
Penarth Heights Utility Services Report

ON BEHALF OF CREST NICHOLSON (SW)



FEBRUARY 2007

DIXON DEBOISE

Unit 6
The Grange Business Park
West Hewish
Bristol
BS24 6RR

This report takes into account the particular instructions and requirements of Crest Nicholson. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

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EXECUTIVE SUMMARY

Dixon DeBoise (SW) Limited received a copy of the site development plan from Crest Nicholson's Project Manager. Dixon DeBoise (SW) Limited has been appointed by Crest Nicholson to investigate the extent and position of the existing site utility services and to outline the utility services requirements to meet the demands of the new development and the phasing of the construction programme.

The investigation shows that all the major utility services are present to serve the site. This Report contains drawings indicating the general arrangement of each of the existing utility services present and includes an indicative site general arrangement drawings showing the possible impact of these services on the development phased construction plan.

This report concludes that:

1. The existing HV electricity service shall be diverted along Paget Road and the 2 No. existing substations shall be removed by WPD and a new enlarged substation will be required to serve the new development.
2. An existing Victorian 1070mm x 570mm brick construction combined public sewer crosses the site. The section of sewer within the site demise currently benefits a 13 metre wide easement (refer to Cole Easdens Drainage Strategy Report).
3. A new connection to the existing mains water services will be required along Windsor Road to serve the new development.
4. The existing gas infrastructure has suitable capacity to serve the new development.
5. A small number of telegraph poles along Paget Road shall have to be re-located along with the existing telephone call box.
6. Cable TV has minimal impact on the development. There will be strip out works required but not necessarily any relocation of cabinets required.

INTRODUCTION

Penarth Heights is a development area of 16.6 acres situated to the north-west of Penarth Town and it is proposed to provide a total of 376 residential units (Houses and Apartments).

Dixon Deboise (SW) Limited have been appointed by Crest Nicholson to provide information with regard to the extent and location of the existing utility services in and around the proposed Penarth Heights development. It is the intention of this report to inform Crest Nicholson of the possible implications imposed by the existing utility services and the alterations necessary to enable the development to be carried out in accordance with the information given by Crest Nicholson at this juncture. The Report shall also outline Budget Costs associated with the remedial works to the existing Utility Services together with an estimation of the Budget Costs associated with the provision of new Utility Services connections.

This Report has been prepared to provide Crest Nicholson a summary of the investigation and includes plans of each of the existing utility services existing on the site and provides a site layout showing the possible impact of the existing services in relation to the development master plan. These details can be found in the Appendices of this report.

This report is based on a desk top, non invasive study and has been prepared using information given in local utility company's drawings and previous survey information provided by Crest Nicholson and from liaison with the utility supply companies at the time of writing.

The information contained herein shall be used for guidance only. It is found that utility services are frequently adapted, extended and upgraded and these changes will affect the information contained within this report. It is essential therefore that new enquiries and surveys are made to verify the information contained herein at the appropriate stages of the development to ensure that the information details are as up to date as possible.

SUPPLY AUTHORITY CONTACT DETAILS**WATER SERVICES**

Welsh Water
Connections Centre
Players Industrial Estate
Clydach
Swansea SA6 5BQ

Tel: 01 792 841000
Fax: 01 792 841001
E: new.connections@dwrcymru.com
www.dwrcymru.com

Reference: ODN/PWB

GAS SERVICES

Transco
Wales LDZ
1st Floor
Lambourne House
Lambourne Terrace
Cardiff
CF14 5GL

Tel: 02920 767539

Reference E3683239

ELECTRICITY SERVICES

Western Power Distribution
Duffryn Bach Terrace
Church Village
Pontypriidd
Rhondda Cynon Taff
CF38 1BN

Tel 01443 211990

Reference 407696

TELECOM SERVICES

New site BT Wales
PP8D
Swansea BT Tower
The Strand
Swansea
SA1 2AB

Tel 01 792 638495

Reference PBM/082

DRAINAGE SERVICES

Welsh Water
PO Box 60
Caernarfon
Gwynedd
LL54 5WA

TEL: 0800 052 0130

www.dwrcymru.com

Reference WHC/BD/PMO.1

CABLE SERVICES

NTL Goup limited
NTL House
Bartley Wood Business Park
Hook
Hampshire
RG27 9XA

TEL: 02920 2030 5187

Reference 100207

PREFERRED ENERGY SERVICE PROVIDER

ELECTRICITY SERVICES

SSE Power Distribution
PO Box 2004
Branksome
Poole
Dorset
BH12 1YT

TEL: 01202 784608

GAS SERVICES

SSE Power Distribution
PO Box 2004
Branksome
Poole
Dorset
BH12 1YT

Tel: 01202 784608

SECTION ONE

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1.0 EXISTING UTILITY SERVICES

1.1 WATER SERVICES

The Water Authority is Welsh Water. The site is served from a network of buried cast iron mains connected to a 12ins (300mm) in Windsor Road.

Water mains exist in Paget Road, Royal Close, Harbour View Road, Highview Road and Chichester Road with the latter being connected to an existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

There are fire hydrants located strategically around the existing site.

The water Authority has stated that the water pressures in the supply main at the site boundary are currently in the order of 3 bar. However, the Authority will only guarantee a supply pressure at 1.5 bar.

Under sections 40 – 41 of the Water Industry Act 1991 requires that the developer contributes towards the provision of the new supplies. The anticipated cost is shown in the cost summary, Section 3.1.

1.2 GAS SERVICES

The Gas Transporter in the area is Transco.

Gas mains exist in Paget Road, Royal Close, Harbour View Road, Highview Road and Chichester Road with the latter being connected to an existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

1.3 ELECTRICITY SERVICES

The Electricity Authority is Western Power Distribution.

HV and LV mains exist in Paget Road, Royal Close, Harbour View Road, Highview Road and Chichester.

The 11KV HV Electricity mains to the existing sub-station (51/1796) in Royal Close run to the rear of Prince Charles Court from one end of Paget Road at the junction of Paget Road and Steep Street and joins Paget Road again at the Harbour View Road and St Joseph House Junction.

Another 11KV HV main extends from Plassey Square and Chichester Road junction to serve Harbour View Road and existing sub-station (51/1798) and looping to the existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street.

Wayleaves are in place at present to maintain the Sub-stations.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

1.4 DRAINAGE SERVICES

The Drainage Authority is Welsh Water.

A Topographical survey of the site has been undertaken by others, which has recorded the drainage where apparent. A subsequent non-invasive site investigation was undertaken by DDPSW to confirm the drainage routes where possible and there is no certainty that all of the drainage has been traced. Extreme caution needs to be taken with the new development to ensure that the drainage is integrated properly into the existing system and that it does not interfere with the proper drainage of other buildings in the area.

Combined sewer Drainage mains exist in Paget Road (not adjacent to site), Harbour View Road and Chichester Road with the latter being connected to an existing main in Plassey Square via the footpath between 17 and 17a Plassey Square.

An existing Victorian 1070mm x 570mm brick construction combined public sewer between Paget Road and High Street crosses the site at the Harbour View Road and Paget Road junction. The section of sewer within the site demise currently benefits from a 13 metre wide easement (refer to Cole Easdons Drainage Strategy Report).

A short section (300mm.dia) combined sewer between Paget Road and High Street crosses the development at the Harbour View Road and Paget Road junction and may require diversion or accommodation into the scheme and currently has a 6m easement. The exact location shall be determined on site.

There is no public storm drain on the site for surface water and therefore no capacity in the existing combined sewer for surface water flow.

Two existing water courses may be suitable for discharge and are subject to further investigation.

1.5 TELECOM SERVICES

The Telecoms Authority is BT

Telecoms mains exist in Paget Road, Royal Close, Harbour View Road, Highview Road and Chichester Road with the latter being connected to an existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street.

There are Telecom services crossing the site between Paget Road and High Street/Arcot Street that may require diversion or accommodation.

The 3 No. Telegraph poles located within Paget Road together with 2 No. poles within Harbour View Road will need to be relocated together with associated distribution cabling as they cross the site boundary and may affect the development.

The single phone box sited at the junction of Paget Road and Queens Road shall need to be relocated together with the service cabling.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

There are no Wayleaves required on site as stated by BT Wholesale.

1.6 CABLE SERVICES

The Cable Authority is NTL.

Existing NTL apparatus which is located around the area of the existing development will need to be disconnected and removed where necessary.

SECTION TWO

SECTION TWO

2.1 ALTERATIONS TO UTILITY SERVICES

The alterations required to the existing utility services on the site shall need to be undertaken with the phasing plan in mind.

It will be essential to enable each phase to be constructed without any disruption to the services that are to remain on-line for other properties in the area.

As the phases develop, it will be essential to maintain services on-line to the earlier phases of the development.

2.1.1 WATER SERVICES

The Water Authority is Welsh Water. They have produced a Developers Guide which is available from their web site.

The new development shall be served from the 12ins (300mm) supply at the Windsor Road roundabout. Offsite reinforcements of the local infrastructure shall be required to maintain services to the new site and existing premises in the supply area.

The Water Authority have stated that the water pressures in the supply main at the site boundary are currently in the order of 3 bar. However, Welsh Water will only guarantee a supply pressure at 1.5 bar. This would generally mean that the distribution pressure is adequate for the supply of the site for all properties rising not more than two, maybe three storeys. Multi-occupancy properties such as apartment blocks shall require water pressure boosting by means of a single pressure booster to each apartment block.

The reinforcement of the service mains from Windsor Road and the site distribution will be in accordance with section 42 of the water industry act 1991 assessed against the predicated income.

A credit is allowed against any redundant services to existing properties that have been in use for the last five years.

The Water Authority allows booster sets to apartment blocks to be sited between the main and the apartment individual meters and all such booster pump sets shall be to a design approved by the Supply Authorities Clydach Office. It will be necessary to pressure boost the incoming service to some of the proposed high rise buildings.

The demarcation of responsibility for the Supply Authority is the boundary of the street in which the main is laid. The boundary shall mean generally, the back edge of the highway footpath.

The incoming main to apartment blocks shall be served from a single common incoming main to a service header in the meter cupboard. From the service header, individual metered service pipes shall rise to each apartment.

Fire hydrants may be required across the site and these shall be determined by the local Fire Officer when more detailed plans of the development are available.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

Ground conditions may stipulate that specialist piping materials are required to avoid cross-contamination to the potable water supply. Soils reports and other determinate factors shall need to be taken into account during detailed design development of the site.

2.1.2 GAS SERVICES

The Gas Transporter is Transco and the proposed Gas Supplier is SSE Power Distribution.

The Gas Supplier has stated that it should be appropriate to serve the development from the existing 125PE LP supply along Chichester Road.

Gas mains exist as 125mmPE in Paget Road and 150mmPE Harbour View Road. The existing 125mmPE gas main in Royal Close shall be cut back to the site boundary and made available for use on the new development. Any existing services in Highview Road and Chichester Road shall be redundant except for an existing 180mmPE main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street shall remain and so shall the 125mmPE into Chichester Road to serve the new development.

The new site is to be serviced as two halves, in effect, the eastern end of the site and the western end of the site because of the difficulty in having to transit past the existing allotments to reach the eastern end of the site from the authority proposal to serve the site from Plassey square.

The supply authority has confirmed that the existing infrastructure has suitable spare capacity to serve the new development.

All single dwellings on the site shall be gas served with meter positions at ground level within built in or semi-concealed meter boxes.

The incoming gas main to apartment buildings shall be served from a single common incoming main to a service header in the meter cupboard.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

Crest Nicholson has a framework agreement in place with SSE Power Distribution for both gas and electrical supplies. The size of the site and the potential for future revenue has resulted in a nil contribution requirement from Crest Nicholson in relation to the provision of new gas distribution network. However, SSE Power Distribution have a caveat stating that a contribution will be requested should the actual final cost of the new gas network exceed an allowance of £ 112,800-00 based upon an asset of £ 300 per Residential Unit.

2.1.3 ELECTRICITY SERVICES

The Electricity Authority is Western Power Distribution and the Electricity Supply Company is proposed to be SSE Power Distribution.

HV and LV mains exist in Paget Road, Royal Close, Harbour View Road, Highview Road and Chichester.

The existing primary HV supplies are buried in the ground and their routes diagrammatically recorded.

The existing HV electricity service to the rear of Prince Charles Court extend from one end of Paget Road where it intersects Steep Street and joins again at the Harbour View Road and St Joseph House Junction. The HV shall be diverted down Paget Road along the boundary of the site. The existing sub-station (51/1796) in Royal Close shall be removed by WPD

It is far more cost effective for the development to be 'clean-sheeted' with all existing services removed during demolition and then for the new services to be specifically designed for the site.

The Developer shall provide the service trench excavation and reinstatement along Paget Road and WPD shall lay the cable. WPD shall excavate the service joint holes and the points of required action and shall pot-end the cables.

Another existing HV main extends from Plessey Square and Chichester Road junction to serve Harbour View Road and existing sub-station (51/1798) and looping to the existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street. The existing sub-station shall be removed by WPD

There are several individual sub connections on site and these shall require redundancy prior to demolition commencing. The existing properties, roadway lighting and signage will require safe disconnection prior to removal.

The new development electricity supplies are to make provision for:

- Domestic
- Non domestic - landlord
- Street lighting

The current LV network is served from the 2no existing sub-stations due to be removed and the HV cables. There needs to be a new enlarged sub-station to provide the L.V. network to the new development. Currently there is no credit for redundant properties.

The new development shall require one new substation of around 1MVA capacity subject to the development being gas heated. The specific location and exact capacity of the transformer has yet to be determined although we have indicated a proposed location on the drawings that supplement this document.

It is proposed to split the site into an eastern and a western segment with the transformer serving each segment. WPD's existing HV underground system will be extended into each development segment in the highway footpath and in unmade ground and to establish a new 11kV/LV substation on land

provided by the developer. Each dwelling shall then be connected via radial LV mains and single phase cables.

Any existing wayleaves shall revert back to the requirements of Vg1e of Glamorgan. No wayleaves are required on the new development by WPD as long as the WPD requirements are met in terms of access and maintainability of the new substation.

On site trenching and backfilling together with the formation of draw-in pits shall be carried out by the developer. WPD shall supply and install all service cabling and associated cut-outs to co-ordinated and approved multi-discipline distribution routes.

2.1.4 DRAINAGE SERVICES

The Drainage Authority is Welsh Water.

Combined sewer Drainage mains exist in Paget Road (not adjacent to site), Harbour View Road and Chichester Road with the latter being connected to an existing main in Plassey Square via the footpath between 17 and 17a Plassey Square.

A short section of 1070mm x 570mm combined sewer between Paget Road and High Street crosses the development and may require accommodation into the scheme. The sewer currently benefits from a 13 metre wide Easement. From the proposed site development plan it would appear that the existing sewer does not interfere with the layout of the new site although a site investigation would have to determine the extent of the impact of the sewer in more detail and the interference with any easements required by the drainage authority.

The short section (300mm.dia) combined sewer between Paget Road and High Street that crosses the development may not require diversion as long as the proposed site development plan bears the requirements of the supply authority in mind.

The supply authority has stated that there are no issues with foul water capacity from the development.

The supply authority has confirmed that the foul flows from the eastern end of the development can be connected to the existing 300mm combined sewer that crosses the south-eastern corner of the development and that the foul flows from the western end of the development can be connected to the existing 300mm combined sewer at manhole ST18/20101.

If any on-site sewers are to be offered for adoption they must be constructed to conform with publication "Sewers for Adoption" – 6th Edition to the satisfaction of Welsh Water.

There is no public storm drain on the site for surface water and therefore no capacity in the existing combined sewer for land or highway drainage surface water flow.

Surface water flows shall therefore have to be dealt with using either soakaways or a discharge directly to a local watercourse with the approval of the Land Drainage Authority and/or Environment Agency.

Two existing water courses may be suitable for discharge and are subject to further investigation.

All surface water discharges shall comply with Building Regulations 2000 Part H.

2.1.5 TELECOM SERVICES

The Telecoms Authority is BT

Telecoms mains exist in Paget Road and Harbour View Road along the perimeter of the site. The existing main in Royal Close shall be cut back to the site boundary and made available for use on the new development. Any existing services in Highview Road and Chichester Road shall be redundant except for an existing main in Plassey Square via the footpath between 21 Plassey Square and 132 Plassey Street which shall remain and so shall the main into Chichester Road to serve the new development.

The 3 No. Telegraph poles located within Paget Road together with 2 No. poles within Harbour View Road will be relocated together with associated distribution cabling.

The single phone box sited at the junction of Paget Road and Queens Road shall be relocated together with the service cabling.

There are no Wayleaves required on site as stated by BT Wholesale.

BT will pay the developer to install free issue cable ducts. This is £135 per house and £47 per flat amounting to a payment to the developer of £38,076.

Diversionary works include the removal of overhead lines and a telephone kiosk.

There are several individual sub connections on site and these shall require decommissioning prior to demolition commencing.

2.1.6 CABLE SERVICES

The Cable Authority is NTL.

Existing NTL apparatus which is located around the area of the existing development will need to be disconnected and removed where necessary.

Various existing distribution cabinets will remain in-situ with additional cabinets installed to suit the revised site distribution proposals.

New feeder cabling shall be installed to distribute to each to each dwelling, from each appropriate cabinet.

NTL have yet to respond if they are going to require a cable duct infrastructure, the cost for diversion of existing NTL equipment is included.

All works shall be carried out by NTL personnel who shall be responsible for the removal of all redundant materials and equipment, together with the installation of all new cabling, distribution cabinets and associated services prior to the handover of a fully tested and commissioned system.

2.2 SERVICE SUPPLY LOADS

The supply loads shown below have been calculated on the limited development details available at this juncture. The loads shall therefore be subject to revision as and when individual property details are known and a more accurate assessment of the load requirements can be made.

2.2.1 WATER SERVICES

The overall development comprises the following Units:

234 No 2/3/4 Bedroom Houses
142 No 1/2/3 Bedroom Apartments

The overall anticipated water consumption can be calculated utilising the Welsh Water simultaneous demand Loading Unit theory. For the purposes of this Report it has be anticipated that each Unit will be provided with the following appliances:

1 No WC with a Loading Unit of 2
2 No Wash Hand Basins with a Loading Unit of 1.5 each
1 No Bath with a Loading Unit of 10
1 No Shower with a Loading Unit of 3
1 No Sink with a Loading Unit of 3
1 No Washing Machine with a Loading Unit of 3
1 No Dishwasher with a Loading Unit of 3

The calculated total Loading Unit allowed for a typical dwelling is 27.

The total site Loading Unit is $376 \times 27 = 10152$

It has therefore been calculated from the Loading Unit Data that the anticipated simultaneous demand for the entire development to be in the region of 40.0 litres/sec.

It is reported by the supply authority that the existing infrastructure shall require off-site reinforcement works to ensure capability for the proposed load. The existing service mains currently deliver water at a supply pressure of 3bar, although the Water Authority will only guarantee 1.5 bar.

Water boosting shall be required to around 4 No. higher rise premises.

The reinforcement of the service mains from Windsor Road and the site distribution will be in accordance with section 42 of the water industry act 1991 assessed against the predicated income.

2.2.2 GAS SERVICES

The preliminary Schedule of Units offers the following heating loads:

98 No 4 Bedroom Houses

4 Bed Houses at $102\text{m}^2 = 102 \times 70 \text{ w/m}^2 = 7140 \text{ Watts}$ plus 20% = 8568 Watts
HWS – 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 16,568 Watts

84 No 3 Bedroom Houses

3 Bed Houses at $89\text{m}^2 = 89 \times 70 \text{ w/m}^2 = 6230 \text{ Watts plus } 20\% = 7476 \text{ Watts}$
 HWS - 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 15,476 Watts

52 No 2 Bedroom Houses

2 Bed Houses at $77\text{m}^2 = 77 \times 70 \text{ w/m}^2 = 5390 \text{ Watts plus } 20\% = 6468 \text{ Watts}$
 HWS - 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 14,468 Watts

4 No 3 Bedroom Flats

4 Bed Flats at $89\text{m}^2 = 89 \times 70 \text{ w/m}^2 = 6230 \text{ Watts plus } 20\% = 7476 \text{ Watts}$
 HWS - 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 15,476 Watts

78 No 2 Bedroom Flats

2 Bed Flats at $61\text{m}^2 = 61 \times 70 \text{ w/m}^2 = 4270 \text{ Watts plus } 20\% = 5124 \text{ Watts}$
 HWS - 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 13,124 Watts

60 No 1 Bedroom Flats

1 Bed Flats at $42\text{m}^2 = 42 \times 70 \text{ w/m}^2 = 2940 \text{ Watts plus } 20\% = 3528 \text{ Watts}$
 HWS - 125 litre storage vessel with a one hour heat up = 8000 Watts

Total heat output required = 11,528 Watts

Total site gas demand

1. Heating -

4 Bed Houses - Boiler sized at 23.4 Kw output, gas consumption $2.52\text{m}^3/\text{hour}$
 3 Bed Houses - Boiler sized at 23.4 Kw output, gas consumption $2.52\text{m}^3/\text{hour}$
 2 Bed Houses - Boiler sized at 23.4 Kw output, gas consumption $2.52\text{m}^3/\text{hour}$
 3 Bed Flat - Boiler sized at 23.4 Kw output, gas consumption $2.52\text{m}^3/\text{hour}$
 2 Bed Flat - Boiler sized at 23.4 Kw output, gas consumption $2.52\text{m}^3/\text{hour}$
 1 Bed Flat - Boiler sized at 14.6 Kw output, gas consumption $1.55\text{m}^3/\text{hour}$

Sub Total -

316 Units x $2.52\text{m}^3/\text{hour} = 796.32\text{m}^3/\text{hour}$
 60 Units x $1.55\text{m}^3/\text{hour} = 93\text{m}^3/\text{hour}$

Sub Total = $889.32\text{m}^3/\text{hour}$

2. Cooking Hobs -

376 Units at $0.8\text{m}^3/\text{hour} = 300.8\text{m}^3/\text{hour}$

3. Total Gas Demand -

Heating + Cooking = 889.32 + 300.8 = 1190.12m³/hour

Allow a domestic U6 meter per Unit.

It is reported by the supply authority that the existing infrastructure is capable of providing for the proposed load from the existing service mains currently delivering an LP supply.

2.2.3 ELECTRICITY SERVICES

It has been calculated by SSE Power Distribution that the anticipated maximum demand for the entire development will require one new 1MVA substation subject to the development being gas heated. The size of the substation may vary following a more detailed assessment of the individual property types as the detailed design is progressed.

The current LV network is served from the 2no existing sub-stations due to be removed and the HV cables. There needs to be a new sub-station to provide the L.V. network to the new development. Currently there is no credit for redundant properties.

4.0 CONCLUSION

The investigation shows that all the major utility services are present on site.

It is apparent from the information given by WPD that there is only one major diversion required and that is to the existing 11KV ring main serving the eastern end of the site. The two existing substations shall be stripped out by WPD and the wayleaves reverted back to Vale of Glamorgan. A new substation shall be required of a capacity up to 1MVA. SSE Power Distribution have indicated that the sub station enclosure will be of an enhanced size in order to facilitate the potential for the installation of a second transformer in the future.

A short section of 1070mm x 570mm combined sewer between Paget Road and High Street crosses the development at the Harbour View Road and Paget Road junction and diversion may be avoided if development or raising or lowering of the land is avoided within the safety zone. This combined sewer is reported to be over 100years old and currently benefits from a 13 metre wide Easement.

It is likely that some lowering of the existing BT services is required around location of the realigned road junctions. This will be subject to confirmed details of finished road and adjacent levels followed by detailed appraisal by BT. There 5No. telegraph poles and 1No. Phone Box that shall require relocation.

The gas services will be provided from existing services and there is adequate capacity in the existing infrastructure to supply the new site from information given at this juncture.

It has been requested that it would be preferred that Welsh Water serve the development as two halves. Reinforcement of the off-site mains will be required along Windsor Road.

All other mains services are routed around the perimeter of the development site and do not pose a major issue to the development.

It is far more cost effective for the development to be 'clean-sheeted' with all existing services removed during demolition and then for the new services to be specifically designed for the site.

Should the development plan alter or change from that given as the basis of this study, the capacities and availability of the all of the utilities shall have to be assessed in conjunction with the supply authorities and other responsible parties. These assessments could lead to the requirement for additional modifications and/or infrastructure reinforcement/upgrade works.