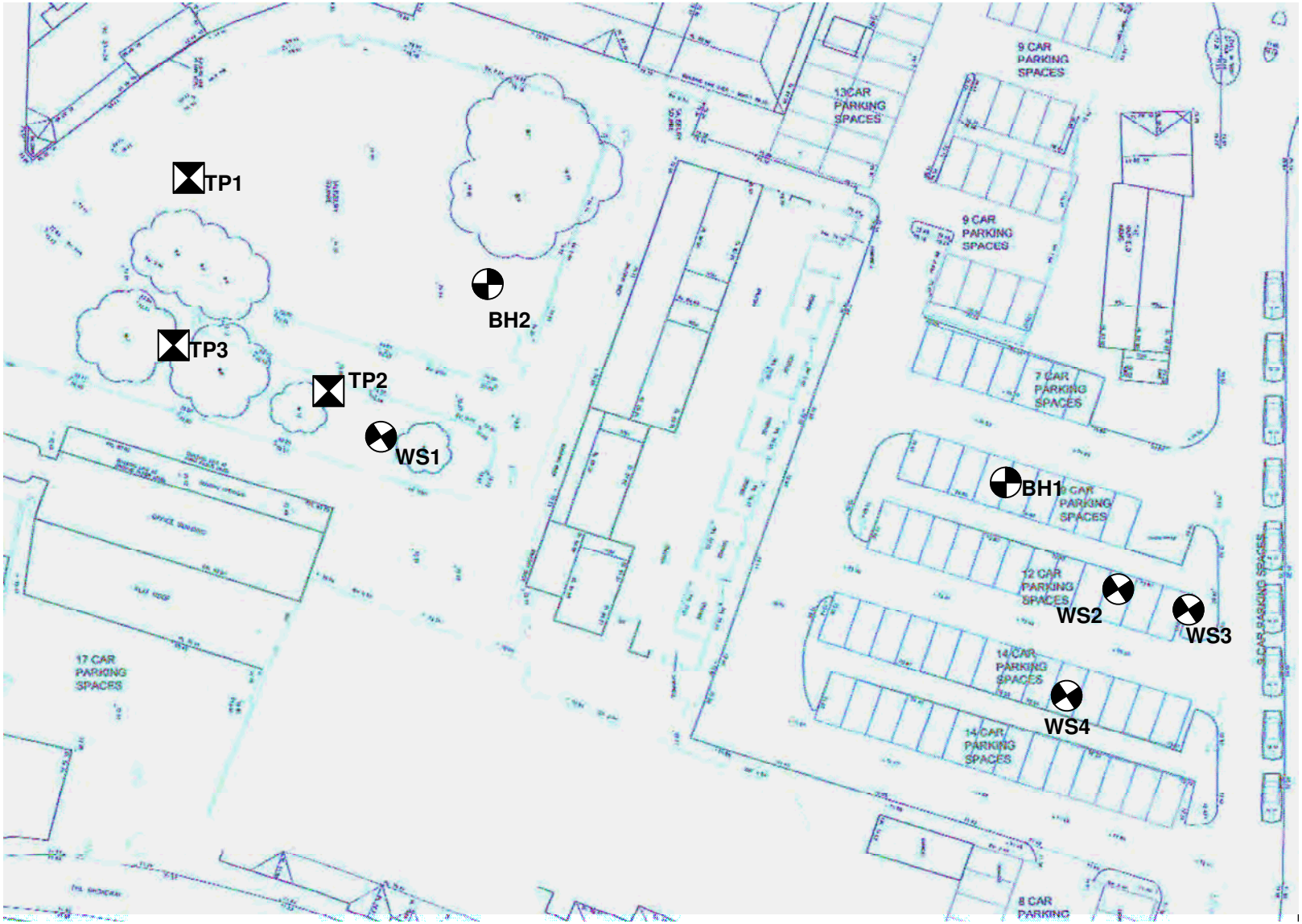
Please contact me if you have any further queries.

Yours sincerely

Miss Eleri Randall
Planning Liaison Officer

Direct dial 01707 632491
Direct e-mail colneplanning@environment-agency.gov.uk

Appendix E Geotechnical Survey Borehole Logs and Location Plan



RSK GROUP PLC	**EXPLORATORY HOLE LOCATION PLAN**	**Client:** Gascoyne Cecil Estate	**Figure No:** 2
		Site: Salisbury Square, Old Hatfield	**Job No:** 241882-01(00)
		Scale: NTS	**Source:** GCE Feasibility Study

RSK GROUP PLC | STATS

BOREHOLE RECORD (Percussive)

Borehole Number: BH1

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 2 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 2

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
			0.20 ES 1 0.25-0.50 B 1		0.18	0.18		MADE GROUND: Concrete with reinforcement
			0.60 D 1 0.70-1.30 B 2 0.70 D 2 ES 2		0.65	0.47		MADE GROUND: Light brown/orange sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. Occasional fragments of brick and concrete.
		1			1.00	0.35		MADE GROUND: Dark brown sandy CLAY with traces of angular to subrounded fine to coarse flint, brick, concrete and occasional ashy deposits. Occasional subangular cobbles of concrete
			1.40 D 3 1.50-2.00 B 3 1.50-1.70 ES 3		1.40	0.40		MADE GROUND: Weak lean mix concrete and brick (possibly remnant of a former footing).
		2				0.90		MADE GROUND: Brown sandy gravelly CLAY. Sand is fine to coarse (predominantly medium to coarse). Gravel is angular to subrounded concrete, brick and occasional clinker.
			2.30-2.50 ES 4 2.40 D 4 2.50-3.00 B 4		2.30			Medium dense light brown/orange slightly clayey silty SAND with traces of subangular to subrounded fine to medium flint gravels. Sand is predominantly fine to medium (GLACIAL DEPOSITS).
		3						…@ 3.5m Sand becoming predominantly medium to coarse with reduction in clay and silt content
			3.40 D 5 3.50-4.00 B 5			3.00		
		4						
			4.40 D 6 4.50-5.00 B 6					
		5						
			5.20 D 7		5.30			Stiff to very stiff dark brown slightly sandy CLAY with traces of subangular to subrounded fine to coarse flint and chalk (medium density) gravels. Occasional subrounded cobbles of flint (GLACIAL DEPOSITS).
		6						
			6.80 D 8 6.90-7.35 U 1 6.90-7.40 B 7					
		7						
			7.50 D 9					
		8				6.50		
			8.90 D 10 9.00-9.45 U 2 9.00-9.50 B 8					
		9						
			9.60 D 11					***Continued next sheet***

Remarks and Water Observations
Service inspection pit to 1.2m bgl. Borehole cased to 5.2m bgl. No water encountered. Undisturbed samples at 6.9m and 9.0m failed due to stiffness of clay and granular content.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Percussive)

Borehole Number: BH1

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 2 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 2 of 2

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
		11	10.90 D 12					
			11.70 D 13					
			11.80-12.30 B 9		11.80			
		12				1.00		Very dense light brown clayey snady GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded flint and chert (GLACIAL DEPOSITS).
					12.80			***End of Borehole at 12.80 m***
		13						
		14						
		15						
		16						
		17						
		18						
		19						

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Borehole cased to 5.2m bgl. No water encountered. Undisturbed samples at 6.9m and 9.0m failed due to stiffness of clay and granular content.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC | STATS

BOREHOLE RECORD (Percussive)

Borehole Number: BH2

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 3 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 2

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
			0.00-0.50 B 1					
			0.25 ES 1		0.30			MADE GROUND: Grass over dark brown sandy silty CLAY with traces of angular to subrounded fine to coarse flint, brick, concrete and occasional clinker. Occasional roots and rootlets.
			0.50 ES 2					
			0.60 D 1					
			0.70-1.30 B 2					
		1	0.90 ES 3					MADE GROUND: Dark brown very sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded brick, clinker, concrete and flint. Occasional ashy deposits. Occasional subangular cobbles of concrete and brick.
			1.40 ES 4					
			1.50 D 2					
			1.60-2.05 U 1			2.70		
			1.60-2.00 B 3					…@ 1.4m Reduction in sand and gravel content, particularly concrete and chalk clasts
		2						
			2.10 D 3					…@ 2.1m Increase in gravel constituents, particularly brick and concrete
			2.10-2.60 B 4					
		3	3.00 D 4		3.00			
			3.10-3.60 ES 5					MADE GROUND: Light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded brick, clinker and flint.
			B 5					
			3.90 D 5					
		4	4.00-4.50 B 6			1.90		…@ 3.9m Slight reduction in brick and clinker content
			4.90 D 6		4.90			
		5	5.00-5.50 ES 6					Medium dense light brown/orange slightly silty SAND with traces of subangular fine to medium flint gravel. Sand is predominantly medium to coarse (GLACIAL DEPOSITS).
			B 7			0.70		
			5.60 D 7		5.60			
			5.70-6.15 U 2	U65				Stiff to very stiff dark brown slightly sandy CLAY with traces of subangular to subrounded fine to coarse flint and chalk (low to medium density) gravels. Occasional subrounded cobbles of flint (GLACIAL DEPOSITS).
		6	6.20 D 8					
		7	6.90 D 9					
		8						
			8.40 D 10					
			8.50-8.95 U 3	U130				
		9	9.00 D 11			7.90		
			9.90 D 12					***Continued next sheet***

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Borehole cased to 6.0m bgl. Groundwater encountered at 4.9m, rising to 4.7m in 30 minutes. Water sealed out at 6.0m. Monitoring well installed to 6.0m bgl, comprising 1m plain casing, 5m slotted. Undisturbed sample at 1.6m failed due to granular content.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Percussive)

Borehole Number: BH2

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 3 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 2 of 2

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
		11	11.40 D 13 11.50-12.00 B 8					
		12	12.10 D 14					
		13	12.80 D 15					
			13.50 D 16 13.50-14.00 B 9		13.50	1.00		Very dense brown sandy GRAVEL. Sand is fine to coarse (predominantly medium to coarse). Gravel is subangular to subrounded fine to medium flint and chert (GLACIAL DEPOSITS).
		14			14.50			***End of Borehole at 14.50 m***
		15						
		16						
		17						
		18						
		19						

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Borehole cased to 6.0m bgl. Groundwater encountered at 4.9m, rising to 4.7m in 30 minutes. Water sealed out at 6.0m. Monitoring well installed to 6.0m bgl, comprising 1m plain casing, 5m slotted. Undisturbed sample at 1.6m failed due to granular content.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Percussive)

Borehole Number: TP1

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 2 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
			0.10 ES 1					
			0.40 ES 2		0.40	0.40		MADE GROUND: Grass over dark brown sandy silty CLAY with traces of angular to subrounded fine to coarse flint, brick, concrete and occasional clinker. Occasional roots and rootlets.
			0.70 ES 3		0.80	0.40		MADE GROUND: Light brown/orange-yellow slightly clayey gravelly SAND. Gravel is angular to subrounded flint, brick and concrete. Occasional subangular fine to medium clinker and ash. Occasional subangular cobbles of concrete.
		1						***End of Borehole at 0.80 m***
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						

Remarks and Water Observations

Hand-excavated trial pit. CBR at 0.2m: 3%, CBR at 0.5m: 14%, CBR at 0.7m: 28%. Trial pit remained dry and stable. Exploratory hole terminated due to concrete spanning base of pit.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Percussive)

Borehole Number: TP2

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 2 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
			0.20 ES 1		0.30	*0.30*		MADE GROUND: Grass over dark brown sandy silty CLAY with traces of angular to subrounded fine to coarse flint, brick, concrete and occasional clinker. Occasional roots and rootlets. Occasional woody fragments.
			0.50 ES 2			*0.70*		MADE GROUND: Light brown very sandy silty CLAY with traces of angular to subrounded medium to coarse brick, concrete and flint. Occasional subangular cobbles of brick. Occasional fine rootlets.
		1	1.00 ES 3		1.00			…@ 0.5m Becoming lighter brown. Onset of clinker and occasional fragments of bitumen
		2						…@ 0.85 to 0.90m Relatively weak concrete
		3						***End of Borehole at 1.00 m***
		4						
		5						
		6						
		7						
		8						
		9						

Remarks and Water Observations
Hand-excavated trial pit. CBR at 0.2m: 2%, CBR at 0.5m: 3%, CBR at 0.8m: 12%. Trial pit remained dry and stable.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Percussive)

Borehole Number: TP3

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Date: 2 Feb 11

Job No: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Depth/Type (m)	SPT 'N' or U Blows	Depth (m)	Level (mAOD)	Key	Description
			0.10 ES 1		0.35	0.35		MADE GROUND: Grass over dark brown sandy silty CLAY with traces of angular to subrounded fine to coarse flint, brick, concrete and occasional clinker. Occasional roots and rootlets.
			0.50 ES 2		0.95	0.60		MADE GROUND: Light brown gravelly very clayey SAND/very sandy CLAY. Sand is predominantly fine to medium. Gravel is angular to subrounded fine to coarse (predominantly medium to coarse) brick, concrete, clinker and flint. Occasional subangular fine fragments of chalk. …@ 0.55m Subangular cobble-sized fragment of concrete
		1						***End of Borehole at 0.95 m***
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						

Remarks and Water Observations
Hand-excavated trial pit. CBR at 0.2m: 3%, CBR at 0.6m: 7%. Trial pit remained dry and stable.

Scale: 1:50

Logged by: BC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Window Sampler)

Borehole Number: WS1

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Dates: 3 Feb 11

Job No.: 241882

Sheet 1 of 2

GROUND WATER		SAMPLES/TESTS			STRATA RECORD				
Strike	Well	Depth (m)	Type/Depth (m)	In-situ Tests	Depth (m)	Level (mAOD)		Key	Description
			ES1 0.20-0.30						MADE GROUND: Grass over dark brown clayey silty gravelly SAND. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium flint. Frequent fine rootlets.
			ES2 0.50-0.60		0.45		0.45		MADE GROUND: Orange/light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse flint, ceramics, brick and clinker.
		1	B1 0.90-1.10		0.90		0.45		MADE GROUND: Grey slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular fine to medium flint and subangular fine brick and occasional clinker. Occasional black specks of decomposing organic matter. Organic odour.
			B2 1.20-1.40						
			B3 1.40-1.70		1.40		0.50		MADE GROUND: Orange/brown/light brown slightly gravelly CLAY. Gravel is subangular fine to medium flint, brick and infrequent clinker. Occasional black specks of decomposing organic matter
			B4 1.85-2.00		1.90		0.50		…@ 1.80 to 1.85m Crushed concrete, recovered as subangular medium to coarse gravels and occasional flint
		2							MADE GROUND: Brown/white sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium flint, brick clinker and low to medium density chalk.
									…@ 2.55m Coarse gravel-sized fragment of brick within sample …@ 2.70m Crushed concrete encountered in sample tube
		3			3.00		1.10		Stiff dark grey slightly sandy slightly gravelly CLAY with subrounded fine chalk and flint gravels (GLACIAL DEPOSITS).
		4							

Continued next sheet

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Exploratory hole remained dry and stable.

Key for Insitu tests

HV-Hand Vane (kN/m2)
PP-Pocket Penotometer (kN/m2)
MP-Mackintosh Probe (N150)

Scale: 1:25

Logged by: SOC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Window Sampler)

Borehole Number: WS1

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Dates: 3 Feb 11

Job No.: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 2 of 2

Strike	Well	Depth (m)	Type/Depth (m)	In-situ Tests	Depth (m)	Level (mAOD)		Key	Description
					5.20		2.20		*End of Borehole at 5.20 m*

6

7

8

9

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Exploratory hole remained dry and stable.

Key for Insitu tests
HV-Hand Vane (kN/m2)
PP-Pocket Penotometer (kN/m2)
MP-Mackintosh Probe (N150)

Scale: 1:25

Logged by: SOC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Window Sampler)

Borehole Number: WS2

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Dates: 3 Feb 11

Job No.: 241882

Sheet 1 of 1

GROUND WATER		SAMPLES/TESTS			STRATA RECORD				
Strike	Well	Depth (m)	Type/Depth (m)	In-situ Tests	Depth (m)	Level (mAOD)		Key	Description
					0.13		0.13		MADE GROUND: Concrete with reinforcement
			ES1 0.20-0.30						MADE GROUND: Orange/brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium flint. Occasional fine rootlets.
			ES2 0.50-0.60		0.45		0.32		MADE GROUND: Orange/brown clayey gravelly SAND. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint and flint cobbles.
		1							
			B1 1.70-1.90		1.80		1.35		Loose to medium dense orange/brown sand with traces of fine subrounded flint gravels. Sand is predominanty coarse (GLACIAL DEPOSITS).
		2							
		3							
			B2 3.50-3.75						
			B3 3.80-4.00		3.75		1.95		Firm dark grey silty CLAY (GLACIAL DEPOSITS).
		4			4.00		0.25		***End of Borehole at 4.00 m***

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Exploratory hole remained dry and stable. Monitoring well installed to 3m bgl, comprising 1m plain casing, 2m slotted.

Key for Insitu tests
HV-Hand Vane (kN/m2)
PP-Pocket Penotometer (kN/m2)
MP-Mackintosh Probe (N150)

Scale: 1:25

Logged by: SOC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Window Sampler)

Borehole Number: WS3

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Dates: 3 Feb 11

Job No.: 241882

GROUND WATER | **SAMPLES/TESTS** | **STRATA RECORD** | Sheet 1 of 1

Strike	Well	Depth (m)	Type/Depth (m)	In-situ Tests	Depth (m)	Level (mAOD)		Key	Description
					0.13		0.13		MADE GROUND: Concrete with reinforcement
			ES1 0.20-0.30						MADE GROUND: Orange/brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium flint. Occasional fine rootlets.
			ES2 0.50-0.60		0.45		0.32		…@ 0.40 to 0.42m Horizon of lean-mix concrete
		1	B1 1.00-1.20						MADE GROUND: Orange/brown clayey SAND and GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse (predominantly fine to medium) flint.
			B2 1.60-1.80						…@ 1.60m Onset of occasional subangular fine brick and specks of decomposing organic matter. Roots noted in sample tube
		2	B3 2.10-2.30						…@ 2.10m Becoming softer
			B4 2.65-2.85		2.65		2.20		…@ 2.60m Occasional linear inclusions of coarse sands
			B5 2.90-3.30		2.95		0.30		Brown/orange/grey slightly silty slightly gravelly CLAY. Sand is coarse. Gravel is subangular to subrounded fine flint (GLACIAL DEPOSITS).
		3							Medium dense orange/brown SAND. Sand is medium to coarse (GLACIAL DEPOSITS).
					3.30		0.35		Stiff grey, becoming dark grey by 3.8m silty CLAY with occasional subrounded fine flint and low to medium density chalk (GLACIAL DEPOSITS).
			B6 3.60-3.80						
			B7 3.90-4.00						
		4			4.00		0.70		***End of Borehole at 4.00 m***

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Exploratory hole remained dry and stable.

Key for Insitu tests
HV-Hand Vane (kN/m2)
PP-Pocket Penotometer (kN/m2)
MP-Mackintosh Probe (N150)

Scale: 1:25

Logged by: SOC

Figure: App B

RSK GROUP PLC STATS

BOREHOLE RECORD (Window Sampler)

Borehole Number: WS4

Site: Salisbury Square, Old Hatfield

Location: Salisbury Square, Old Hatfield

Client: Gascoyne Cecil Estate

Ground Level: GL not measured

Dates: 3 Feb 11

Job No.: 241882

Sheet 1 of 1

GROUND WATER			SAMPLES/TESTS					STRATA RECORD	
Strike	Well	Depth (m)	Type/Depth (m)	In-situ Tests	Depth (m)	Level (mAOD)		Key	Description
					0.13		0.13		MADE GROUND: Concrete with reinforcement
			ES1 0.20-0.30						MADE GROUND: Orange/brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium flint. Occasional fine rootlets.
			ES2 0.50-0.60						
		1							
					1.25		1.12		MADE GROUND: Brown/dark brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium flint and brick.
			B1 1.40-1.60						
			B2 1.80-2.00						…@ 1.80m Becoming lighter brown
		2							
					2.20		0.95		Brown silty CLAY with occasional subangular fine flint (GLACIAL DEPOSITS).
					2.50		0.30		Brown slightly clayey gravelly SAND. Gravel is subangular to subrounded fine flint (GLACIAL DEPOSITS).
					2.70		0.20		Stiff dark brown/dark grey CLAY with subangular fine flint and occasional chalk (low to medium density) gravels (GLACIAL DEPOSITS).
		3			3.00		0.30		***End of Borehole at 3.00 m***
		4							

Remarks and Water Observations

Service inspection pit to 1.2m bgl. Exploratory hole remained dry and stable. Monitoring well installed to 3m bgl, comprising 1m plain casing, 2m slotted.

Key for Insitu tests
HV-Hand Vane (kN/m2)
PP-Pocket Penotometer (kN/m2)
MP-Mackintosh Probe (N150)

Scale: 1:25

Logged by: SOC

Figure: App B

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 11/00569
Issue Number: 1 **Date:** 23 February, 2011

Client: RSK STATS Hemel Hempstead
18 Frogmore Roa
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Ben Coulston
Project Name: Salisbury Square, Hatfield
Project Ref: 241882
Order No: Not specified
Date Samples Received: 10/02/11
Date Instructions Received: 10/02/11
Date Analysis Completed: 23/02/11

Prepared by: **Approved by:**

[redacted]

Melanie Marshall
Laboratory Coordinator

John Gustafson
Director

Notes - Soil analysis
All results are reported as dry weight (<40°C).
Stones >10mm are removed from the sample prior to analysis and results corrected where appropriate.

Notes - General
For soil samples subscript A indicates analysis performed on the sample as received, D indicates analysis performed on dried & crushed sample.
Superscript M indicates method accredited to MCERTS.

Predominant Matrix Codes - 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.
Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our MCERTS accreditation.
Secondary Matrix Codes - A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.
IS indicates Insufficient sample for analysis. NDP indicates No Determination Possible. NFI indicates No Fibres Identified.
Superscript # indicates method accredited to ISO 17025.
Accreditation for TPH (C6-C40) applies to the range C6-C36 only.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.

MCERTS
UKAS TESTING 1247

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/1	11/00569/2	11/00569/3	11/00569/4	11/00569/5	11/00569/6	11/00569/7	11/00569/8	Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH2		
Depth to Top	0.20	0.70	1.50	2.30	0.25	0.50	0.90	1.40		
Depth To Bottom			1.70	2.50						
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	5A	5A	1A	7	5A	7	5A		
ACM Screen$_A$	-	NFI	NFI	-	NFI	NFI	-	-		Visual
pH$_D^{M\#}$	8.1	8.8	9.4	9.0	9.0	-	11.6	9.0	pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.02	-	-	0.02	-	-	-	-	g/l	A-T-026s
Phenols - Total by HPLC$_A$	<0.2	-	<0.2	-	-	<0.2	-	-	mg/kg	A-T-050s
Total Organic Carbon$_D^{\#}$	-	2.07	-	-	-	-	-	0.83	% w/w	A-T-032s
Arsenic$_D^{M\#}$	26	23	12	7	23	-	23	11	mg/kg	A-T-024
Boron (water soluble)$_D^{M\#}$	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	mg/kg	A-T-027s
Cadmium$_D^{M\#}$	0.6	0.6	<0.5	<0.5	0.5	-	<0.5	<0.5	mg/kg	A-T-024
Copper$_D^{M\#}$	17	50	14	3	17	-	16	33	mg/kg	A-T-024
Chromium$_D^{M\#}$	29	29	29	15	23	-	30	30	mg/kg	A-T-024
Lead$_D^{M\#}$	14	278	21	5	14	-	43	46	mg/kg	A-T-024
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	-	<0.17	<0.17	mg/kg	A-T-024
Nickel$_D^{M\#}$	43	32	28	9	35	-	35	21	mg/kg	A-T-024
Selenium$_D^{M\#}$	1	2	<1	<1	<1	-	<1	<1	mg/kg	A-T-024
Zinc$_D^{M\#}$	105	177	46	17	87	-	97	62	mg/kg	A-T-024
TPH total (C6-C40)$_A$	-	-	-	-	-	-	-	168	mg/kg	A-T-007s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/1	11/00569/2	11/00569/3	11/00569/4	11/00569/5	11/00569/6	11/00569/7	11/00569/8	Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH2		
Depth to Top	0.20	0.70	1.50	2.30	0.25	0.50	0.90	1.40		
Depth To Bottom			1.70	2.50						
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	5A	5A	1A	7	5A	7	5A		
TPH CWG										
Ali >C5-C6$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-022+23s
Aro >C5-C7$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10$_A$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-023s
Total Aromatics$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-022+23s
TPH (Ali & Aro)$_A$$^{\#}$	<0.1	-	-	-	-	-	-	-	mg/kg	A-T-022+23s
MTBE$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
BTEX										
BTEX - Benzene$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene$_A$$^{\#}$	<0.01	-	-	-	-	-	-	-	mg/kg	A-T-022s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/1	11/00569/2	11/00569/3	11/00569/4	11/00569/5	11/00569/6	11/00569/7	11/00569/8	Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH2		
Depth to Top	0.20	0.70	1.50	2.30	0.25	0.50	0.90	1.40		
Depth To Bottom			1.70	2.50						
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	5A	5A	1A	7	5A	7	5A		
PAH 16										
Acenapthene$_A^{M\#}$	<0.01	0.01	0.02	<0.01	<0.01	-	0.04	-	mg/kg	A-T-019s
Acenapthylene$_A^{M\#}$	<0.01	0.05	<0.01	<0.01	<0.01	-	0.14	-	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.01	0.07	<0.01	<0.01	<0.01	-	0.19	-	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{\#}$	<0.01	0.36	0.01	<0.01	<0.01	-	0.67	-	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.02	0.47	<0.01	<0.01	<0.01	-	0.94	-	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.01	0.33	<0.01	<0.01	0.01	-	0.70	-	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.01	0.71	0.02	<0.01	0.01	-	1.01	-	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A$	0.02	0.48	0.02	<0.01	<0.01	-	0.76	-	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.01	0.70	0.03	<0.01	0.02	-	1.48	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{\#}$	<0.01	0.10	<0.01	<0.01	<0.01	-	0.14	-	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.01	0.78	0.07	<0.01	0.03	-	1.90	-	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	0.01	<0.01	<0.01	-	0.03	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{\#}$	<0.01	0.27	<0.01	<0.01	<0.01	-	0.58	-	mg/kg	A-T-019s
Napthalene$_A^{M\#}$	<0.01	0.03	0.11	0.02	<0.01	-	0.04	-	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.02	0.17	0.06	<0.01	0.02	-	0.65	-	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.01	0.75	0.06	0.02	0.03	-	1.71	-	mg/kg	A-T-019s
Total PAH$_A^{\#}$	0.10	5.28	0.41	0.03	0.13	-	11	-	mg/kg	A-T-019s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/9	11/00569/10	11/00569/11	11/00569/12	11/00569/13	11/00569/14	11/00569/15	11/00569/16	Units	Method ref
Client Sample No										
Client Sample ID	BH2	BH2	WS1	WS1	WS2	WS2	WS3	WS3		
Depth to Top	3.00	4.90	0.20	0.50	0.20	0.50	0.20	0.50		
Depth To Bottom			0.30	0.60	0.30	0.60	0.30	0.60		
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	5A	1A	5AE	5AE	5AE	7	5A			
ACM Screen$_A$	-	-	NFI	-	NFI	NFI	NFI	NFI		Visual
pH$_D$ M#	8.7	8.9	-	8.7	-	7.6	-	-	pH	A-T-031s
Sulphate (water sol 2:1)$_D$ M#	-	0.02	-	-	-	-	-	-	g/l	A-T-026s
Phenols - Total by HPLC$_A$	<0.2	-	<0.2	-	<0.2	-	-	-	mg/kg	A-T-050s
Total Organic Carbon$_D$ #	-	-	-	-	-	0.10	-	-	% w/w	A-T-032s
Arsenic$_D$ M#	11	14	-	12	-	23	-	-	mg/kg	A-T-024
Boron (water soluble)$_D$ M#	<1.0	<1.0	-	<1.0	-	<1.0	-	-	mg/kg	A-T-027s
Cadmium$_D$ M#	<0.5	<0.5	-	<0.5	-	<0.5	-	-	mg/kg	A-T-024
Copper$_D$ M#	18	9	-	26	-	17	-	-	mg/kg	A-T-024
Chromium$_D$ M#	30	18	-	30	-	29	-	-	mg/kg	A-T-024
Lead$_D$ M#	35	16	-	68	-	17	-	-	mg/kg	A-T-024
Mercury$_D$	<0.17	<0.17	-	<0.17	-	<0.17	-	-	mg/kg	A-T-024
Nickel$_D$ M#	21	15	-	21	-	42	-	-	mg/kg	A-T-024
Selenium$_D$ M#	<1	<1	-	<1	-	1	-	-	mg/kg	A-T-024
Zinc$_D$ M#	55	40	-	80	-	95	-	-	mg/kg	A-T-024
TPH total (C6-C40)$_A$	-	-	-	<10	<10	-	<10	-	mg/kg	A-T-007s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/9	11/00569/10	11/00569/11	11/00569/12	11/00569/13	11/00569/14	11/00569/15	11/00569/16	Units	Method ref
Client Sample No										
Client Sample ID	BH2	BH2	WS1	WS1	WS2	WS2	WS3	WS3		
Depth to Top	3.00	4.90	0.20	0.50	0.20	0.50	0.20	0.50		
Depth To Bottom			0.30	0.60	0.30	0.60	0.30	0.60		
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	5A	1A	5AE	5AE	5AE	7	5A			
PAH 16										
Acenapthene$_A^{M\#}$	-	0.02	-	0.02	-	<0.01	-	-	mg/kg	A-T-019s
Acenapthylene$_A^{M\#}$	-	<0.01	-	<0.01	-	<0.01	-	-	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	-	<0.01	-	0.02	-	0.01	-	-	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{\#}$	-	<0.01	-	0.04	-	<0.01	-	-	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	-	<0.01	-	0.04	-	<0.01	-	-	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	-	<0.01	-	0.03	-	<0.01	-	-	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	-	<0.01	-	0.09	-	<0.01	-	-	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A$	-	<0.01	-	0.03	-	<0.01	-	-	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	-	0.02	-	0.13	-	0.01	-	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{\#}$	-	<0.01	-	<0.01	-	<0.01	-	-	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	-	0.03	-	0.14	-	0.03	-	-	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	-	<0.01	-	<0.01	-	<0.01	-	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{\#}$	-	<0.01	-	0.03	-	<0.01	-	-	mg/kg	A-T-019s
Napthalene$_A^{M\#}$	-	0.02	-	0.02	-	<0.01	-	-	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	-	0.02	-	0.05	-	0.02	-	-	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	-	0.03	-	0.13	-	0.02	-	-	mg/kg	A-T-019s
Total PAH$_A^{\#}$	-	0.14	-	0.78	-	0.09	-	-	mg/kg	A-T-019s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/17	11/00569/18	11/00569/19	11/00569/20	11/00569/23	11/00569/25			Units	Method ref
Client Sample No										
Client Sample ID	WS4	WS4	TP1	TP1	TP2	TP3				
Depth to Top	0.20	0.50	0.10	0.40	0.50	0.10				
Depth To Bottom	0.30	0.60								
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	7	7	4AE		4AE	4AE				
ACM Screen$_A$	NFI	-	-	NFI	-	-				Visual
pH$_D$ M#	8.4	8.4	8.3	-	8.3	8.2			pH	A-T-031s
Sulphate (water sol 2:1)$_D$ M#	-	0.01	-	-	-	-			g/l	A-T-026s
Total Organic Carbon$_D$ #	0.07	-	-	-	1.08	-			% w/w	A-T-032s
Arsenic$_D$ M#	22	18	10	-	12	22			mg/kg	A-T-024
Boron (water soluble)$_D$ M#	<1.0	<1.0	<1.0	-	<1.0	<1.0			mg/kg	A-T-027s
Cadmium$_D$ M#	<0.5	<0.5	<0.5	-	<0.5	0.9			mg/kg	A-T-024
Copper$_D$ M#	14	11	22	-	37	174			mg/kg	A-T-024
Chromium$_D$ M#	21	20	18	-	20	29			mg/kg	A-T-024
Lead$_D$ M#	39	10	66	-	84	345			mg/kg	A-T-024
Mercury$_D$	<0.17	<0.17	0.17	-	<0.17	1.03			mg/kg	A-T-024
Nickel$_D$ M#	30	33	14	-	18	33			mg/kg	A-T-024
Selenium$_D$ M#	<1	1	<1	-	1	2			mg/kg	A-T-024
Zinc$_D$ M#	73	70	80	-	112	306			mg/kg	A-T-024

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/17	11/00569/18	11/00569/19	11/00569/20	11/00569/23	11/00569/25			Units	Method ref
Client Sample No										
Client Sample ID	WS4	WS4	TP1	TP1	TP2	TP3				
Depth to Top	0.20	0.50	0.10	0.40	0.50	0.10				
Depth To Bottom	0.30	0.60								
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	7	7	4AE		4AE	4AE				
TPH CWG										
Ali >C5-C6$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Ali >C6-C8$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Ali >C8-C10$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Total Aliphatics$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-022+23s
Aro >C5-C7$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Aro >C7-C8$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Aro >C8-C9$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Aro >C9-C10$_A$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-023s
Total Aromatics$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-022+23s
TPH (Ali & Aro)$_A^{\#}$	-	<0.1	-	-	-	-			mg/kg	A-T-022+23s
MTBE$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
BTEX										
BTEX - Benzene$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	-	<0.01	-	-	-	-			mg/kg	A-T-022s

Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/17	11/00569/18	11/00569/19	11/00569/20	11/00569/23	11/00569/25			Units	Method ref
Client Sample No										
Client Sample ID	WS4	WS4	TP1	TP1	TP2	TP3				
Depth to Top	0.20	0.50	0.10	0.40	0.50	0.10				
Depth To Bottom	0.30	0.60								
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	7	7	4AE		4AE	4AE				
PAH 16										
Acenapthene$_A^{M\#}$	<0.01	<0.01	0.02	-	0.13	-			mg/kg	A-T-019s
Acenapthylene$_A^{M\#}$	<0.01	<0.01	0.05	-	0.01	-			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.01	0.01	0.09	-	1.60	-			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{\#}$	<0.01	<0.01	0.33	-	3.24	-			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.01	<0.01	0.47	-	2.33	-			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.01	<0.01	0.44	-	2.29	-			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.01	0.01	0.68	-	1.90	-			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A$	<0.01	<0.01	0.36	-	2.64	-			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.01	0.02	0.71	-	5.27	-			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{\#}$	<0.01	<0.01	0.05	-	0.42	-			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.01	0.03	0.84	-	8.88	-			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	-	0.17	-			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{\#}$	<0.01	<0.01	0.26	-	1.42	-			mg/kg	A-T-019s
Napthalene$_A^{M\#}$	<0.01	0.01	<0.01	-	0.02	-			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.01	0.03	0.22	-	3.49	-			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.01	0.02	0.79	-	6.11	-			mg/kg	A-T-019s
Total PAH$_A^{\#}$	<0.01	0.14	5.30	-	39.9	-			mg/kg	A-T-019s

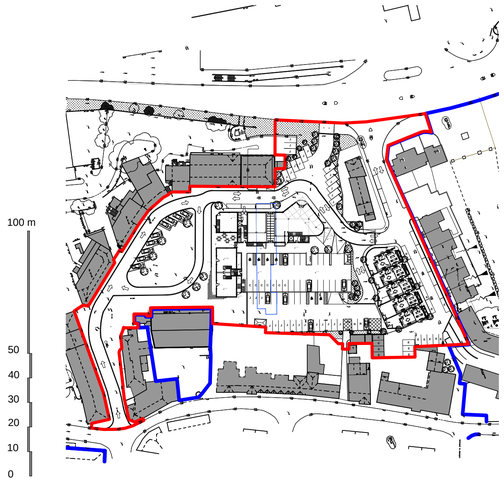
Envirolab Job Number: 11/00569

Client Project Name: Salisbury Square, Hatfield

Client Project Ref: 241882

Lab Sample ID	11/00569/17	11/00569/18	11/00569/19	11/00569/20	11/00569/23	11/00569/25			Units	Method ref
Client Sample No										
Client Sample ID	WS4	WS4	TP1	TP1	TP2	TP3				
Depth to Top	0.20	0.50	0.10	0.40	0.50	0.10				
Depth To Bottom	0.30	0.60								
Date Sampled	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11	03-Feb-11				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	7	7	4AE		4AE	4AE				
Spec PCB-WHO12										
PCB BZ 81_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 105_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 114_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ $118/123_D$	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 126_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 156_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 157_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 167_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 169_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 189_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s
PCB BZ 77_D	-	<0.005	-	-	-	-			mg/kg	A-T-004/5s

Appendix F Development Proposals



Scale : 1:1250

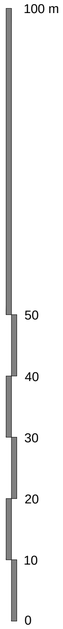
Landscaping

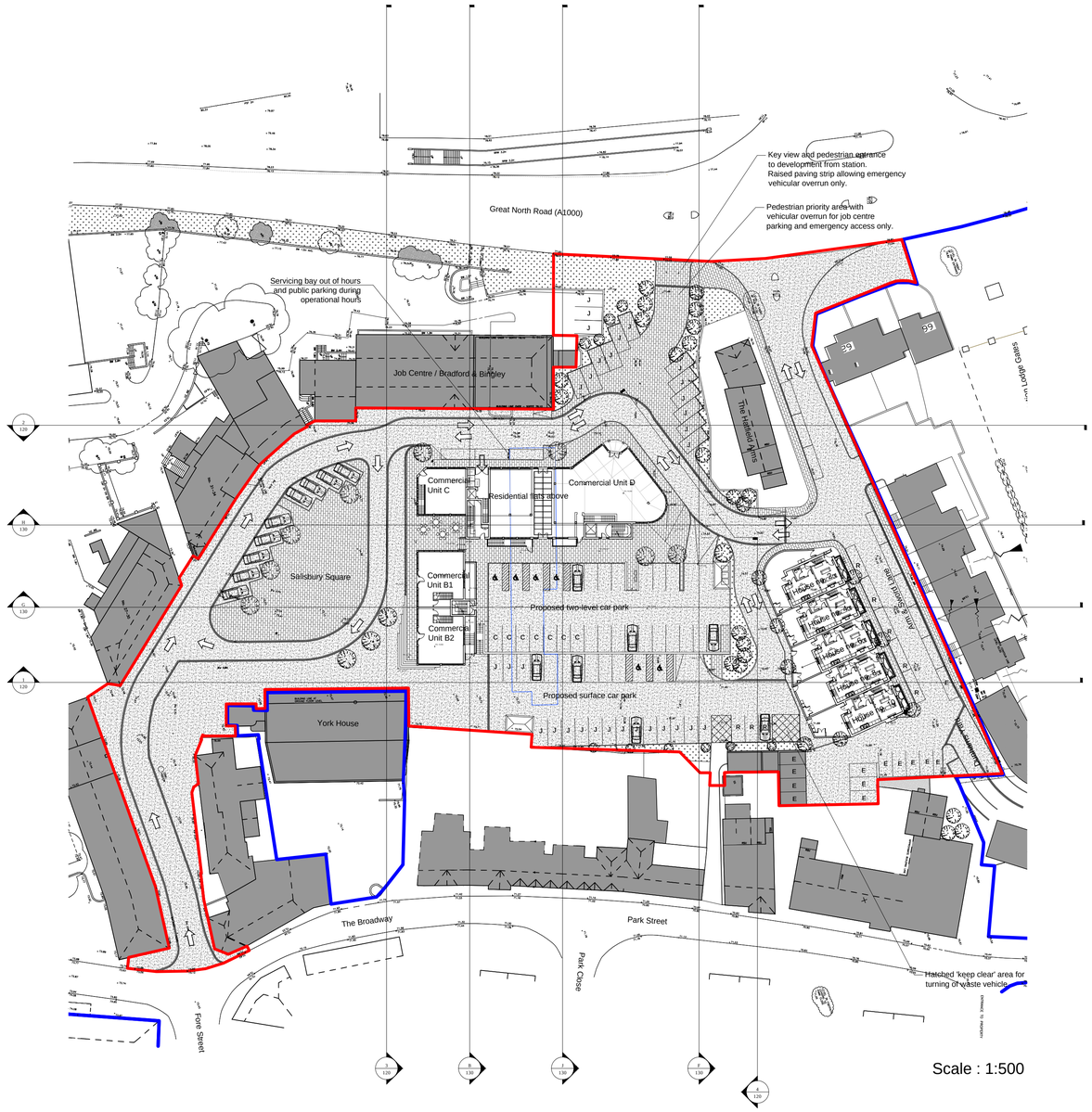
New tarmac with rolled gravel top falling to gravel setts

New stone/reconstituted stone paving slabs for pedestrian access - suitable for vehicular overrun in selected locations, with granite setts/marshalls conservation kerb edging

Grass and soft landscaping

Read in conjunction with 789-091





Scale : 1:500

0 10 20 30 40 50 100 m

USE FIGURED DIMENSIONS ONLY
DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE ANY INCONSISTENCIES MUST BE REPORTED BACK TO THE ARCHITECT.

PARKING

Public:	50 (6 access.)
Job centre:	31
Existing private:	13
For new commercial units:	21
For new residential units:	26
Grand total:	141

Parking key:

J = Job centre parking
E = Existing private parking
C = Allocated for new commercial units
R = Allocated for new residential units

Unmarked spaces are public, inc. accessible

Read in conjunction with 789-110 (Basement Plan)

Revisions

A	17.1.11	Revised red line and reduced scale Scale bar added
B	25.1.11	Scaled 1:1250 plan added
C	27.1.11	Blue line added
D	28.1.11	P Atton revisions Drawing number changed formally known as 789 SK 001 D
E	28.1.11	P Atton revisions
F	31.1.11	Red Line revisions
G	04.02.11	Red Line revision
H	16.03.11	Drawing Number Revised Previously known as 780-011G
I	17.03.11	Amendments to roads around terraced houses
J	25.03.11	Parking allocations added, amendments to disabled parking
K	31.03.11	Parking amended
L	02.06.11	Parking and redline amended, issued for comment
M	16.06.11	Minor amendments to parking and redline, landscaping added, labels added
N	10.08.11	Minor amendments to parking
O	16.08.11	Minor amendments to landscaping

N

Drawing Status
PRELIMINARY

BROOKS / MURRAY
ARCHITECTS
8-10 NEW NORTH PLACE
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CLIENT:
GASCOYNE CECIL ESTATES

JOB:
Salisbury Square

DATE: Jan 2011
SCALE: 1:500@A1

DRAWING TITLE:
Proposed
Site plan - Ground level

DRAWING NUMBER:
789 - 109 O

Appendix G Existing Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for S1

Pipe Sizes Standard Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
Site Location	GB 523250 208650 TL 23250 08650
C (1km)	-0.027
D1 (1km)	0.295
D2 (1km)	0.311
D3 (1km)	0.266
E (1km)	0.321
F (1km)	2.479
Maximum Rainfall (mm/hr)	50
Foul Sewage (l/s/ha)	0.00
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1-1.000	26.631	1.775	15.0	0.118	5.00	0.0	0.600	o	150
S1-1.001	12.183	0.239	51.0	0.036	0.00	0.0	0.600	o	150
S1-1.002	65.418	1.558	42.0	0.139	0.00	0.0	0.600	o	225
S1-2.000	46.432	0.499	93.1	0.108	5.00	0.0	0.600	o	225
S1-1.003	19.001	0.404	47.0	0.037	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1-1.000	50.00	5.17	74.800	0.118	0.0	0.0	0.0	2.61	46.2	16.0
S1-1.001	50.00	5.31	73.025	0.154	0.0	0.0	0.0	1.41	25.0	20.9
S1-1.002	50.00	5.85	72.711	0.293	0.0	0.0	0.0	2.02	80.5	39.7
S1-2.000	50.00	5.57	71.700	0.108	0.0	0.0	0.0	1.36	53.9	14.6
S1-1.003	50.00	6.02	71.153	0.438	0.0	0.0	0.0	1.91	76.0	59.3

Network Design Table for S1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1-3.000	20.168	0.545	37.0	0.044	5.00	0.0	0.600	o	100
S1-1.004	52.799	1.148	46.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1-3.000	50.00	5.26	71.350	0.044	0.0	0.0	0.0	1.27	10.0	6.0
S1-1.004	50.00	6.40	70.605	0.482	0.0	0.0	0.0	2.32	164.3	65.3