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WorleyParsons Group



National Grid Property Holdings Ltd and Wales & West Utilities Ltd

LAND CONDITION SUMMARY STATEMENT

Ferry Road, Grangetown, Cardiff

03/10/2016

NGPH Site Location Code: 0137



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PROJECT NO 305001-00024/50112-31– LAND CONDITION SUMMARY STATEMENT: FERRY ROAD, GRANGETOWN, CARDIFF

Rev	Description	Author	Review	Advisian Approval	Date
A	Draft	<u>K Stone</u>	<u>N Drane</u>	<u>N Bray</u>	10 Nov 2015
B	Draft	<u>K Stone</u>	<u>N Drane</u>	<u>N Bray</u>	20 Jan 2016
C	Final	<u>K Stone</u>	<u>N Drane</u>	<u>N Bray</u>	03 Oct 2016
		<u> </u>	<u> </u>	<u> </u>	



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1 INTRODUCTION

This document provides a summary of environmental works undertaken at the former gasworks, Ferry Road, Grangetown, together with a brief outline of remediation works to address areas of significant contamination and unacceptable pollutant linkages. The site is approximately 11.74 hectares (ha) in area, of which approximately 7.34 ha are owned by National Grid Property Holdings Ltd (NGPH) and 4.40 ha by Wales & West Utilities Ltd (WWU).

2 SITE LOCATION AND DESCRIPTION

Site Address: Ferry Road
Grangetown
Cardiff
CF11 0XR

Site Area: 11.74 ha
Grid Reference: ST 174 742

The site has approximate dimensions of 590 m x 275 m. It is bounded by the River Ely to the south west, the main Barry-Penarth railway line to the north west, Ikea to the north-east and the Ferry Road landfill and a retail park to the south-east. A mixture of palisade fencing, brick walls and buildings delimits the site boundary. The proposed sale area is shown on Figure 2.

The NGPH land ownership is approximately 7.34 ha. Approximately 2.44 ha of the NGPH site is covered by scrubland and/or gravel. The remainder is predominantly hard covered. All of the NGPH landholding is currently vacant. A number of buildings remain on the NGPH landholding. An access route (0.27 ha) runs from the site entrance to the neighbouring Ikea site and an active WWU gas distribution area.

An electricity sub-station is present in the north east of the site, near to the main site entrance. Although the sub-station is not believed to be providing power to any facilities at the site the sub-station remains live.

The WWU landholding comprises five separate areas. An active gas distribution area to the north (0.78 ha) will be retained by WWU and will not be included as part of any land sale. The remaining four areas will be included in the land sale and comprise; a compound containing a listed column guided holder (0.33 ha), a central area containing the former Gas Holder No. 6 (0.64 ha) and a southern area comprising the concrete base of the former Gas Holder No. 7, fire training area and a former gas plant testing area (2.68 ha). A number of redundant buildings/structures remain extant within the WWU landholding. The total WWU landholding is 4.40 ha. A mixture of palisade fencing, brick walls and buildings form the boundaries around the WWU landholding.

An active mast site operated by Arqiva is located to the south of the former Gas Holder No. 7.

Remaining structures are shown on Figure 2.



3 SITE HISTORY

The main Grangetown gasworks was initially located off site to the north of the current NGPH/WWU landholding. The Grangetown gasworks underwent several generations of expansion from 1865 onwards which included retort houses, purifiers, carburetted water gas (CWG) plant, scrubbers, washers, tar wells and gasholders.

Facilities known to have been present on the current landholding include five gasholders, CWG plant, tar works, coke plant, purifiers, governor house and an array of tanks.

Most of the gasworks was decommissioned by 1970. A number of gas storage facilities remained on the WWU landholding but all have now been removed. However, the cast iron support structure of the former column guided Gasholder No. 3 remains in the north of the site and is a Grade II listed structure. The WWU landholding is largely vacant except for the operational gas distribution area in the north of the site and the fire training facility in the south of the site.

The NGPH site was most recently in use providing office, workshop and storage space for Transco, Amec and Enterprise. However, the former Transco offices were demolished between January and June 2015 and the NGPH site is now vacant.

4 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

The following sections present a brief summary of geology, hydrogeology and hydrology at the site.

4.1 Geology

Geology consists of 1 to 4 m of made ground, above 4 to 9 m of silty clay alluvium, overlying 5.5 to 12 m of sandy gravel. Much of the southern area of the site is reclaimed marsh and a former river channel. Mercia Mudstone forms the bedrock and is classified as a Secondary B Aquifer as are the fluvial sands and gravels and the made ground above.

4.2 Hydrogeology

There are two groundwater-bearing zones at the site. The first is perched groundwater within the made ground above low permeability alluvial clays. The second zone is within sands and gravels and is confined by the overlying clays. Groundwater was not encountered in the Mercia Mudstone

The groundwater elevation in the made ground is between 6.38 and 7.00 m above ordnance datum (AOD). The groundwater flow direction in the made ground is approximately to the east, towards the River Ely and Cardiff Bay.

The groundwater elevation in the sands and gravels varies between 3.67 m AOD and 4.03 m AOD. The groundwater flow direction in the sands and gravels is to the north east, towards a groundwater control pump in central Grangetown. The pump was installed by Cardiff Harbour Authority as part of the Cardiff Bay development to control groundwater levels in the gravels. Groundwater from the control area is discharged into the River Taff to the north east of the site, approximately 500 m from the site boundary.



4.3 Hydrology

The main sources of water input to the groundwater system are rainfall, water mains leakage and surface water within Cardiff Bay and River Ely. Annual rainfall is reported to be 1152 mm.yr⁻¹ (Met Office 2015).

4.3.1 River Ely

The River Ely, located to the south-east of the gasworks, was diverted to its present course in 1971. This diversion was carried out by Cardiff Council to create the adjacent waste disposal site. The River Ely approaches the south-western boundary of the site (approximately 15 m away). Natural Resources Wales (NRW) classifies the water quality as poor (NRW, 2015).

4.3.2 River Taff

The River Taff, is situated to the north east of the site approximately 500 m from the site boundary. NRW classifies the water quality as moderate (NRW, 2015).

5 SITE INVESTIGATION WORKS TO DATE

Several phases of investigation have been completed on this site by WorleyParsons and others. The various phases of investigation and assessment works are shown below. Site investigations locations are shown on Figure 3.

Brown & Root	1983	Summary of Available Information and an Assessment of Ground Conditions at Ferry Road. Report for Cardiff Bay Development Corporation ¹ .
Hydrotechnica	1991	Cardiff Bay Barrage - Final Report on Groundwater Modelling. Executive Summary.
Haliburton	1993	Desk Study and Site Investigation Report.
Komex Clarke Bond	1997	Draft Environmental Assessment Report.
Komex Clarke Bond	1998	Environmental Assessment Report.
WorleyParsons	2011	Data Review and Environmental Assessment Site Investigation Report.
WorleyParsons	2013	Detailed Quantitative Risk Assessment Report.
WorleyParsons	2015	Factual Site Investigation Report.

¹ Cardiff Bay Development Corporation was established by the United Kingdom Government on 3 April 1987 to undertake and manage the Cardiff Bay redevelopment.



Adjacent to the site, two relevant phases of ground works have been undertaken:

- 1) In the mid 1990's, a bentonite wall was constructed along the eastern boundary of the site to mitigate the migration of contaminants from the adjacent landfill. The work was undertaken by the Cardiff Bay Development Corporation.
- 2) In 1998, the area beyond the north-eastern site boundary (now owned and occupied by IKEA) underwent remediation works to remove contamination associated with the areas use as a gasworks. A clean service corridor containing high voltage electricity cables and medium pressure gas mains was installed on the IKEA site, immediately adjacent to the northern site boundary, as part of the remediation works. The service corridor is bordered to the south (adjacent to the northern site boundary) by a 750 mm wide clay cut off wall.

6 SUMMARY OF CONTAMINATION

Coal tar derived contaminated soils have been identified to approximately 2 m below ground level (bgl) in the active WWU area in the north of the site and in the south of the footprint of the former Transco building in the NGPH landowning. Significant deposits of spent oxide were also observed in the south of the footprint of the former Transco building.

Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and lead have been identified across much of the site associated with shallow made ground, extending locally to a maximum depth of 3.4 m bgl. Deposits of spent oxide and fowl lime are present in areas to the west and south of the site. It is likely that these materials were used as fill where original ground levels were lower towards the river. The depth of the spent oxide/fowl lime deposits vary up to a maximum depth of 4.1 m bgl in the southern corner of the site.

Groundwater contamination is present in both the shallow and deeper groundwater bearing zones. PAHs, easily liberatable cyanide, ammonium, chloride, arsenic, lead, chromium, copper, nickel, zinc and iron contamination is widespread across the site, with sulphate contamination on the eastern boundary. However, risks to the River Taff and River Ely/Cardiff Bay have been assessed and it has been agreed with Natural Resources Wales that no further action is required in respect of these receptors at the present time.

7 FURTHER WORK AND REMEDIATION STRATEGY

Remediation works for the site are likely to comprise:

- Removal of hydrocarbon-impacted soils from the south of the former Transco building (see Figure 2).
- Removal of identified spent oxide and fowl lime deposits (see Figure 2).

The exact scope of any remediation works would be based on robust risk assessment, and remediation would be undertaken on an as-required basis, minimising costs and maintaining a strong element of sustainability within the process.



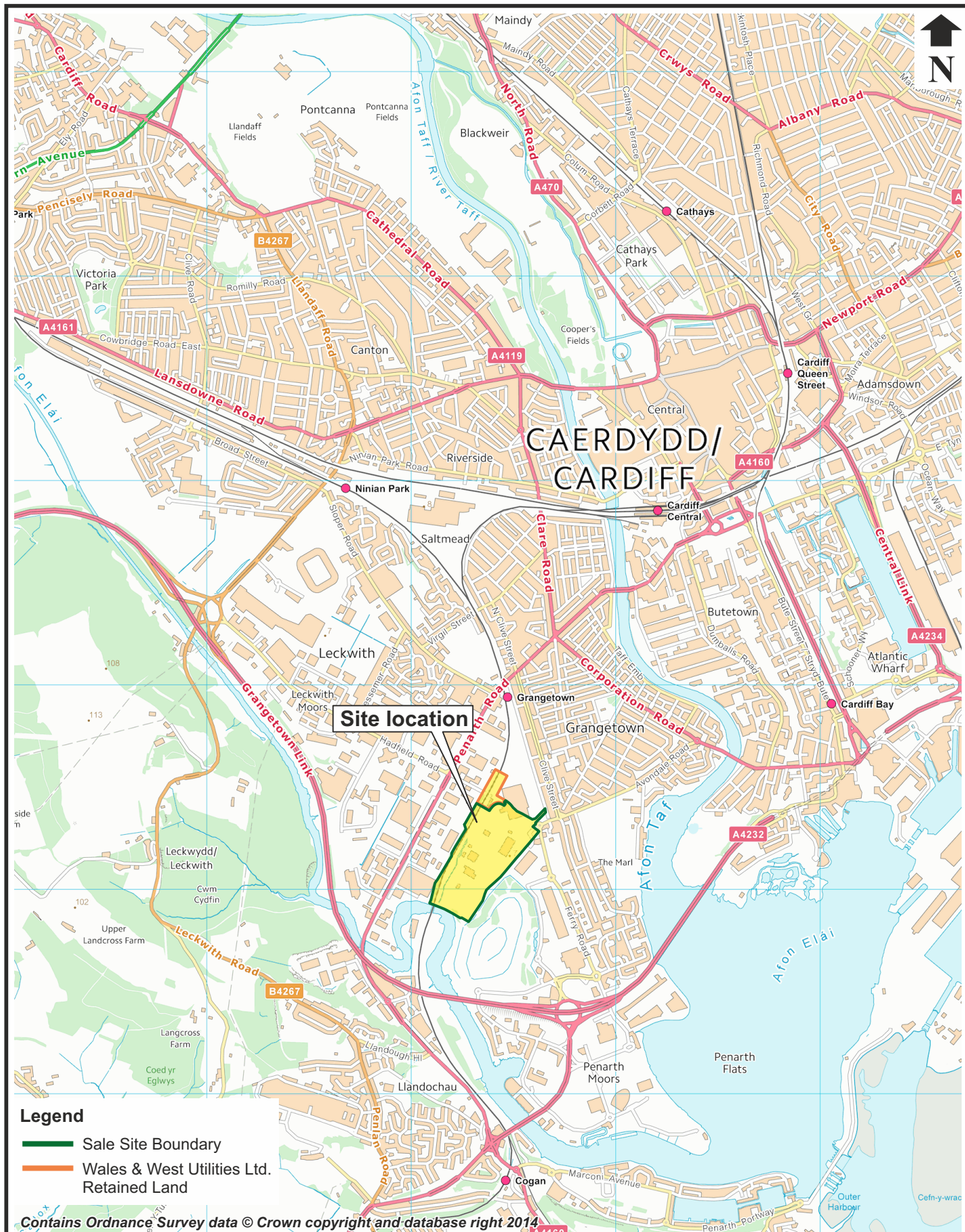
Please note that remediation will not be undertaken to a development end use standard, and it is likely that further remediation/mitigation measures will be required to satisfy the Local Planning Authority, should the land be redeveloped.

8 NATIONAL GRID PROPERTY, WALES & WEST UTILITIES AND LAND REGENERATION

NGPH and WWU both own large land portfolios with environmental legacy issues stemming from the operation of former gas manufacturing plants. The companies work collaboratively to return these properties back to beneficial use. Dedicated land regeneration specialists manage a multi-million pound, multi-year programme, involving stakeholders such as developers, local authorities, independent experts and regulators in order to devise and implement strategic and innovative remediation programmes for brownfield sites.

A combination of established and new technologies are used to design the most appropriate clean up strategy for each individual site. The land regeneration teams are committed to the introduction of new technologies to enable materials to be treated in situ and recycled, minimising the use of landfill and reducing traffic movements.

During all site remediation projects Safety, Health, Environment and Security is paramount and this extends beyond the site boundaries. The positive impact of the collaborative approach between NGPH and WWU is evident throughout Wales and the south-west of England as many former gasworks sites have been remediated, enabling them to be redeveloped and returned to beneficial use.



JOB NO.: 50112-31
FERRY ROAD, CARDIFF

**NATIONAL GRID PROPERTY HOLDINGS LIMITED
 & WALES AND WEST UTILITIES LIMITED**

SITE LOCATION



Advisian

WorleyParsons Group

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DRAWN BY	STATUS	PASSED	ORIGINAL	DATE	SCALE	ISSUING OFFICE
PM	DRAFT	-	A4	APR 2016	1:25,000	BRISTOL

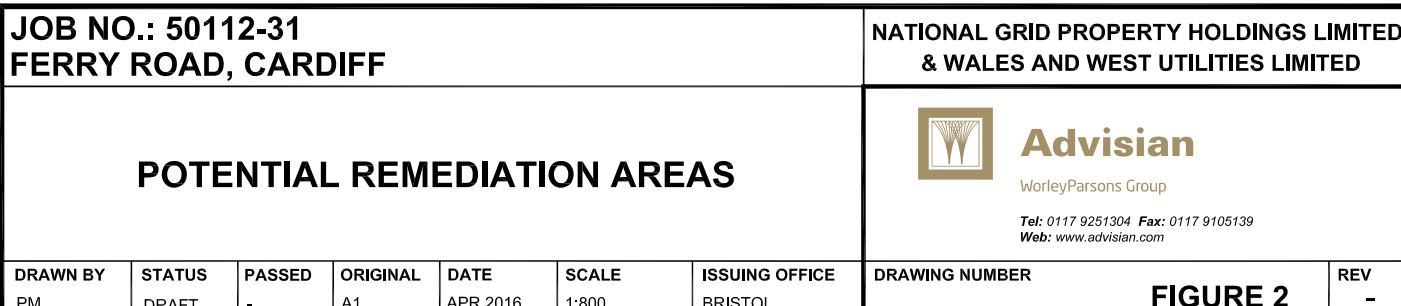
DRAWING NUMBER

FIGURE 1

REV

Approximate Site Centre: (317329, 174054)

References:
Plan based on Anthony Brookes Surveys Ltd, drawing no.: 221/5886/2, August 2015
Walker Ladd survey, drawing no.: 108/7054/1J, July 1996
Cardiff Gaslight & Coke Co., Historical plans dated 1907, 1912



Our ref: NIA/6076/16/6439/v1/Grangetown

12th April 2016

Mr. Kevin Stone
Worley Parsons
Bull Wharf
Redcliff Street
Bristol
BS1 6QR



Sent by email only kevin.stone@worleyparsons.com

Dear Sirs

**NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT (OUTLINE)
LAND SOUTH OF IKEA, HEOL FERRY, GRANGETOWN, CARDIFF**

1.00 INTRODUCTION

- 1.01 Environmental Noise Solutions has been commissioned by Worley Parsons to carry out a noise assessment for the proposed residential development (outline) of land south of Ikea, Heol Ferry, Grangetown, Cardiff (hereafter referred to as the application site).
- 1.02 The objectives of the noise impact assessment were to:
- Determine the ambient noise climate at the application site during representative periods of the daytime and night time.
 - Assess the potential impact of the ambient noise climate on the proposed residential development with reference to the National Planning Policy Framework and other pertinent guidelines.
 - Provide outline recommendations for layout options and sound attenuation works, as necessary, so that the future occupants of the proposed development do not experience any unacceptable loss of amenity due to noise.
- 1.03 This report details the methodology and results of the assessment and provides outline recommendations for layout options and building envelope (fenestration and ventilation) construction. It has been prepared to accompany a planning application to be submitted to the local authority for the residential development of the application site.
- 1.04 This report has been prepared for Worley Parsons for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Worley Parsons and ENS as to the extent to which the findings may be appropriate for their use.
- 1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

- 2.01 The application site is located in Grangetown, to the south of Cardiff city centre. Roughly rectangular in shape (site plan reproduced in Appendix 2), the site currently consists of open Brownfield land and is bound by:
- Gas pressure reducing station (PRS) compound and Ikea store to the north;
 - The Vale of Glamorgan railway line to the west;
 - Grangemoor Park and Cardiff Bay Retail Park (Units J–N) to the east; and
 - The River Ely to the south.

- 2.02 The noise environment across the application site is characterised by:
- Noise from existing operating PRS compound
 - Intermittent train passes
 - Distant road traffic on the A4232 Grangetown Link
- 2.03 Timetable information indicates that there circa 200 passenger trains and circa 25 freight trains passing the application site during the daytime.
- 2.04 With respect to night time train passes (Monday to Saturday), there are 15 no. movements during the end of the night time period (0525–0700) and 5 no. movements during the onset of the night time period (2300–2342 hours).
- 2.05 In addition to this, timetable information illustrates typically 2–4 freight services during the night time period (although there are typically 10–20 slots).
- 2.06 The primary noise source at the north western corner of the application site is the existing operating PRS compound.

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish the ambient and background noise levels at the application site, a baseline noise survey was undertaken during the daytime and night time on Monday 15th February 2016.
- 3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate location of the noise monitoring positions is contained in Appendix 2 for reference):
- MP1 was located midway along the western boundary of the application site at 4 metres above ground level (AGL)
 - MP2 was located midway along the southern boundary of the application site at 1.5 metres AGL
 - MP3 was located at the north eastern corner of the application site, at 1.5 metres AGL
 - MP4 was located midway along the eastern boundary of the application site, at 1.5 metres AGL
 - Measurements were also taken local to the PRS compound (see Table 3.2)
- 3.03 Noise measurements were undertaken in a free field environment using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Windshields were fitted for all measurements. The measurement system calibrations were verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels were noted. Weather conditions throughout the survey were appropriate for monitoring.
- 3.04 Measurements consisted of A-weighted broadband parameters, together with linear octave and one-third octave band L_{eq} levels. The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L _{Aeq} (dB)	L _{A90} (dB)	L _{A10} (dB)	L _{A1} (dB)	Comment
MP1	15/02/16	1200–1436	52	45	52	63	Regular passenger train passes (circa 15 per hour), occasional freight train passes and distant road traffic. 76 dB L _{AFMax} from freight train pass.
MP1	15/02/16	2310–0010	49	44	49	61	Intermittent passenger train passes and distant road traffic. 68 dB L _{AFMax} from passenger train pass.
Daytime ambient noise level circa 52 dB L _{Aeq, T} time ambient noise level circa 49 dB L _{Aeq, T} noise level of freight train pass up to 76 dB L _{AFMax}							Night Maximum
MP2	15/02/16	1221–1235	52	47	51	63	Regular passenger train passes and distant road traffic. 68 dB L _{AFMax} from passenger train pass.
MP2	15/02/16	2312–2327	50	46	50	64	Intermittent train passes and distant road traffic. 68 dB L _{AFMax} from passenger train pass.
Daytime ambient noise level circa 52 dB L _{Aeq, T} time ambient noise level circa 50 dB L _{Aeq, T}							Night
MP3	15/02/16	1300–1315	54	52	56	62	Regular train passes, intermittent car movements on Ikea car park, constant noise from PRS compound and distant road traffic.
MP3	15/02/16	2334–2347	51	49	52	57	Intermittent train passes, constant noise from PRS compound and distant road traffic.
Daytime ambient noise level circa 54 dB L _{Aeq, T} time ambient noise level circa 51 dB L _{Aeq, T}							Night
MP4	15/02/16	1418–1432	47	46	49	50	Distant intermittent train passes and distant road traffic. No noise from adjacent retail park.
Daytime ambient noise level circa 47 dB L _{Aeq, T}							

- 3.05 The ambient noise climate at the application site is formed primarily by distant traffic on the surrounding road network, with localised contributions from the adjacent railway line and PRS compound.
- 3.06 No noise was noted from daytime deliveries or fixed plant at the adjacent Ikea store during the course of the noise survey, and it is understood that deliveries to the store are restricted to 0700–2300 hours Mon-Sat (with no deliveries on Sunday) by planning condition. Use of the overflow car park was sporadic and the noise impact of the car park is therefore considered to be negligible.
- 3.07 No noise was noted from Cardiff Bay Retail Park during the course of the noise survey.
- 3.08 As ambient noise levels along the western and southern boundaries of the application site are relatively low, the façade sound insulation requirements of rail-fronting bedrooms along these boundaries will be governed by discrete event maxima associated with train passes during the night time period.

- 3.09 A comparison of train passes measured simultaneously at MP1 and MP2 indicates that maximum noise levels are comparable (MP2 is further from the railway line but has an increased horizon). The worst case freight train maximum noise level of 76 dB L_{AFMax} (measured at MP1) is therefore adopted for the rail-fronting bedrooms along the southern boundary.
- 3.10 In order to establish the noise emission levels associated with the PRS compound, noise measurements were undertaken at the north western corner of the application site at various distances from the nearest PRS enclosure, as summarised in the following table:

Table 3.2 – PRS Noise Measurement Data

Position	L_{Aeq} (dB)	L_{A90} (dB)	Position	L_{Aeq} (dB)	L_{A90} (dB)
10m (Daytime)	78	77	10m (Night Time)	74	73
20m (Daytime)	74	73	20m (Night Time)	70	69
40m (Daytime)	69	68	40m (Night Time)	64	63
Comparison of measurements at 20m and 40m demonstrates point source propagation					

4.00 NOISE IMPACT ASSESSMENT CRITERIA

- 4.01 In lieu of specific criteria, for residential development, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).
- 4.02 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) defines a range of internal noise level criteria for dwellings as follows which represent good living conditions.

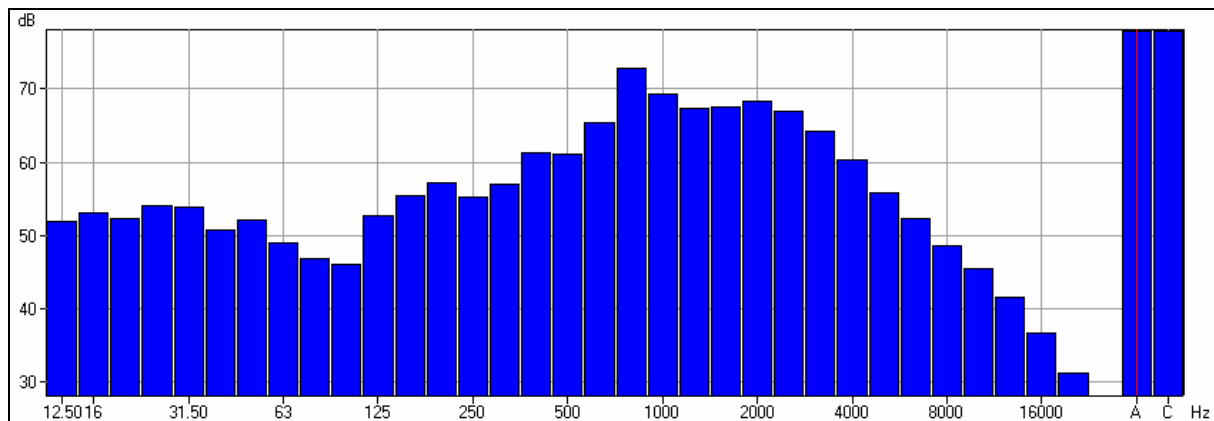
Table 4.2 – Indoor Ambient Noise Levels as Recommended in BS 8233

Activity	Location	0700 to 2300 hours	2300 to 0700 hours
Resting	Living room	35 dB L_{Aeq} (16 hour)	-
Dining	Dining room	40 dB L_{Aeq} (16 hour)	-
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq} (16 hour)	30 dB L_{Aeq} (8 hour)

- 4.03 The internal noise level criteria are based on average annual data and do not have to be achieved in all circumstances. It is normal to exclude occasional events. The internal noise level criteria may be relaxed by up to 5 decibels and reasonable living conditions will still be achieved.
- 4.04 With reference to outdoor amenity, BS 8233 states:

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.'

- 4.05 The WHO Guidelines on Community Noise (1999) considers that if negative effects on sleep are to be avoided, noise events exceeding 45 dB L_{AFMax} internally should be limited.
- 4.06 On the basis of the above, for residential development of the application site, the following criteria are considered appropriate:
- 35 dB L_{Aeq} (0700-2300) in living rooms and bedrooms during the daytime
 - 30 dB L_{Aeq} (2300-0700) in bedrooms at night
 - 45 dB L_{AFMax} (2300-0700) not normally exceeded in bedrooms at night
 - 55 dB L_{Aeq} (0700-2300) or as low as practicable in external amenity areas during the daytime
- 4.07 British Standard BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142) describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to complaints from people residing in the building.
- 4.08 ENS does not consider BS 4142 an appropriate assessment tool for the application site, given that, as a new build development, attenuation measures can be incorporated into the building design (this is a point recognised in BS 4142). However, elements of the methodology are relevant; specifically, the methodology contained within BS 4142 includes adjustment for characteristic features of the noise.
- 4.09 On this basis, it is noteworthy that noise from the PRS is continuous in nature, does not contain impulsive components and is not considered tonal (as defined in BS 4142). See below for the one-third octave frequency spectrum of the PRS as measured at 10 metres:



5.00 SOUND ATTENUATION SCHEME PROPOSALS

- 5.01 Based on external and internal noise measurements undertaken by ENS at other sites, it is considered that a standard double glazed window with standard trickle vents in a building façade will provide of the order of 30 dB(A) sound insulation (from external to internal) to road traffic noise and railway noise. This statement is also corroborated by Annex 6 of the now superseded Planning Policy Guidance 24 'Planning and Noise' (PPG 24).
- 5.02 It is therefore considered that standard double glazed windows and standard trickle vents are appropriate throughout the majority of the application site, with the exception of plots which are affected by train noise (rail-fronting bedrooms along the western and southern boundaries) and noise associated with the PRS compound (north western corner of the application site).
- 5.03 In order to calculate the sound insulation requirements of the building envelope for habitable rooms in these plots, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFmax} in this case).

Proposed Residential Dwellings Adjacent to Railway Line

- 5.04 The daytime and night time ambient noise levels at MP1 (along the western boundary of the application site) and MP2 (along the southern boundary of the application site) have been measured at circa 52 dB $L_{Aeq, T}$ and 49–50 dB $L_{Aeq, T}$, respectively (with maximum noise levels of up to 76 dB L_{AFMax}).
- 5.05 The glazing requirements of bedrooms on the rail-fronting façades of these dwellings are governed by discrete event maxima. Based on a glazing area of 1.2 m² and a room volume of 25 m³, good internal noise levels can be achieved with 10 mm glass / 6–20 mm cavity / 6 mm glass (or equivalent). Trickle ventilation is not appropriate.

BRE 1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 25 m ³	Building Envelope Insulation 2) Select elements of facade structure, and enter corresponding internal surface area in m ² OR enter number of vents.		Switch to Reverberation Time Calculation HELP	4) Select exterior sound level type Option (A) ☒ User defined spectrum 76 dB LAFMax View/Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 76 dB ISO 717 - 1 (Ctr) View Data
	Surface area OR number of vents Wall 1 Brick / block cavity 9 m ² Wall 2 None m ² Window 1 10/ 12/ 6 double glazing 1.2 m ² Window 2 None m ² Door None m ² Roof/ Ceiling None m ² Vent 1 None Vent 2 None View/Edit Data			
	3) Enter reverberation time of the room. 0.5 seconds		Internal sound level L_{Aeq} 41.6 dB	

- 5.06 In order to provide rapid ventilation without the need to open windows, it is recommended that the bedrooms fronting onto the railway line are provided with a mechanical ventilation strategy. Appropriate ventilation solutions include:
- A fully ducted mechanical ventilation system with heat recovery (MVHR).
 - A System 3 mechanical extract ventilation (MEV) system (e.g. Airflow Developments Ltd.).
 - A whole house positive input ventilation (PIV) system (e.g. Nuaire Drimaster 365).
 - An individual room ventilator, such as the Titon Sonair unit (or equivalent).
- 5.07 It should be noted that any room-in-roof constructions should have double plasterboard to the 'cheek' walls of dormer windows and also the ceiling / roof. The dormer windows should also have enhanced double glazing as set out in Paragraph 5.05 above.
- 5.08 Standard double glazing and standard trickle vents are considered appropriate to remaining habitable rooms fronting onto the railway line (and bedrooms on the rear).
- 5.09 There is no specific need to protect garden amenity adjacent to the railway line as railway noise is not a steady, continuous noise source

Proposed Residential Dwellings Adjacent to PRS Compound

- 5.10 It is recommended that a buffer zone is introduced such that the nearest proposed residential dwellings are set back at least circa 20 metres from the PRS compound. An indicative sound attenuation scheme, based on both 20 metre and 40 metre buffer zones, is summarised in Table 5.1 below (see Appendix 3 for BRE calculation spreadsheets):

Table 5.1 –Sound Attenuation Scheme (Rooms fronting onto PRS Compound)

Location	Noise Level	Internal Criteria	Glazing and Ventilation
Habitable rooms of dwellings fronting on to PRS compound (20 metre buffer zone)	74 dB $L_{Aeq, T}$ (Daytime) 69 dB $L_{Aeq, T}$ (Night time)	< 35 dB L_{Aeq} (0700–2300) 30 dB L_{Aeq} (2300–0700)	Enhanced glazing i.e. 10 mm glass / 12 mm cavity / 6 mm glass and mechanical ventilation.
Habitable rooms of dwellings fronting on to PRS compound (40 metre buffer zone)	70 dB $L_{Aeq, T}$ (Daytime) 64 dB $L_{Aeq, T}$ (Night time)	< 35 dB L_{Aeq} (0700–2300) 30 dB L_{Aeq} (2300–0700)	Enhanced glazing i.e. 10 mm glass / 12 mm cavity / 6 mm glass and acoustic trickle vents rated at 38 dB $D_{n,e,w}$. **

** Greenwood 5000EAW.AC1 or equivalent

- 5.11 It should be noted that any room-in-roof constructions should have double plasterboard to the 'cheek' walls of dormer windows and also the ceiling / roof. The dormer windows should also have enhanced double glazing as set out in Table 5.1 above.
- 5.12 In order to protect garden amenity along the northern boundary, dwellings should 'front' onto the northern boundary, such that the gardens are screened from the PRS compound by the dwellings themselves.
- 5.13 A detailed building envelope specification can be provided when the detailed layout is determined. The noise climate at the application site is, however, considered suitable for residential development.

6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for the proposed residential development (outline) of land south of Ikea, Heol Ferry, Grangetown, Cardiff.
- 6.02 The ambient noise climate at the application site is formed primarily by distant road traffic of the surrounding road network, with localised contributions from the adjacent railway line and PRS compound.
- 6.03 Outline recommendations for an indicative scheme of building envelope sound insulation and boundary treatments have been provided to protect the proposed residential development from the ambient noise climate in accordance with the requirements of the National Planning Policy Framework. On this basis, the ambient noise climate is not considered to represent a constraint to the proposed residential development.
- 6.04 A detailed building envelope specification can be provided when the detailed layout is determined.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely



Thomas Crabb
MIOA, Diploma in Acoustics & Noise Control
For Environmental Noise Solutions Limited

cc File

Appendix 1 Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μ Pa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μ Pa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

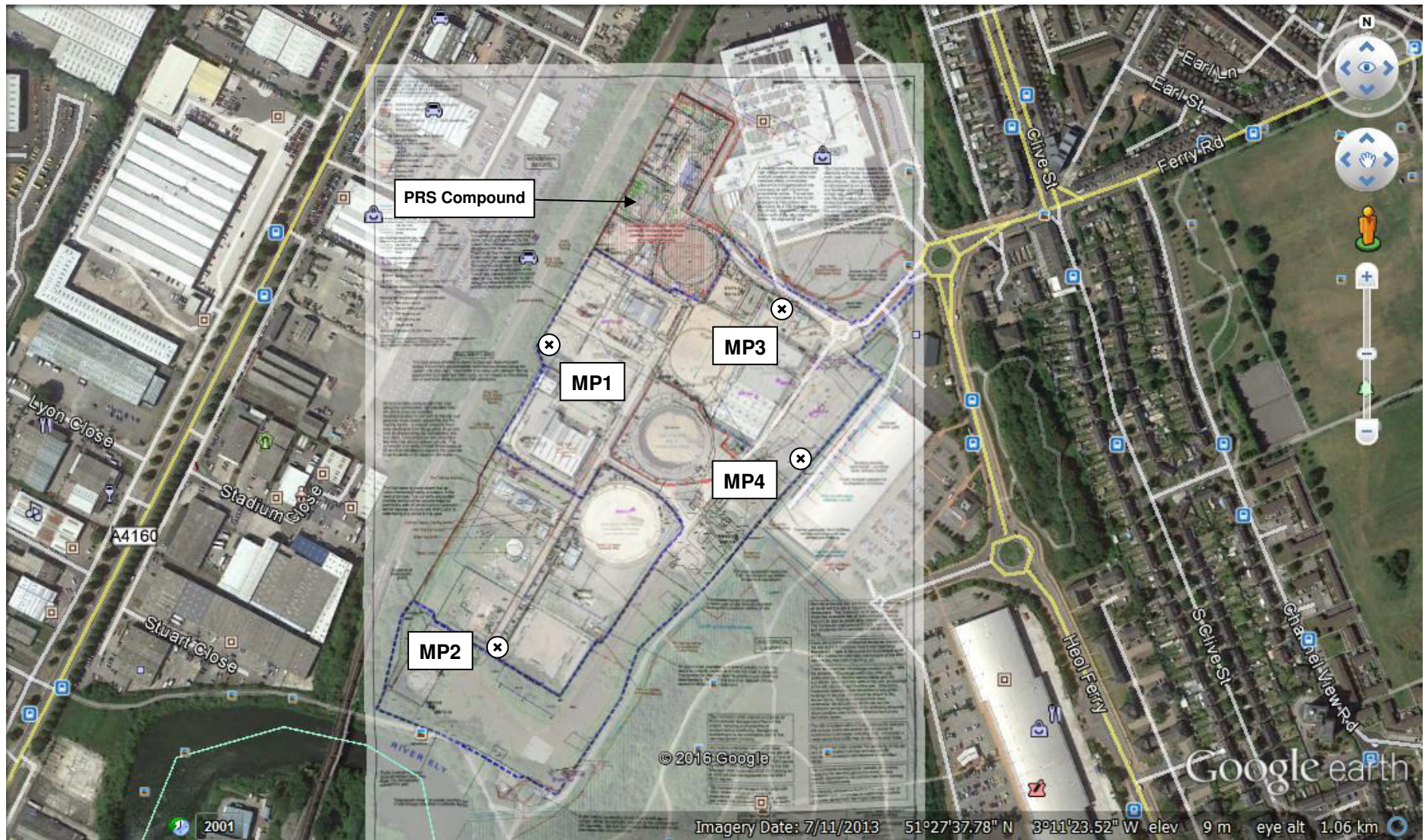
Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 Approximate Noise Monitoring Positions



Appendix 3

BRE Calculation Spreadsheets – Habitable Rooms at 20 metres to PRS Compound

Living Rooms

BRE 1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m³ OR ☒ Use volume 25 m³	Building Envelope Insulation 2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents. Switch to Reverberation Time Calculation HELP <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: center;">Surface area OR number of vents</th> </tr> </thead> <tbody> <tr> <td>Wall 1 Brick / block cavity </td> <td style="text-align: center;"> 9 m²</td> </tr> <tr> <td>Wall 2 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Window 1 10/ 12/ 6 double glazing </td> <td style="text-align: center;"> 1.2 m²</td> </tr> <tr> <td>Window 2 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Door None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Roof/ Ceiling None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Vent 1 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Vent 2 None </td> <td style="text-align: center;"> m²</td> </tr> </tbody> </table> View/ Edit Data		Surface area OR number of vents	Wall 1 Brick / block cavity	9 m ²	Wall 2 None	m ²	Window 1 10/ 12/ 6 double glazing	1.2 m ²	Window 2 None	m ²	Door None	m ²	Roof/ Ceiling None	m ²	Vent 1 None	m ²	Vent 2 None	m ²	4) Select exterior sound level type Option (A) ☒ User defined spectrum 74 dB LAeq (day) View/ Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L _{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 74 dB ISO 717 - 1 (C) View Data
		Surface area OR number of vents																		
Wall 1 Brick / block cavity	9 m ²																			
Wall 2 None	m ²																			
Window 1 10/ 12/ 6 double glazing	1.2 m ²																			
Window 2 None	m ²																			
Door None	m ²																			
Roof/ Ceiling None	m ²																			
Vent 1 None	m ²																			
Vent 2 None	m ²																			
3) Enter reverberation time of the room. 0.5 seconds		Internal sound level L _{Aeq} 31.7 dB																		

Bedrooms

BRE 1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m³ OR ☒ Use volume 25 m³	Building Envelope Insulation 2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents. Switch to Reverberation Time Calculation HELP <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: center;">Surface area OR number of vents</th> </tr> </thead> <tbody> <tr> <td>Wall 1 Brick / block cavity </td> <td style="text-align: center;"> 9 m²</td> </tr> <tr> <td>Wall 2 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Window 1 10/ 12/ 6 double glazing </td> <td style="text-align: center;"> 1.2 m²</td> </tr> <tr> <td>Window 2 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Door None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Roof/ Ceiling None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Vent 1 None </td> <td style="text-align: center;"> m²</td> </tr> <tr> <td>Vent 2 None </td> <td style="text-align: center;"> m²</td> </tr> </tbody> </table> View/ Edit Data		Surface area OR number of vents	Wall 1 Brick / block cavity	9 m ²	Wall 2 None	m ²	Window 1 10/ 12/ 6 double glazing	1.2 m ²	Window 2 None	m ²	Door None	m ²	Roof/ Ceiling None	m ²	Vent 1 None	m ²	Vent 2 None	m ²	4) Select exterior sound level type Option (A) ☒ User defined spectrum 70 dB LAeq (night) View/ Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L _{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 70 dB ISO 717 - 1 (C) View Data
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Roof/ Ceiling None	m ²																			
Vent 1 None	m ²																			
Vent 2 None	m ²																			
3) Enter reverberation time of the room. 0.5 seconds		Internal sound level L _{Aeq} 27.3 dB																		

Appendix 3

BRE Calculation Spreadsheets – Habitable Rooms at 40 metres to PRS Compound

Living Rooms

BRE	Building Envelope Insulation Switch to Reverberation Time Calculation		4) Select exterior sound level type Option (A) ☒ User defined spectrum 69 dB LAeq (day) View/Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 69 dB ISO 717 - 1 (C) View Data																
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	Surface area OR number of vents																		
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Vent 1 38dB Dnew Acoustic Ventilator	1																		
Vent 2 None	m ²																		
1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 25 m³	3) Enter reverberation time of the room. 0.5 seconds		Internal sound level L_{Aeq} 31.3 dB																

Bedrooms

BRE	Building Envelope Insulation Switch to Reverberation Time Calculation		4) Select exterior sound level type Option (A) ☒ User defined spectrum 64 dB LAeq (night) View/Edit Data Option (B) ☐ Spectrum shape Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz) L_{Aeq} 64 dB ISO 717 - 1 (C) View Data																
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1) Enter room dimensions or volume ☐ Use dimensions x m y m z m Volume m ³ OR ☒ Use volume 25 m³	3) Enter reverberation time of the room. 0.5 seconds		Internal sound level L_{Aeq} 26.3 dB																

James Cinicola/GBR

From: Quarrie, Ben <Ben.Quarrie@nationalgrid.com>
Sent: 14 October 2016 16:00
To: James Cinicola/GBR
Cc: James Blundell/GBR; Richard Williams1; Taylor1, Chris; James, Christopher
Subject: Cardiff - demolition costs
Attachments: Grangetown demo phasing mark-up.pdf

James,

As requested please see below regarding demolition costs.

Work Package

Area 1 - Warehouse, Maintenance Stores, Jet Wash & Bay Areas	£	39,300.00
Area 1 - Engineering Stores/Main Warehouse	£	28,500.00
Area 1 - Engineering Stores/Divided Workshop	£	13,150.00
Area 1 - Sub Station	£	7,560.00
Area 1 - GH6 Building	£	8,290.00
Area 1 - Entrance Sub Station	£	9,300.00
Area 2 - South WWU Compound	£	48,900.00

Summary Options

Work Package

Option 1 - NG Owned Buildings - Area 1 only	£106,100.00
Option 2 - NG and Southern WWU Buildings (Areas 1 & 2)	£155,000.00

Notes

- All prices exclude VAT (which is chargeable)
- These prices were provided by a demolition contractor on National Grid Property's approved contractor panel, provided on 31/07/2016 for works to take place on a 'stand-alone' basis.
- This estimate includes scrap credit and the removal of any asbestos containing materials.
- The plan denoting the demolition areas referred to is attached. Area 3 is excluded from the options as this is the WWU Retained Operational land.
- Prices are subject to change due to factors such as scrap prices etc. and should be treated as an indicative guide.

Kind regards,

Ben Quarrie

Real Estate Development Manager, National Grid Property | ben.quarrie@nationalgrid.com | 07917 093 295
National Grid is a trading name for National Grid Property Holdings Limited, Registered address: 1-3 Strand London WC2N 5EH
Registered in England and Wales, No 3797578

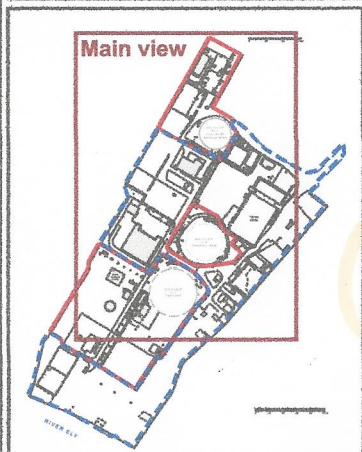
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ALL DIMENSIONS SHOWN ARE APPROXIMATE AND ARE TO BE USED FOR INDICATIVE PURPOSES ONLY.

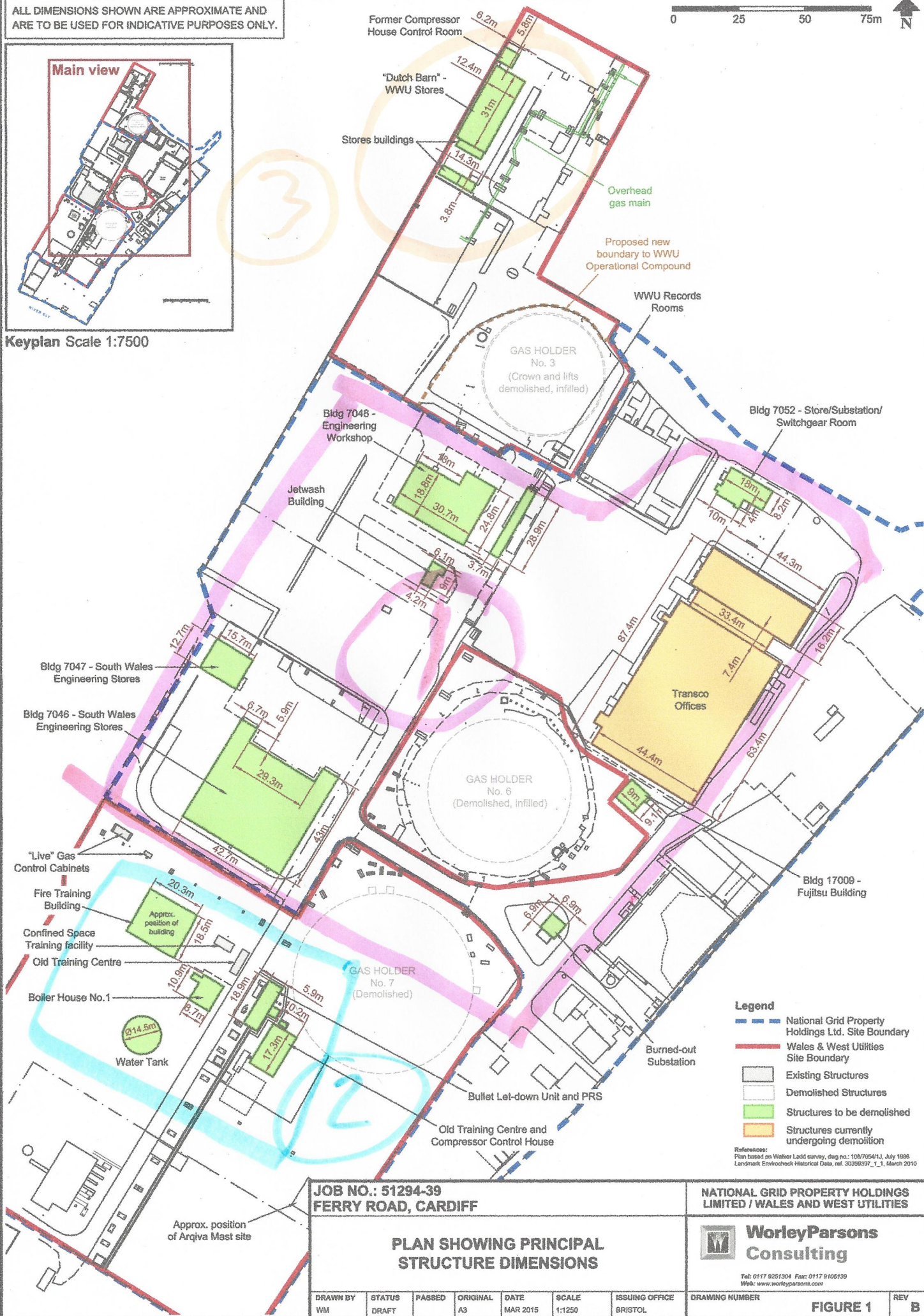
0 25 50 75m



Main view



Keyplan Scale 1:7500



Legend

- National Grid Property Holdings Ltd. Site Boundary
- Wales & West Utilities Site Boundary
- Existing Structures
- Demolished Structures
- Structures to be demolished
- Structures currently undergoing demolition

References:
Plan based on Walker Laid survey, dag no.: 1067054713, July 1996
Landmark Environment Historical Data, ref. 30359337_1_1, March 2010

JOB NO.: 51294-39
FERRY ROAD, CARDIFF

PLAN SHOWING PRINCIPAL
STRUCTURE DIMENSIONS

NATIONAL GRID PROPERTY HOLDINGS
LIMITED / WALES AND WEST UTILITIES



**WorleyParsons
Consulting**

Tel: 0117 9251304 Fax: 0117 9106139
Web: www.worleyparsons.com

DRAWN BY	STATUS	PASSED	ORIGINAL	DATE	SCALE	ISSUING OFFICE
WM	DRAFT		A3	MAR 2015	1:1250	BRISTOL

DRAWING NUMBER	FIGURE 1	REV
		B

Cardiff Local Development Plan 2006-2026

Council Statement

County Council of City and County of Cardiff response to Inspector's request for information relating to

Strategic Site B Former Gas Works, Ferry Road

Due to ongoing dialogue between joint landowners and agents for the site unforeseen circumstances have resulted in a minor delay in agreeing this information with the Council. This Council statement will form the starting position for a Statement of Common Ground which will be submitted in due course.

including the following details:

- Trajectory of housing provision over plan period;
- Table summarising infrastructure requirements (including 'explanatory note to clarify content');
- Updated site-specific Masterplanning Framework (extract relating to the relevant Strategic Site taken from the Updated Masterplanning Framework)

December 2014

Strategic Planning
City of Cardiff Council
County Hall
Atlantic Wharf
Cardiff CF10 4UW

Trajectory of Housing Provision for Strategic Site B - Former Gas Works, Ferry Road

The table below sets out a trajectory of housing provision over the remainder of the plan period 2015 to 2026 for the above site which has been agreed between the developer, agent or landowner for the site and the Council.

Site B Former Gas Works, Ferry Road			
Year	Totals		Cumulative
	Outlets	Total	All units
2015	0	0	0
2016	0	0	0
2017	1	20	20
2018	2	60	80
2019	2	70	150
2020	2	70	220
2021	2	90	310
2022	2	80	390
2023	2	70	460
2024	1	40	500
2025	0	0	500
2026	0	0	500
Totals		500	500

Explanatory Note (Infrastructure Plan Tables)

- The information contained within these tables is derived from the Cardiff LDP Infrastructure Plan, prepared as a Background Paper to the Deposit LDP and updated for submission of the Deposit LDP for examination in May 2014.
- The tables provide a breakdown of site-specific infrastructure requirements for each of the LDP “Strategic Sites” (A to H).
- The list of infrastructure requirements has been prepared from current standards and policy requirements provided by Council service areas and infrastructure providers.
- The list of requirements is not an exhaustive list, nor is it a definitive statement of requirements.
- Affordable Housing is addressed through specific LDP policies and supporting evidence and is excluded from the table of community infrastructure requirements
- Assumptions have been made regarding the scale, location, type and mix of uses and will require further discussion and amendment as detailed proposals and evidence emerge through the LDP Examination process, Development Management process, site masterplanning, community consultation and collaborative working.
- Infrastructure requirements which relate to more than one strategic site are identified within the tables and will be considered within the scope of legal tests and apportioned on a pro-rata basis having regard to the impact of the proposed development and the appropriate phasing of infrastructure delivery.
- The costs identified are indicative, based upon current standards and policy requirements provided by Council service areas and infrastructure providers. Actual costs will be the subject of further analysis, testing and policy interpretation as detailed site-specific proposals emerge over the plan period.
- Additional funding sources and innovative solutions to the delivery and management of infrastructure, including the sharing of facilities where appropriate, will be necessary to supplement developer contributions for some infrastructure items to deliver sustainable development within well planned, liveable neighbourhoods.
- Whilst developer contributions/obligations can make a significant contribution towards the cost of delivering necessary infrastructure, it is acknowledged that additional funding will be required for some infrastructure items to support and sustain the planned level of growth over the Plan Period and beyond.

Strategic Site B: Former Gas Works, Ferry Road - 500 Homes

Infrastructure Category	List of infrastructure requirements	Delivery Method / Estimated cost*	Potential Funding Sources	Delivery Body / Lead	Anticipated timescale for delivery
Transport and Highways	Walking, Cycling, Public Transport and Highway provision	To be provided through onsite provision and any offsite works that directly relate to the proposed development	Developer, Cardiff Council, Welsh Government	Developer / Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
Schools	Contribution to existing Primary Schools	Pro rata contribution toward £2,215,520 (est) brownfield primary school requirements	Developer, Cardiff Council, Welsh Government	Cardiff Council	To be provided within initial phases of development
	Contribution to existing Secondary Schools	Pro rata contribution toward £10,423,600 (est) brownfield secondary school requirements	Developer, Cardiff Council, Welsh Government	Cardiff Council	To be provided within initial phases of development
Green Infrastructure	1.2ha Open space	To be provided through onsite provision	Developer	Developer / Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
	Contribution to formal recreational open space	Developer contribution	Developer	Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
	Contribution to allotment provision	Developer contribution	Developer	Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
	1 playground, 1 teen facility plus off site contribution	To be provided predominantly through onsite provision	Developer	Developer / Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
Community Facilities	Contribution to offsite community facility provision	Developer contribution	Developer	Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
Environmental Management	Residential waste collection infrastructure	To be provided through onsite provision	Developer	Developer / Cardiff Council	Provided within appropriate phases of development / S106 trigger threshold(s)
	Flood Mitigation measures (TBC)	To be provided through onsite provision and any off-site works that directly relate to the proposed development	Developer	Developer (Through Flood Consequence Assessment)	Supporting technical infrastructure to be provided in an ongoing manner with phases of development
Utility Services	Water, Gas, Electric infrastructure	To be provided through onsite provision and any off-site works that directly relate to the proposed development	Developer / Utility Providers	Developer / Utility Providers	Supporting technical infrastructure to be provided in an ongoing manner with phases of development
	'Fibre to premises' telecoms infrastructure	To be provided through onsite provision and any off-site works that directly relate to the proposed development	Developer	Developer / Providers	Supporting technical infrastructure to be provided in an ongoing manner with phases of development

* For the avoidance of doubt, the costs identified are indicative, based upon current standards and policy requirements provided by Council service areas and infrastructure providers. Actual costs will be the subject of further analysis, testing and policy interpretation as detailed site-specific proposals emerge over the plan period.

Strategic Site B : Former Gas Works, Ferry Road



Schematic Framework

Key

- Existing Residential
- Existing School
- Existing Retail Area
- Existing Open Space
- Existing Employment
- Listed Building
- Protected Woodland
- Strategic Green Open Spaces
- Residential
- Mixed Use
- Employment
- Neighbourhood Centre
- Secondary School
- Primary School
- Improved and Extended Bus Network
- Cycle Footpath/Route
- P&R Park and Ride



Diagrammatic only. Do not Scale. Conceptual diagram to be rigorously tested and modified during future design collaboration in line with masterplanning principles.

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Site Specific Principles Site B

1. Master Planning Approach - Infrastructure Requirements:

- Walking, Cycling, Public Transport and Highway provision
- Contribution to existing Primary Schools
- Contribution to existing Secondary Schools
- 1.2ha Open space
- Contribution to formal recreational open space
- Contribution to allotment provision
- 1 playground, 1 teen facility plus off site contribution
- Contribution to offsite community facility provision
- Residential waste collection infrastructure
- Flood Mitigation measures (TBC)
- Water, Gas, Electric infrastructure
- 'Fibre to premises' telecoms infrastructure

2. Development Density

- Seek to provide high density residential accommodation of at least 50dph.

3. Sustainable Transport Corridor

- Improve pedestrian access to public transport facilities in the vicinity of the site.

4. Sustainable Travel Choices

- Provide pedestrian/cycle access from the site to the Ely Trail and Grangemoor Park.
- Enhance the existing path networks to provide walking and cycling links through Grangemoor Park to link the site with Cardiff Bay Retail Park.

5. Neighbourhood Centres

- Maximise pedestrian, cycling and public transport links to facilities within the surrounding area.

6. High quality, sustainable design and distinctive character

- Maximise the relationship between the site and River Ely and Grangemoor Park.
- Development at the northern end of the site should be of an appropriate layout and scale relative to the adjacent Ikea building.
- Consider how development within the site would relate to the railway line running to the west.
- Mitigate the acoustic impact of the railway line running to the west of the site.

- Incorporate the existing off road cycle route linking the Ely Trail to Ferry Road effectively within the development ensuring it is safe and overlooked.
- Ensure that the Listed gas holder is integrated into the design of the adjoining development.

7. Integration with neighbouring areas

- Provide accessible pedestrian and cycle links to the neighbouring retail park.
- Provide good links from the site to the east to enable easy access to Channel View Centre.

8. Connected strategic green open spaces

- Extend Grangemoor Park along the river frontage to create a riverside park with informal play opportunities.

9. Landscape, biodiversity and heritage

- Mitigate and compensate for reptiles and bats.
- Enhance the buffer of the trees along the railway corridor (north west boundary of site).
- Ensure an adequate buffer from the River Ely Site of Importance for Nature Conservation to protect the river bank and associated vegetation.
- Provide a systematic assessment of the character and setting of listed buildings, their curtilage structures and other heritage assets within and adjoining the site, in order to understand their significance and demonstrate how the proposals preserve or enhance those assets and their setting; in particular the Grade 2 listed gas holder (LB ref: 14067).
- Ensure a landscape & visual impact study is undertaken to inform the design of development.

10. Resource efficiency

- Explore the potential to use a method such as biomass to create electricity and use the heat created to heat the site's buildings.
- Explore collecting methane gas from Grangemoor Park to create a combined heat and power system.
- Consider the potential for flooding and associated mitigation within the proposed development layout for the site.



**Nathaniel Lichfield
& Partners**

Planning. Design. Economics.

**Former Gas Works Site, Ferry Road,
Grangetown, Cardiff**

Planning Brief

Wales & West Utilities / National Grid
Property
14 October 2016

31206/JCO/AE

Nathaniel Lichfield & Partners
Helmont House
Churchill Way
Cardiff CF10 2HE

nlpplanning.com

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1.0 Introduction

- 1.1 This report has been prepared by Nathaniel Lichfield & Partners ('NLP') on behalf of Wales & West Utilities and National Grid Property, the joint owners, who will be bringing the former Gas Works site to the market.
- 1.2 The purpose of this report is to ensure that potential purchasers are aware of key planning issues that need to be considered when formulating proposals for development.
- 1.3 This report will describe the site and the surrounding area, provide the site's context and characteristics, provide an overview of the site's planning policy status, discuss the constraints and opportunities and the prospects of obtaining planning permission for residential development. It will also provide a basis for the submission of a planning application.
- 1.4 NLP has used all these elements to inform a set of plans that demonstrate how the site could be developed. NLP considers that a combination of townhouses and apartments may be the most appropriate form of development on this site.
- 1.5 Specialist input into the report has been provided by Vectos Transport Planning Specialists, Montague Evans in respect of the gas holder structure only and FMW Consultancy (now part of WYG) respectively.

Site & Surrounding Area

2.0

- 2.1 The site is located in the south west of Cardiff in the Grangetown area. It is well located with regard to public transport services being located approximately 3 km from Cardiff Central train station and the city centre. In addition, it is located approximately 1.25 km to the north of the A4232 which provides easy access to the M4.
- 2.2 The site comprises a strategic allocation (Site B) in the Cardiff LDP (2006-2026) for 500 homes. The LDP was adopted by Cardiff Council on the 28th January 2016.
- 2.3 The site measures 10.24ha and is brownfield in nature. It was previously used as a gas works (Site location plan – **Appendix 1**). It continues to accommodate a range of structures and buildings that were used as part of the gas works. Two gas holders have been dismantled and removed. The framework of another gas holder is located in the north west corner of the site and is Grade II Listed.
- 2.4 Adjacent uses comprise an IKEA store to the north, Cardiff Bay Retail Park and Grangemoor Park to the east, the River Ely to the south and the Cardiff to Barry railway line to the west which delineates the western boundary. Beyond the railway line to the west is a commercial area that comprises several car showrooms and garages. Dense vegetation exists on the west, south and eastern boundaries.
- 2.5 There are three compounds located beyond the site boundary to the south east. Two are operated by Infinis and burn off landfill gasses associated with the former landfill site beneath Grangemoor Park. The third compound is operated by Cardiff Council and appears to be used for storage purposes. Such conflicting uses may need to be reviewed in consultation with the Council and the operators.
- 2.6 Vehicular and pedestrian access to the site is obtained from Ferry Road at the north eastern corner of the site.
- 2.7 The site is in a highly sustainable location, with employment opportunities, services and facilities all within walking distance.

3.0

Site Context and Characteristics

Heritage

3.1

The former gas holder structure is Grade II listed, which now includes the backfilled and levelled base.

3.2

The gas holder was listed in 1992 as CADW considered it to be a '*striking C19 gasholder with literate architectural design to framework.*' The gas holder is described as a:

"Shallow domed crown of holder has, at circumference, brackets with wheels running on vertical rails attached to supporting framework which consists of two tiers, each of 16 cast-iron Doric columns supporting panelled entablature blocks with cornices in the manner of Florentine C15 architecture. Upper-tier columns slightly slimmer than lower with lighter, narrower entablature blocks. Lattice girders between columns at entablature level of both tiers, and x-shaped cross-bracing between columns on both levels."

3.3

A review of the gas holder from a heritage perspective was carried out by Montague Evans (ME) in July 2015 and indicates that the gas holder is a '*Type 14 Double-Order, Double-Tier Guide Frame*'. This type was adopted very widely in the following 25 years after 1858, when the first was most likely built at Bethnal Green (now demolished).

3.4

The manufacture and distribution of gas was introduced in the 19th century and grew throughout the United Kingdom. The industry was UK wide and ME is not aware of the Grangetown Gasworks being of particular importance regionally.

3.5

ME advises that the gasholder sustained bomb damage during WWII, and was subsequently restored. ME also states that the gas holder's tank has been demolished and infilled and that only the frame, i.e. the upper part of the holder survives. These aspects of repair have eroded the architectural integrity of the frame.

3.6

With regard to the setting of the listed gas holder, NLP considers that this has been lost in its entirety as the industrial surroundings associated with the gas works has been eroded over time to redevelopment.

3.7

The site is not located within a Conservation Area.

Flooding

3.8

According to the TAN15 Development Advice Maps the majority of the site falls within Flood Zone A (considered to be at little or no risk of fluvial or coastal/tidal flooding). A portion of the site at the north and the south fall within Zone C1 (served by significant infrastructure, including flood defences). A portion of the site, close to the eastern boundary falls within Zone B (areas known to have been flooded in the past).

- 3.9 FMW Consultancy (now part of WYG) has prepared a Flood Risk Scoping Report for this site and this is appended at **Appendix 2**.
- 3.10 FMW advise that in planning terms, the entire site passes the most critical test which is complying with key TAN15 criteria. This means that the site can be developed for housing.
- 3.11 FMW state that the key issues to address and consider comprise:
- 1 To prove that the extreme fluvial and tidal events do not cause flooding that exceeds TAN 15 criteria. (This should be possible to demonstrate using existing hydraulic modelling so that the potential costs of commissioning a new model should be avoidable);
 - 2 To prove that surface water flooding can be managed within the site ensuring that no property floods during a 100 year plus climate change event, and that flood risk is not increased outside the site boundary. (This will require a detailed understanding of overland flow routes and care during the masterplanning stage. Flood Risk and Drainage engineers will need to work in tandem with the layout designers and other professionals in the design team);
 - 3 If dwellings are to be located within the 1000 year flood outline of zone C1 (the Northern end of the site), there may be an aspiration by the planning authority for flood resilient construction methods;
 - 4 Ensure that run off from the development will not increase the risk of flooding offsite. Through negotiation with the local land drainage authority, it would seem reasonable to assume that ultimately there would not be a restriction on flow rates into the Bay (with the controlled water level);
 - 5 It is almost certain that infiltration will not be viable, and this will limit the range of SUDs that could be incorporated;
 - 6 Groundwater is unlikely to be a significant constraint but an assessment will almost certainly be needed to accompany the planning application.

Ecology and Biodiversity

- 3.12 The River Ely and Grangemoor Park are both designated Sites of Importance for Nature Conservation (SINC). Cardiff Council explains on its public access map¹ that the River Ely is important for migratory fish, otters, wildflower and bankside vegetation. It also acts as a major wildlife corridor.
- 3.13 The site's western, eastern and southern boundary is formed of scrub and vegetation. Vegetation also exists on the southern part of the site in the form of trees, shrubs and grassland. There may therefore be ecological issues that need to be addressed before development can commence. Survey work will be required to ascertain the ecological value of the vegetation and to ascertain if there is biodiversity present.

¹ <http://ishare.cardiff.gov.uk/>

Ground Conditions and Physical Constraints

- 3.14 Given the site's previous use as a gas works facility there is a possibility of the need for remedial works. Survey work will be required to ascertain ground conditions.
- 3.15 A communications mast is located in the south eastern part of the site and a gas governor is located near the western perimeter.
- 3.16 Adjacent to the south east corner of the site are two landfill gas compounds. We understand from the operator that these compounds intermittently release exhaust gases which may impact on air quality and could lead to noise pollution. A Cardiff Council compound exists adjacent to the southern extent of the site. We understand that Cardiff Council and Welsh Water require constant access to the compound for inspection and maintenance.
- 3.17 Medium and intermediate pressure gas mains run through the site on a north/south axis. These are located in close proximity to the western boundary.

Access and Sustainability

- 3.18 Vectos Transport Planning has reviewed the transport arrangements with regard to this site. The Transport Review is appended at **Appendix 3**.
- 3.19 Vectos advise that the site connects directly to the existing pedestrian network, with footways provided to the north and south of the site access, and a direct connection to the Ely Trail to the immediate south of the site access. However, the pedestrian provision at the Ferry Road roundabout is inadequate and unattractive, with sub-standard crossing facilities and excessive provision of guard railing. The provision for pedestrians (and cyclists) at the Ferry Road / Clive Street Junction is also sub-standard, with narrow footways / small pedestrian refuges and excessive guard railing. Pedestrian (and cyclist) improvements will be required at both of these locations.
- 3.20 The nearest bus stops to the site on Ferry Road are 'Staples, south-east bound' and 'Staples, north-west bound'. These stops, which are circa 410 and 430 metres from the centre of the site respectively, are well equipped with shelters, benches, timetables and bins. Service 9 provides 3 buses an hour (weekdays and Saturday) between Cardiff City Centre and the Sports Village. Service 9B provides an additional 3 buses an hour between Cardiff City Centre and Windsor Quay on weekdays.
- 3.21 The nearest rail station is Grangetown station which is located approximately 990m from the site (via Clive Street). Grangetown station provides frequent links with Cardiff Central as well as Barry and the South Wales valleys.
- 3.22 Vehicular access to the site is via a four arm priority roundabout on Ferry Road. The Ferry Road roundabout operates satisfactorily, although at peak times there is some delay and inconvenience to car drivers at the roundabout, primarily due to traffic queuing back from Ferry Road / Clive Street Junction (four arm signal controlled junction) to the immediate east. At peak retail times,

including bank holidays, inconvenience and delay to car drivers can be excessive in the vicinity of the site, primarily due to the proximity of Ikea, which is accessed via the same roundabout as the site, and Cardiff Bay Retail Park.

- 3.23 Vectos advise that there is limited scope for highway capacity improvements in the vicinity of the site, and indeed this approach would be contrary to policy and the thrust of the Council's Local Development Plan (2006-2026). However, WWU has indicated that if the Listed structure were to be removed and if existing WWU apparatus were to be rationalised there may be scope to create a cycle link between the site and Penarth Road via an existing underpass.

Local Facilities and Services

- 3.24 There is a wide variety of facilities and services located within close proximity of the site. The majority of these can be accessed easily via walking and cycling.

Table 3.1 Local Facilities and Services

Facility/Service	Location	Approximate Distance from site (m)
Grangemoor Park	Ferry Road	Adjacent to site
IKEA	Ferry Road	Adjacent to site
Cardiff Bay Retail Park (including Boots, B&M Bargains, Poundstretcher and Argos)	Ferry Road	Adjacent to site
Playing Fields	The Marl	350
St Paul's Primary School	Bromsgrove Street	650
Grangetown Primary School	Bromsgrove Street	700
Asda Superstore	Ferry Road	750
Grangetown Health Centre	Cambridge Street	850
Aldi	Ferry Road	950
The Surgery	Corporation Road	1,000
Morrisons	Ferry Road	1,200
Fitzalan High School	Lawrenny Avenue	3,000

- 3.25 Currently, there is no direct access between the site and Penarth Road. However, as set out above there is the potential to open up a pedestrian and cyclist route between the site and Penarth Road via Fleet Way, utilising an existing route under the railway bridge. Further investigation with Wales and West Utilities would be required to understand the potential viability of bringing this route into public use, which would present significant benefits to the wider community.

Planning History

- 3.26 Listed Building Consent was granted on 23 October 2012 for the removal of part of the listed gas holder.
- 3.27 A planning application (15/02834/MJR) was submitted by Pegasus Development (Clive Lane) Ltd on 13th November 2015 for 116 dwellings

approximately 150 m from the site. The proposed development was considered at planning committee on 13 July 2016 and a resolution to grant subject to the signing of a s106 agreement was reached. Whilst a decision has not been formally issued as the s106 has not been signed, the principal vehicular access for the scheme would be off Clive Road, with preliminary site levelling works requiring the removal of 60,000 cubic meters of material utilising the existing Network Rail access at the southern end of the site from Ferry Road. The submitted material to the Council indicates that the levelling operation will take approximately 12 month and will generate 8 movements per hour (4 in, 4 out). An indicative layout can be seen below:1

Figure 3.1 Indicative Site Layout



Source: Cardiff Council Online Register

4.0 Planning Policy Position

- 4.1 Cardiff Council has been preparing a Local Development Plan (LDP) to replace The City of Cardiff Local Plan (Adopted 1996) and the South Glamorgan (Cardiff Area) Replacement Structure Plan (Adopted 1997).
- 4.2 Cardiff Council received the Inspectors' report on 5th January 2016.
- 4.3 The LDP was adopted by Full Council on Thursday 28th January 2016 and now comprises the statutory development plan for Cardiff.
- 4.4 The six week period within in which the LDP could be formally challenged expired on 11 March 2016.
- 4.5 Planning Policy Wales (PPW) is also a material consideration. Key policy tests embodied at paragraph 9.2.9 will need to be satisfied in order to ensure that the proposed development is sustainable.

Local Development Plan

- 4.6 The site is identified as a strategic allocation 'Site B' in the LDP (2006-2026). In total, the strategic sites are to deliver approximately 13,950 new dwellings together with a range and choice of employment opportunities and a significant amount of supporting infrastructure and community facilities.
- 4.7 The LDP explains that strategic site B is to be developed as a:
"Housing-based scheme of 500 homes and other associated community uses"
- 4.8 Individual policies have been prepared for each strategic site. Policy KP2 (B) deals with the Former Gas Works, Ferry Road.
- 4.9 Policy KP2 (B) explains that the site is allocated for a scheme of 500 homes. The policy identifies Essential/Enabling Infrastructure² and Necessary infrastructure³ for the site.
- 4.10 Essential/Enabling Infrastructure includes:
- Improving pedestrian access to public transport facilities in the vicinity of the site;
 - Providing new and enhanced existing pedestrian / cycle links from the site to the Ely Trail, Grangemoor Park, Cardiff Bay Retail Park and other community facilities within the area including Channel View Centre;

² Essential/Enabling Infrastructure - Those items which will need to be delivered prior to, or from the commencement of the relevant phases of development (e.g. transportation / highways infrastructure, utility services and flood mitigation / defences).

³ Necessary Infrastructure - Items which need to be phased and implemented alongside new development, to ensure that areas are served with appropriate facilities over time (e.g. schools and recreational open space)'.

- 4.11 Necessary Infrastructure includes:
- Contribution to off-site community facility provision;
 - Education – Contribution to existing primary and secondary schools;
 - Minimum of 1.2 ha open space including 1 playground, 1 teen facility, plus contributions to formal open space, allotment provision and play provision.
- 4.12 The policy KP2(B) proceeds to set out the key masterplanning requirements that a potential development scheme would need to accord with:
- Development density of at least 50 dwellings per hectare;
 - Density, design, scale and layout at the northern end of the site should respond effectively to the adjacent Ikea building;
 - The layout should relate effectively to the railway line forming the western boundary of the site including mitigating any acoustic impacts;
 - Ensure that the cycle trail linking the Ely Trail to Ferry Road is retained and that the layout provides a safe and overlooked solution;
 - Maximise the relationship between the site, the River Ely and Grangemoor Park including extending the park along the river frontage to create a riverside park with informal play opportunities;
 - Effectively respond to landscape and biodiversity assets;
 - Effectively respond to heritage assets, especially the Listed Gas Holder.
 - Explore the potential to collect methane gas from Grangemoor Park to create a heat and power system together with exploring other potential opportunities such as biomass to create electricity and to heat the site's buildings.

Other LDP Policies That Need to be taken into Account

- 4.13 Whilst, Policy KP2 (B) focuses on the Ferry Road site, there are a number of general policies that are relevant to the development of this site.

Policy H3: Affordable Housing

- 4.14 Policy H3 states that 20% affordable housing will be sought on residential proposals of more than 5 dwellings on brownfield sites. This will need to be delivered on-site unless there are exceptional circumstances, including viability concerns.

Policy EN8: Trees, Woodlands and Hedgerows

- 4.15 The proposal will need to avoid any unacceptable harm to trees, woodlands and hedgerows of significant public amenity, natural or cultural heritage value, or that contribute significantly to mitigating the effects of climate change.

Policy EN9: Conservation of the Historic Environment

- 4.16 The proposal will need to demonstrate that it preserves or enhances the listed Gas Holders architectural quality, historic and cultural significance, character, integrity and/or setting.

Policy EN13: Air, Noise, Light Pollution and Land Contamination

- 4.17 The proposal will need to avoid any unacceptable harm to health, local amenity, the character and quality of the countryside, or interests of nature conservation, landscape or built heritage importance because of air, noise or light pollution or unacceptable levels of land contamination. This policy is relevant due to the noise generating uses in close proximity to the site (e.g. railway, service yards, methane gas compounds) and also the site's historic use as a gas works.

Policy EN14: Flood Risk

- 4.18 The proposal will need to ensure that there is no increase to the risk of flooding from fluvial and/or tidal flooding or from additional run-off from the development in any location. The proposal should also demonstrate that it has considered the need to incorporate environmentally sympathetic flood risk mitigation measures such as Sustainable Urban Drainage Systems (SUDS).

Policy T1: Walking and Cycling

- 4.19 The proposal will need to comply with policy T1 which seeks to enable people to access employment, essential services and community facilities by walking and cycling. The policy puts forward several criteria to assist in achieving this goal. These include developments that put forward permeable and legible networks of safe, convenient and attractive walking and cycling routes as well as high quality, sustainable design which makes a positive contribution to the distinctiveness of communities and places.

Policy T6: Impact on Transport Networks and Services

- 4.20 The proposal will need to ensure that it does not cause unacceptable harm to the safe and efficient operation of the highway, public transport and other movement networks including pedestrian and cycle routes, public rights of way and bridle routes.

Planning Policy Wales (PPW) Edition 8, January 2016

- 4.21 Paragraph 9.2.9 of PPW puts forward criteria that LPA's should consider when allocating sites for housing. The allocation of the site for residential development is a clear indication that the potential development of the site is in accordance with the PPW criteria. The criteria comprise:

- the availability of previously developed sites and empty or underused buildings and their suitability for housing use;
- the location of potential development sites and their accessibility to jobs, shops and services by modes other than the car, and the potential for improving such accessibility;
- the capacity of existing and potential infrastructure to absorb further development;
- the scope to build sustainable communities to support new physical and social infrastructure;
- the physical and environmental constraints on development of land, including, for example, the level of contamination, stability and flood risk;
- the compatibility of housing with neighbouring established land uses;
- the potential to reduce carbon emissions through co-location with other uses.

5.0

Constraints and Opportunities

5.1

As set out above, there are number constraints affecting the site that need to be considered when developing design proposals. There are also numerous opportunities to incorporate elements of good design. Set out below are the constraints and opportunities in respect of the site:

Table 5.1 Constraints

Constraint	Resolution
Wales & West retained operational area	Appropriate boundary treatment to be established between the site and the W&W area.
Grade II Listed gas holder	Gas holder and its setting to be preserved through the sensitive positioning of built form.
Intermediate pressure gas main	Easement corridor to be provided. This will reduce the developable area.
Medium pressure gas main	Easement corridor to be provided. This will reduce the developable area.
Gas governor	Gas governor to be retained and integrated into the development. This will reduce the developable area. WWU will need to retain the operational are but are reviewing potential for some rationalisation.
Telecommunication mast	Mast to ideally be removed or relocated elsewhere on site.
Landfill gas compounds	Public open space buffer to be provided between the compound and residential development.
Council compound	Public open space buffer to be provided between the compound and residential development.
Footpaths	Connections from the site to the existing footpaths to be provided.
Service yard overlooking site	Landscape buffer and appropriate boundary treatment to be provided.
Railway noise	Landscape buffer to be provided to militate against railway noise and overlooking.

Table 5.2 Opportunities

Opportunities	Design Consideration
Utilise attractive views towards Grangemoor Park and River Ely	Position built form so that the attractive views towards Grangemoor Park and the River Ely are utilised. Consideration should be given to increased building heights in order to capitalise on the number of units that benefit from key views.
Extension of park/buffer to SINC	Provision of open space buffer between the River Ely and built form which integrates with the SINC.
Greater integration with River Ely	Convenient pedestrian and cycle access to the River Ely Corridor will ensure that greater integration is achieved. This may require the felling of some trees to increase permeability and visibility.
Enhanced pedestrian linkages	Seek to deliver a number of pedestrian linkages into and out of the site, integrating with footpaths that exist outside of the site.
Enhanced boundary with park	Removal of existing fence and improvements to

Opportunities	Design Consideration
	boundary treatment.

- 5.2 NLP considers that there are good prospects of managing the constraints and opportunities related to this site in order to achieve a sustainable form of development.
- 5.3 The above constraints and opportunities are set out in plan form in **Appendix 4**.

Potential Layout

6.0

6.1

Taking into account the policy framework and other relevant material considerations, enclosed at **Appendix 5** is a form of development that may come forward which assumes that the existing telecommunications mast on site has been relocated elsewhere.

6.2

Plan IL31206-007 presents an illustrative layout which provides one example of how the site could be developed. Whilst only illustrative, it is based upon a series of development principles informed by the site's current constraints, which should be used as a basis to guide future development.

6.3

The key potential development principles are as follows:

- a Provision of a landscape belt to the western boundary to accommodate the intermediate pressure gas main (easement measures 6 metres) and provide a visual and auditory buffer to the adjacent railway line. A zone of parking adjacent to the landscape belt will maximise the distance between habitable rooms and the railway line.
- b Creation of a centrally located formal open space to provide a green focal point at the heart of the development. Less formal open space located to the south western end of the development site will provide additional recreational provision; extend Grangemoor Park along the river frontage; create an attractive outlook for properties adjacent to it; and form a buffer to the River Ely SINC and landfill gas compound apparatus.
- c Creation of an attractive gateway at the north eastern site entrance with Ferry Road. There is the potential to include multi-storey development at this and other key junctions within the development site, providing visual punctuation and enhancing legibility.
- d Promote perimeter block development to maximise overlooking of public spaces and routes and provide secure enclosed rear gardens to the majority of the properties.
- e Provision of natural surveillance of existing routes and spaces through the orientation of new development. Encourage pedestrian linkages through and between the new development and adjacent facilities.
- f Encourage a development solution which is sympathetic to the historic importance inferred to the former gas holder by its Grade II listing.

6.4

Whilst the market will dictate the form of development that can come forward, the illustrative layout plan enclosed at **Appendix 5** shows 257 houses (a mix of 2 and 3 storeys) together with 7 blocks of flats (up to 4 storeys in height) accommodating approximately 109 units. Totalling 366 units. If the telecommunications mast were to be retained in its current location, this would theoretically result in the loss of a terrace of 5 town houses on the enclosed illustrative layout.

- 6.5 Whilst the policy requirement is for 500 units on this site, the enclosed illustrative layout has been produced to demonstrate how a wider range and mix of housing can be delivered on the site.
- 6.6 Parking provision has been based upon Cardiff's SPG Table 3.8: C2 & C3 – Parking Standards for Residential, and allows for a maximum of 1 car parking space per unit.
- 6.7 The illustrative plan provides 1.24ha of public open space accommodated within the central and southern areas (1.2ha is the minimum LDP policy requirement for the site). There is scope for a children's play area and a teen facility to be located on this area. In addition, the landscape buffer provides a further 0.63ha of informal space. The open space provision therefore is in accordance with the requirements set out in the LDP. If the gas holder framework is to be retained then subject to the Health and Safety Executive's comments there is scope for the area to be used as public open space.
- 6.8 We consider that whilst it is technically possible to deliver 500 units (50 dwellings per hectare) on this site such a form of development would be restricted to predominantly flatted development. An alternative illustrative layout (Plan IL31206-005) enclosed at **Appendix 6** seeks to demonstrate how such a form of development could look. The alternative layout retains the existing telecommunications mast in its current location.
- 6.9 The alternative layout comprises 13 apartment blocks ranging in height from 4 storeys up to 8 storeys, accommodating approximately 460 dwellings. In addition, a perimeter block and row of high density town houses are illustrated. This equates to an additional 40 dwellings, totalling approximately 500 homes overall on the site. This alternative layout is more closely aligned to the LDP policy requirement to deliver a scheme of at least 50 dwellings per hectare.

7.0

Planning Application Submission

7.1

Based on the approach that the Council has been pursuing on other Strategic Sites across the City, it is likely that the Council would deem the proposed development to comprise an Environmental Impact Assessment (EIA) development.

7.2

We would recommend however that a screening request is submitted at the earliest opportunity to ascertain whether an environmental statement would be necessary in this instance. Should the Council agree that the proposed development does not comprise EIA development, the following documents should be submitted to support the planning application:

- 1 Planning Statement;
- 2 Design and Access Statement;
- 3 Drainage Assessment including Flood Consequences Assessment;
- 4 Ecological Assessment;
- 5 Arboriculture Assessment;
- 6 Transport Assessment;
- 7 Ground Conditions Report;
- 8 Acoustic Assessment;
- 9 Heritage Statement;
- 10 Landscape and Visual Assessment.

7.3

If the development is deemed to comprise EIA development, we recommend that the contents of the ES should be agreed with the Council by way of a Scoping Report. We consider that the following topic areas would need to be covered:

- 1 Socio Economic;
- 2 Transportation;
- 3 Water Resources;
- 4 Ecology;
- 5 Landscape and Visual;
- 6 Noise and Vibration;
- 7 Air Quality;
- 8 Heritage;
- 9 Waste;
- 10 Ground Conditions;
- 11 Utilities;
- 12 Cumulative and Residual.

8.0

S106 and CIL

Community Infrastructure Levy (CIL)

- 8.1 Cardiff Council published its CIL Drafting Charging Schedule for public consultation between September and October 2016. This represents the second stage of the process of adopting CIL, with the Council having previously consulted on a preliminary Draft Charging Schedule in November 2014. The Council will take into account representations made to the latest consultation, before submitting its Draft Charging Schedule for Public Examination, which is anticipated to take place in early/mid 2017.
- 8.2 The Draft Charging Schedule proposes differential charging zones for residential development; it is proposed that a CIL rate of £70/sqm be applicable to residential developments of between 1-499 dwellings across the authority area. However, it is identified that the LDP strategic sites, including Strategic Site B (Former Gasworks, Ferry Road), and developments that are for 500 or more dwellings would be subject to a separate NIL (£0) CIL rate.
- 8.3 Assuming therefore that the proposed nil CIL rate is carried forward, s106 will continue to form the basis of mitigating the potential impacts of development that comes forward on this site.

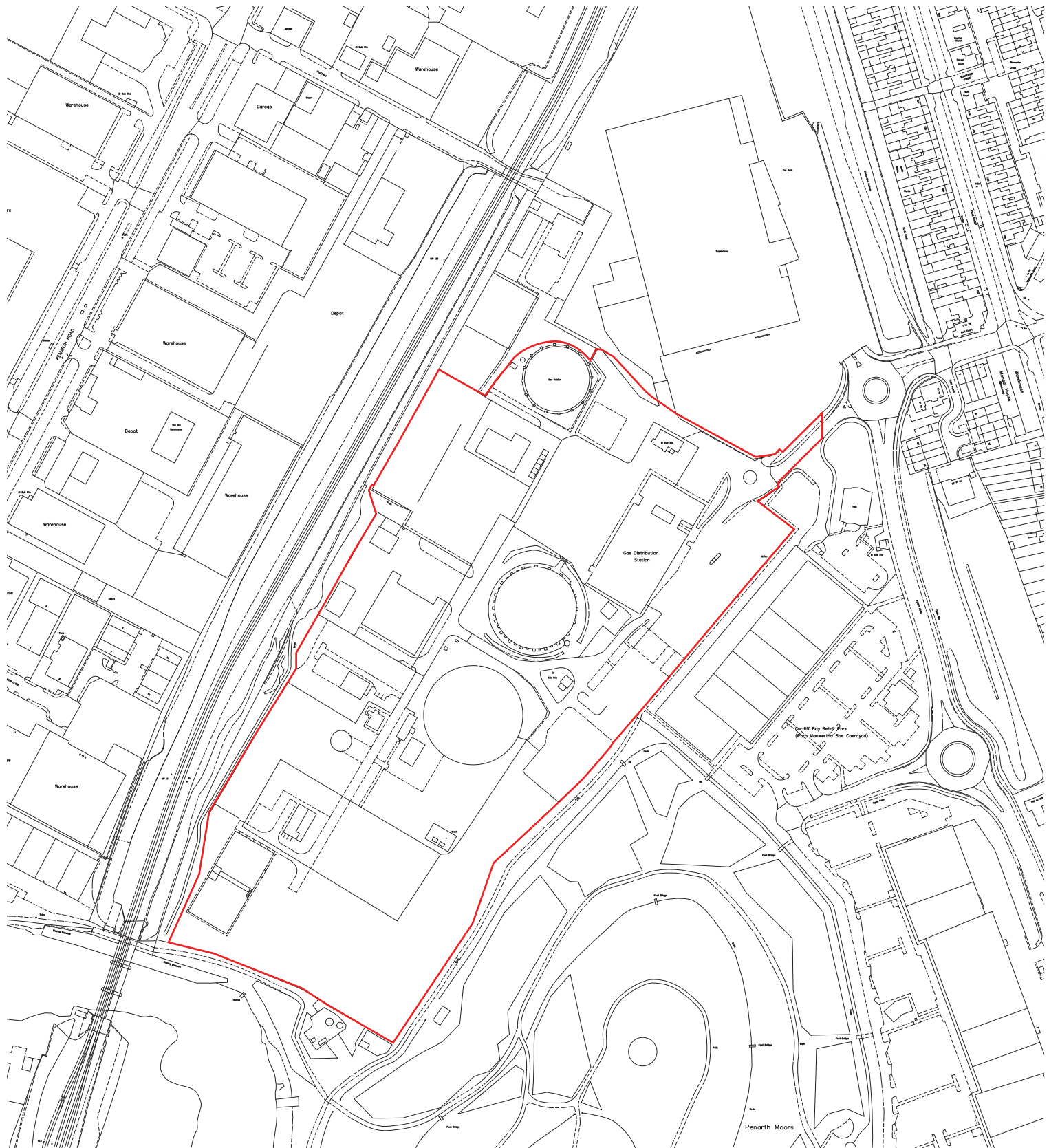
S106

- 8.4 The Council will require that planning obligations are delivered by way of a section 106 agreement. The heads of terms should be presented as part of the planning application. We consider that the following matters would need to be considered as a basis for joint discussion.
- 1 Off-site walking and cycling improvements, including potential cycle link to Penarth Road;;
 - 2 Improving pedestrian access to public transport facilities in the vicinity of the site;
 - 3 Provide new and enhance existing pedestrian/cycle links from the site to the Ely Trail, Grangemoor Park, Cardiff Bay Retail Park and other community facilities within the area including Channel View Centre;
 - 4 Financial contribution to off-site community facility provision;
 - 5 Education contribution to existing primary and secondary schools;
 - 6 Obligation to provide a minimum of 1.2ha open space including 1 playground and 1 teen facility;
 - 7 Financial contribution to formal open space (playing fields) and allotments.

8.5

The open space illustrated on drawing IL31206-007 delivers 1.24 ha of open space and is therefore in accordance with the open space requirements for this site.

Appendix 1 – Site Location Plan



KEY

Location of Site



**Nathaniel Lichfield
& Partners**
Planning, Design, Economics.

Project **Ferry Road**

Title **Site Location Plan**

Client **Wales & West Utilities**

Date **October 2016**

Scale **NTS**

Drawn by **SG**

Drg. No **IL31206/001 (Rev D)**

N



WE31206
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Appendix 2 – Flood Risk Scoping Report

FERRY ROAD, GRANGETOWN

FLOOD RISK SCOPING REPORT

Introduction

FMW Consultancy have been appointed by Nathaniel Litchfield and Partners (acting on behalf of National Grid) to provide a Flood Risk Scoping Report for land at Ferry Road, Grangetown. The scoping report will be used to inform potential purchasers of the site of likely constraints related to flooding and drainage and provide guidance on the scope of work that would be needed to address these issues as part of a planning application.

Existing Conditions

In flood risk terms, the site (which is referred to as 77LBR in the Local Plan) is constrained as follows:

On the TAN 15 Development Advice Map the site is almost entirely within Zone C1. This means that in theory highly vulnerable development (such as residential development) is permissible subject to compliance with TAN 15 criteria.

In this instance the relevant criteria includes:

1. Whether the site is allocated in a Development Plan or is a Brownfield Site
2. Whether technical criteria, defined by TAN 15 relating to the severity of extreme flooding is complied with.

Fluvial and Tidal Flooding has been assessed in detail through hydraulic modelling. This modelling is a prime reference document for the Cardiff Council Strategic Flood Consequence Assessment (SFCA) 2011. This modelling shows that the site is flood free during a 100 year fluvial event. It also shows that the site is flood free during a 1 in 200 year tidal event. The northern part of the site is flooded during a 1 in 1000 year (0.1%) event, but flood depth and velocity maps suggest that flooding will be within acceptable limits as defined by TAN 15.

Surface Water flooding theoretically impacts upon the site. It is not clear at this stage where exactly the surface water flows originate. There is a medium to high risk of surface water flooding in the site.

Sewer flooding has been experienced in the past, most notably on Clive Road in 2001. DCWW hold numerous records of sewer flooding, and the SFCA advises that the potential adverse effect of development of Site 77 on the existing sewer network would need to be further investigated as part of site specific assessment.

Groundwater is not considered to be a significant issue within the catchment (as stated in the Ely and Taff Catchment Flood Management Plan). Groundwater monitoring is an ongoing

obligation for the Cardiff Harbour Authority until 2019. Discussions with Cardiff Land Drainage team (Gary Jenkins and Ian Tythterington) revealed that there have been no instances of groundwater flooding in the area, and this is not likely to be a development constraint.

Consultations

Natural Resources Wales (NRW): Consultation with Rebecca Loder (Flood Risk Specialist) revealed that NRW would accept the use of the Cardiff SFCA November 2011 as the prime reference document. As this report provides strong evidence supporting the fact that the site would be capable of delivering a TAN 15 compliant residential development, then in that case it is unlikely that NRW would object to such a proposal.

Cardiff Council (CC): Gary Jenkins, Cardiff's Land Drainage officer was consulted. Gary commented that in terms of flood risk and drainage his authority did not have any records of Council owned drainage in the area. Gary did comment that there were outfalls into the River Ely, and these were probably outfalls for either privately owned surface water sewers, or sewers owned by DCWW Welsh Water. During the site visit two outfalls were seen on site. Refer to photographs below.



Submerged Outfall



Large Culvert Outfall

Cardiff Council (CC): Gary Jenkins confirmed that whilst groundwater monitoring was ongoing, and had been since the construction of the Cardiff Bay Barrage, there had been no witnessed incidents of groundwater flooding, and this is not viewed as a major concern. It was noted however that the underlying ground was likely to be contaminated, meaning that soakaways were probably unsuitable even if infiltration rates proved to be good.

Surface Water Drainage

A detailed analysis of the current drainage regime falls outside the scope of this report. However, the following facts will help to provide guidance on the likely surface water drainage strategy that would be needed to support a planning application:

The existing site is extensively hard surfaced and will almost certainly have a positive drainage network leading to existing outfalls. It is likely that a residential development of the

site (even a dense residential development) will have the effect of reducing the hard surface and potentially reduce the rate of peak run off from the site. See photographs below which are typical of the surfacing across the site.



The site has a large area of impermeable surfacing

If it is reasonably assumed that infiltration methods will not be suitable (due to groundwater levels), then a positive drainage outfall to a watercourse is the preferred alternative option. In this instance a free discharge may be acceptable due to the hydraulic nature of Cardiff Bay where water levels are controlled. In this instance the maximum rate of discharge of surface water may be governed by the capacity of existing outfall pipes (rather than a calculation of greenfield run off). There appears to be two possibly watercourses for discharge: Firstly there is a minor watercourse adjacent to the western boundary between the development and the railway line. Secondly there is the River Ely to the south, into which existing culverts can be seen to be discharging (see previous photos).

The capacity of the existing surface water drainage outfall should be considered and this will determine the potential volume of attenuation (if any) that may be needed for the development.

Conclusions

In planning terms the entire site passes the most critical test: Complying with key TAN 15 criteria. This means that in principle the site can be developed for a wide range of uses including highly vulnerable housing.

A planning application will have to be accompanied by a robust Flood Consequence Assessment (FCA).

The key issues to address will be:

- ✓ To prove that the extreme fluvial and tidal events do not cause flooding that exceeds TAN 15 criteria. (This should be possible to demonstrate using existing hydraulic modelling so the potential costs of commissioning a new model should be avoidable)

-
- ✓ To prove that surface water flooding can be managed within the site ensuring that no property floods during a 100 year plus climate change event, and that flood risk is not increased outside the site boundary. (This will require a detailed understanding of overland flow routes and care during the masterplanning stage. Flood Risk and Drainage engineers will need to work in tandem with the layout designers and other professionals in the design team)
 - ✓ If dwellings are to be located within the 1000 year flood outline of zone C1 (the Northern end of the site), there may be an aspiration by the planning authority for flood resilient construction methods.
 - ✓ By a Sustainable Drainage Strategy ensure that run off from the development will not increase the risk of flooding offsite. Through negotiation with the local land drainage authority, it would seem reasonable to assume that ultimately there would not be a restriction on flow rates into the Bay (with the controlled water level).
 - ✓ It is almost certain that infiltration will not be viable, and this will limit the range of SUDs that could be incorporated.
 - ✓ Groundwater is unlikely to be a significant constraint but an assessment will almost certainly be needed to accompany the planning application

FMW Consultancy Ltd

17 April 2015

Appendix 3 – Transport Review

Transport Review

Former Gas Works, Ferry Road, Grangetown, Cardiff

TN01-W151645-IS-Transport Review-01

22nd April 2015

Introduction

1. This Technical Note provides an overview of the transport position at Ferry Road, Grangetown, Cardiff, at a site known as 'Former Gas Works', including:
 - A review of the existing accessibility of the site by all transport modes, including walking, cycling, public transport and private vehicle access, and reports on the strengths, weaknesses and opportunities in relation to each network;
 - Provides details of any committed or future proposed transport improvements in the vicinity of the site;
 - Identifies the future potential of the site, cognisant of the aims and objectives of the Council's Deposit LDP; and
 - A summary of the position on the local highway network, specifically Site Access / Ferry Road Roundabout and Ferry Road / Clive Street Junction.

Site Accessibility

Walking

2. The site connects directly to the existing pedestrian network, with footways provided to the north and south of the site access, and a direct connection to the Ely Trail to the immediate south of the site access.
3. The Ely Trail provides a pleasant and attractive walking route, and provides traffic free connections to Cardiff Bay and to Penarth Road. However, the Ely Trail is unlit, which reduces the attractiveness of the route in the hours of darkness.
4. The footway to the north of the site access connects to Site Access / Ferry Road Roundabout, and whilst this roundabout has some pedestrian provision, it is inadequate and unattractive, with sub-standard crossing facilities and an excessive provision of guard railing.

**Photograph 1 –
Site Access / Ferry Road Rbt**

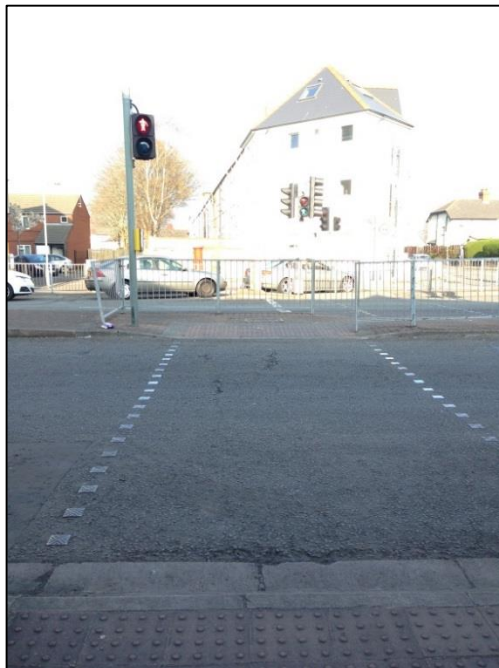


Photograph 2 – Site Access / Ferry Road Roundabout

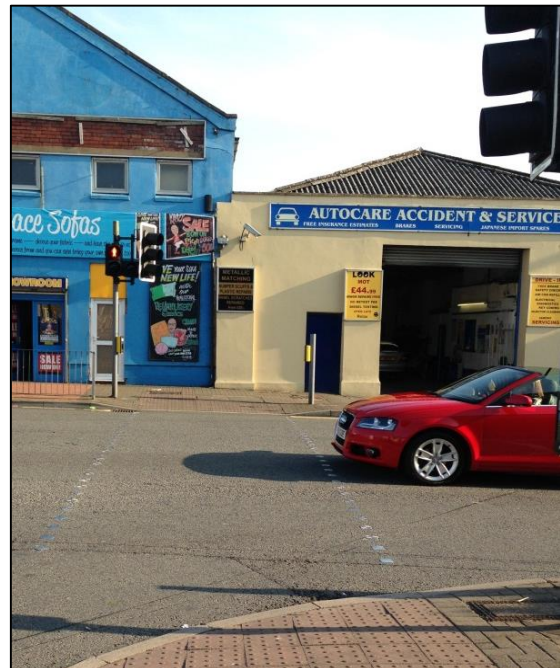


5. Therefore, pedestrian (and cyclist) improvements would be required at the Site Access / Ferry Road Roundabout to enhance the accessibility of the site.
6. The provision for pedestrians (and cyclists) at Ferry Road / Clive Street Junction is also sub-standard, with narrow footways / small pedestrian refuges and excessive guard railing, and environmental improvements to this junction to improve facilities for pedestrians (and cyclists) would be required to enhance the accessibility of the site.

**Photograph 3 –
Ferry Road / Clive Street Junction**



**Photograph 4 -
Ferry Road / Clive Street Junction**



7. Ferry Road extends south of the Site Access/ Ferry Road Roundabout and provides good pedestrian (and cycle) facilities. There is a segregated footway/ cycleway on one side of the road, and a footway exists on both sides. Lighting is present along the extent of this road.
8. North of Ferry Road/ Clive Street Junction, pedestrian provision is good, with street lighting present.
9. The Council has recently undertaken pedestrian and cycle improvement works on Penarth Road, providing a shared footway / cycleway adjacent to the southbound carriageway, enhancing the connectivity of Grangetown rail station. The potential may exist for the site to connect to this new footway / cycleway directly, by re-establishing a connection via Fleet Way, under the existing railway bridge.

Photograph 5 -

Footway / Cycleway – Grangetown



Photograph 6 -

Footway / Cycleway – Penarth Road



Cycling

10. The terrain in the immediate vicinity of the site is flat, and the topography of the city of Cardiff as a whole is conducive to cycling.
11. The site is well placed in terms of cycling, directly connected to the Ely Trail, and to the cycleway network leading to Cardiff Bay.
12. The Ely Trail is primarily a traffic free route which runs east to west across the south of the city, which in turn connects to the Cardiff Bay Trail and the Wales Coast Path. The cycling infrastructure in the vicinity of the site is shown in **Figure 1**.

Figure 1 – Cycle Infrastructure



13. In the vicinity of the site the Ely Trail is of a good standard, and benefits from route improvements on Penarth Road, with a toucan crossing provided to assist the movement of pedestrians and cyclists in this location.

Photograph 7 – Ely Trail



Photograph 8 – Ely Trail (Penarth Road)



14. A segregated cycleway is provided on Ferry Road towards Cardiff Bay, and between the site access and Ferry Road/ Clive Street junction there is a shared cycleway/ footway.

15. However, as noted in the previous walking section, environmental improvements would be required at Site Access /Ferry Road Roundabout and Ferry Road / Clive Street Junction to improve the accessibility of the site for cyclists.
16. Whilst the provision for cyclists travelling south along Ferry Road is good, provision for cyclists to the east and north is in the form of on-road routes, with limited dedicated provision for cyclists.

**Photograph 9 – Ferry Road (south)
Pedestrian/ Cycle Provision**



**Photograph 10 – Shared Cycle Footway
on Ferry Road (east)**



Bus

17. The nearest bus stops to the site on Ferry Road are 'Staples, south-east bound' and 'Staples, north-west bound'. These stops, which are circa 410 and 430 metres from the centre of the site respectively, are well equipped with shelters, benches, timetables and bins.

Photograph 11 – Staples, s-e bound

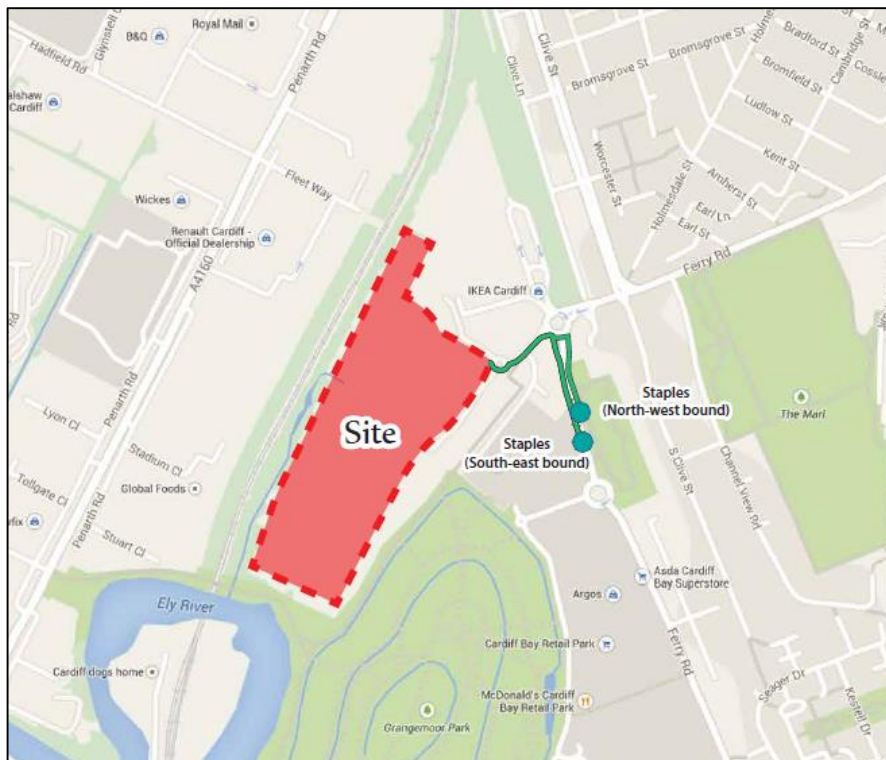


Photograph 12 – Staples, n-w bound



18. The walking route from the site to the 'Staples' bus stops is shown in **Figure 2**.

Figure 2 – Walking Route to 'Staples' Bus Stops



19. The nearest bus stops to the site on Penarth Road are 'Sorting Office, south-west bound' and 'Sorting Office, north-east bound'. These stops are located circa 630 and 1260metres respectively from the centre of the site via the potential route on Fleet Way. 'Sorting Office south-west bound' is equipped with a timetable and sign, whereas 'Sorting Office north-east bound' benefits from a dedicated layby, shelter, seat and timetable.

20. 'Sorting Office, north-east bound' is made difficult to reach by foot from the site due to a lack of appropriate crossing facilities over Penarth Road.

Photograph 13 – Sorting Office, s-w bound

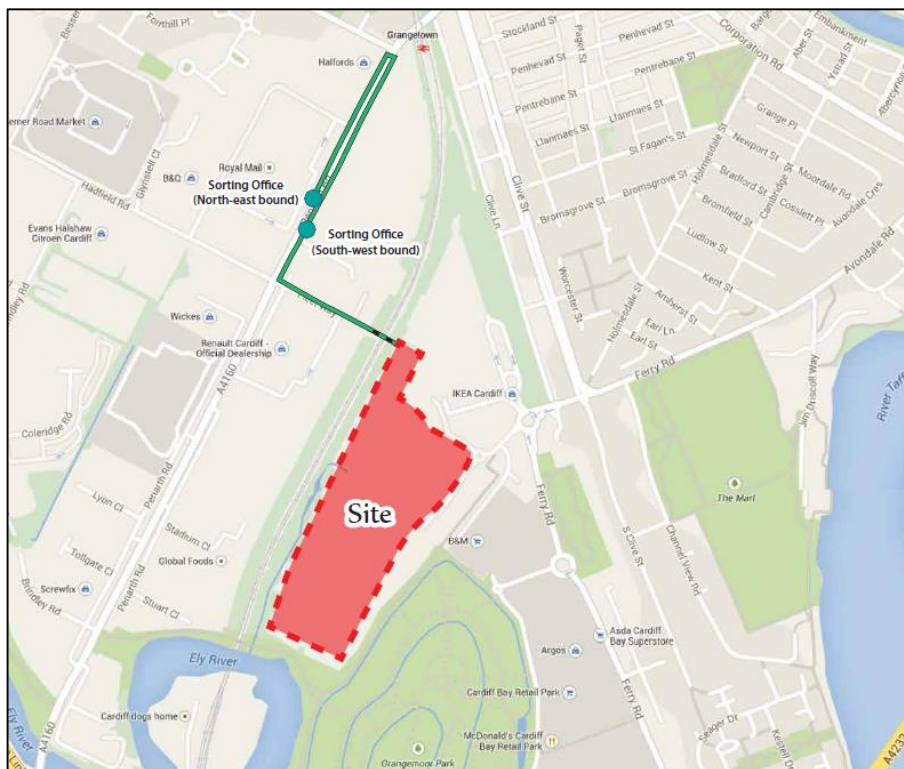


Photograph 14 – Sorting Office, n-e bound



21. The potential walking route from the site to the 'Sorting Office' bus stops is shown in **Figure 3**. The walking to the north-east bound bus stop is convoluted due to a lack of pedestrian crossing facilities at Hadfield Road / Penarth Road / Fleet Way Junction, and pedestrian improvements to this junction could be provided to enhance the connectivity of the site to public transport.

Figure 3 – Potential Walking Route to Sorting Office Bus Stops



22. A summary of the bus services serving the bus stops on Ferry Road and Penarth Road is provided in **Table 1**.

Table 1 – Summary of Bus Services

No.	Route	Frequency			Bus Stop
		Mon – Fri	Sat	Sun	
92	Cardiff – Penarth – St. Luke’s Avenue	3/ hour	3/ hour	1/ hour	Sorting Office (NE and SW bound)
93	Cardiff – Penarth – Dinas Powys – Barry	1/ hour	1/ hour	-	Sorting Office (NE and SW bound)
94	Cardiff – Penarth – Sully - Barry	3/ hour	3/ hour	1/ hour	Sorting Office (NE and SW bound)
9	Cardiff City Centre – Sports Village	3/ hour	3/ hour	2/ hour	Staples (NW and SE bound)
9B	Cardiff City Centre – Windsor Quay	3/ day	-	-	Staples (NW and SE bound)
89A	Cardiff – Cardiff Bay – Llandough – Dinas Powys	Every 2 hours	Every 2 hours	-	Staples (NW and SE bound)
89B	Cardiff – Penarth – Llandough	Every 2 hours	Every 2 hours	-	Staples (NW and SE bound)
304	Cardiff - Barry	1/ hour	1/ hour	Every 2 hours	Staples (NW and SE bound)
616	Cardiff Sloper Road – Bishop of Llandaff HS	School Bus – 1/ day in both directions	-	-	Staples (NW and SE bound)
93S	Grangetown – Penarth (St Cyres School)	School Bus – 1/ day in both directions	-	-	Staples (NW and SE bound)

23. **Table 1** demonstrates that the site is well placed in terms of bus accessibility, provided a connection to Penarth Road is established. Regular services on Penarth Road offer easy access to destinations including Cardiff City Centre, Penarth and Barry. Many of these services operate on a less-than hourly service.
24. Bus provision on Ferry Road includes routes operating at 3 per hour, hourly and 2 hourly basis to destinations such as Cardiff City Centre, Cardiff Bay, Penarth, Llandough and Barry.
25. Two dedicated school bus services run from Staples bus stops on Ferry Road, providing transport to Bishop of Llandaff High School and St Cyres School.

26. Currently, there is no direct access between the site and Penarth Road. However, there is the potential to open up a pedestrian and cyclist route between the site and Penarth Road via Fleet Way, utilising an existing route under the railway bridge. Further investigation would be required to understand the potential viability of bringing this route into public use, but improvement works would provide an area wide benefit, enhancing connectivity for all existing residents, particularly to bus stops on Penarth Road and Grangetown rail station. The existing route is shown in **Photograph 15**.

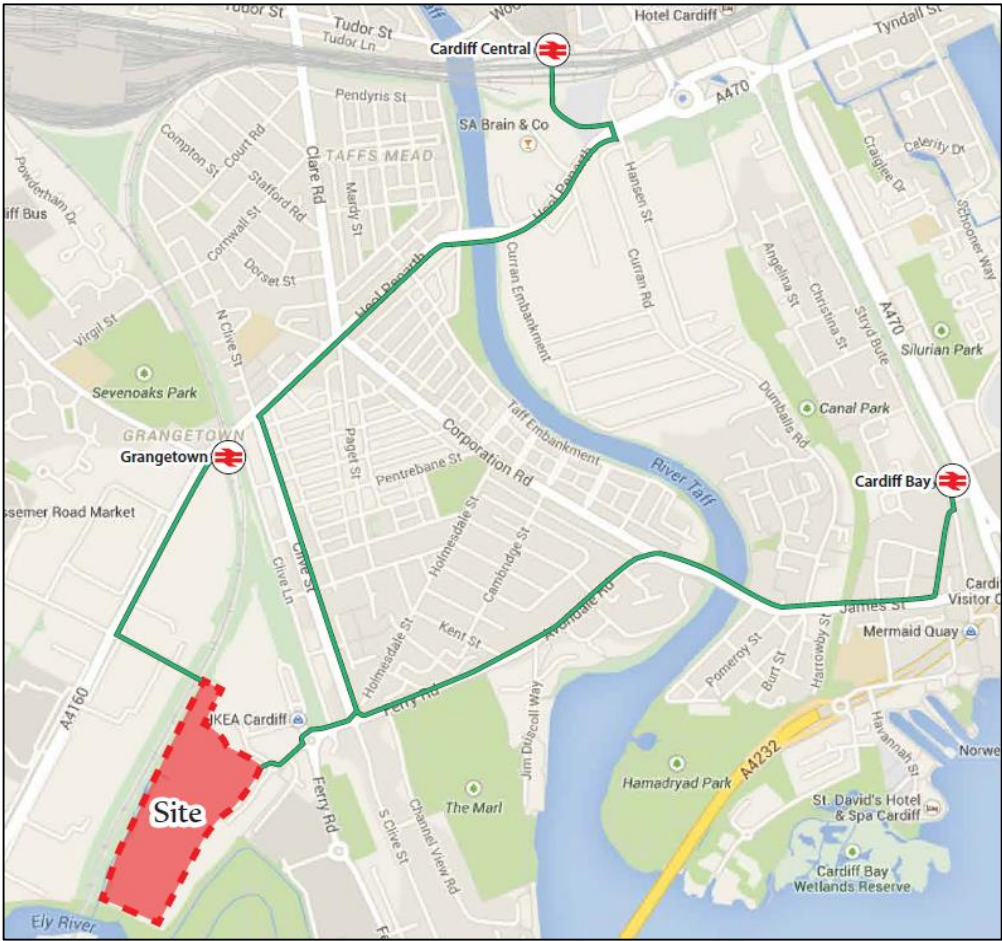
Photograph 15 – Existing Link connecting to Fleet Way



Rail

27. There are three rail stations within close proximity of the site, Grangetown (990 metres), Cardiff Bay (2.1km) and Cardiff Central (2.4km). The walking / cycling route to each rail station, on the basis that the route via Fleet Way is re-established, is shown in **Figure 4**.

Figure 4 – Walking Routes to Rail Stations



28. A summary of the key destinations served and the frequency of services is provided in **Table 2**.

Table 2 – Summary of Rail Services

Station	Destination	Journey Time	Frequency
Grangetown	Barry Island	26 minutes	Every 15 minutes
	Merthyr Tydfil	1hr 12 minutes	Every 30 minutes
	Penarth	11 minutes	Every 15 minutes
	Bargoed	53 minutes	Every 16 minutes
	Aberdare	1hr 12 minutes	Every 30 minutes
	Bridgend	52 minutes	Every hour
	Rhymney	1hr 10 minutes	Every 75 minutes
Cardiff Bay	Cardiff Queen Street	4 minutes	Every 12 minutes
Cardiff Central	Fishgaurd Harbour	2 hours 52 minutes	3/ day
	Radyr	18 minutes	5 – 15 minutes
	Treherbert	1 hour 4 minutes	Every 30 minutes
	Cheltenham Spa	1 hour 23 minutes	25-45 minutes
	Maesteg	53 minutes	Every hour
	Chester via Shrewsbury	2 hours 44 minutes	Every hour
	Coryton	22 minutes	Every 30 minutes
	London Paddington	2 hours 5 minutes	Every 30 minutes
	Portsmouth Harbour	3 hours 24 minutes	Every 25 minutes
	Ebbw Vale Parkway	57 minutes	Every hour
	Nottingham	3 hours 18 minutes	Every hour
	Manchester Piccadilly	3 hours 25 minutes	Every hour
	Swansea	55 minutes	16- 36 minutes

29. **Table 2** demonstrates that the three closest rail stations to the site serve a large number of key destinations. Grangetown is located nearest to the site, and sees frequent services to local key termini, whereas Cardiff Central allows rail travel wider afield to destinations including London, Nottingham, Manchester, and Portsmouth.

30. The site can be considered well placed in terms of rail provision.

Highway Network

31. Vehicular access to the site is via a four arm priority roundabout on Ferry Road, referenced as Site Access / Ferry Road Roundabout. Site Access / Ferry Road Roundabout operates satisfactorily, although at peak times there is some delay and inconvenience to car drivers at the roundabout, primarily due to traffic queuing back from Ferry Road / Clive Street Junction (four arm signal controlled junction) to the immediate east. At peak retail times, including bank holidays, inconvenience and delay to car drivers can be excessive in the vicinity of the site, primarily due to the proximity of Ikea, which is accessed via the same roundabout as the site, and Cardiff Bay Retail Park.
32. However, there is limited scope for highway capacity improvements in the vicinity of the site, and indeed this approach would be contrary to policy and contrary to the thrust of the Council's Deposit Local Development Plan (DLDP), which is currently part way through an Examination in Public.

33. The DLDP includes the aim of achieving a 50:50 sustainable travel mode split in Cardiff for all journeys i.e 50% by car (33% driver, 17% passenger) and 50% by non-car modes. The DLDP includes a number of strategies to achieve this aim, including enhancements to non-car networks and behavioural change, and a number of strategic sites have been identified to deliver growth in the city in the prescribed manner.
34. Strategic Site B (the site) is well placed to deliver the aims of the LDP due to its location, minimising the distance of a significant proportion of journeys and therefore offering a real opportunity for these journeys to be undertaken on foot, by bicycle or on public transport, and (potential) connectivity to non-car modes.
35. There is real potential to deliver a development in this location which is not car reliant, and therefore the scope and extent of any highway works should focus on pedestrians, cyclists and highway safety improvements rather than highway capacity improvements.

Committed and Future Transport Improvements

36. The committed and future transport improvements in the vicinity of the site are in line with the ethos of the DLDP, and focus on enhancing pedestrian and cyclist connectivity, including:
 - The regeneration / environmental improvement of Penarth Road/ Clare Road/ Corporation Road Junction, including the provision of new pedestrian crossing facilities (at the expense of highway capacity), new pavements, road surface treatment, and the provision of bins, cycle stands and seating.
 - The development of Enfys Route 5, providing a link between Grangetown, the city centre, Cardiff Bay and Cardiff Enterprise Zone, and the provision of a connection between the Taff trail and the Penarth Road area, to connect Enfys Route 5 with the Taff Trail (Enfys Route 8) and the Ely Trail (Enfys Route 42). This route will use the shared cycle/ footway along the southern side of the carriageway on Penarth Road.

Cardiff Council's Deposit LDP

37. The Council's overarching strategy in the Deposit LDP is to achieve a 50:50 sustainable travel mode split for all journeys across the city. To achieve this, the Council will prioritise improvements to the walking, cycling and public transport networks, with less importance placed on highway capacity and the convenience of the car.
38. Therefore, the critical transport element in terms of the delivering any of the strategic sites is demonstrating the sustainability of the site, and the capacity of high capacity networks, such as walking, cycling and public transport, rather than accessibility by car. The high capacity networks in the vicinity of the site are well established, and with some improvement works, could support and deliver significant residential development in this location.

Appendix 4 – Constraints and Opportunities Plan

KEY

Site boundary



Site access



W&W retained operational area



Potential acoustic zone



Retained W&W access



Retained Ikea aervice access



Grade II listed gas holder



IPG alignment (approx)



MPG alignment (approx)



Gas governor



Easement corridor (draft)



Telecoms mast



Landfill gas compound



Council Compound



Footpaths



Service yard overlooking site



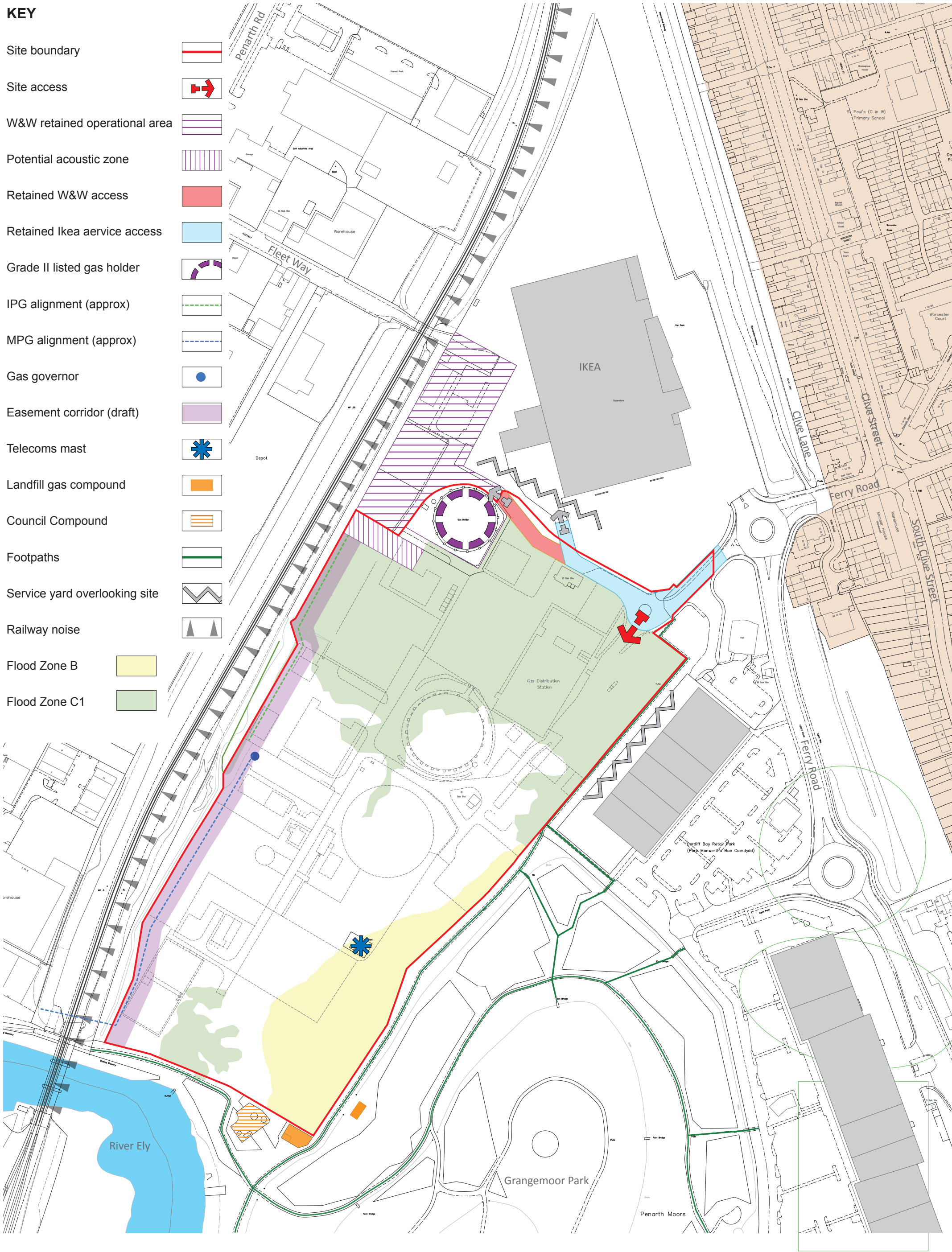
Railway noise



Flood Zone B

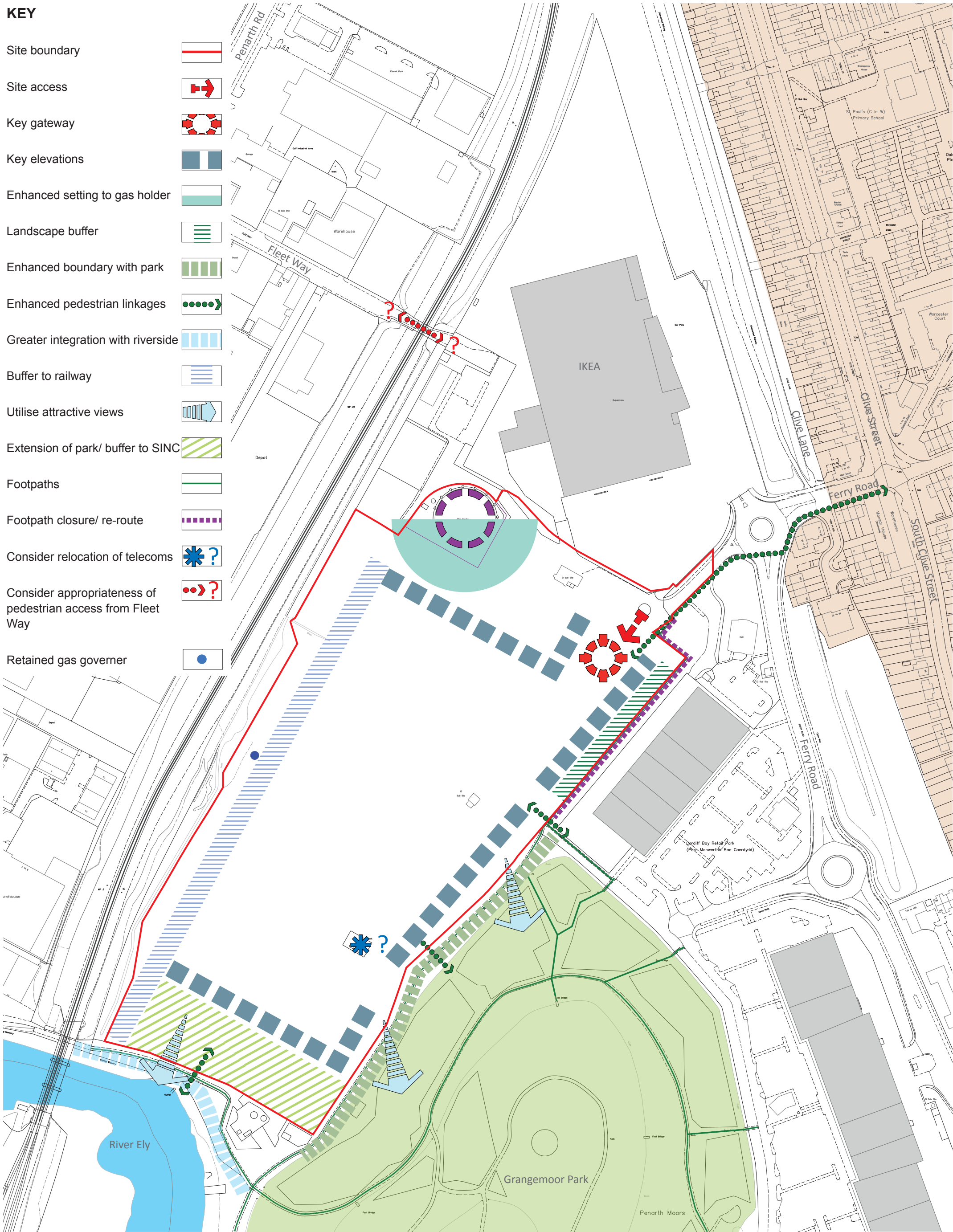


Flood Zone C1

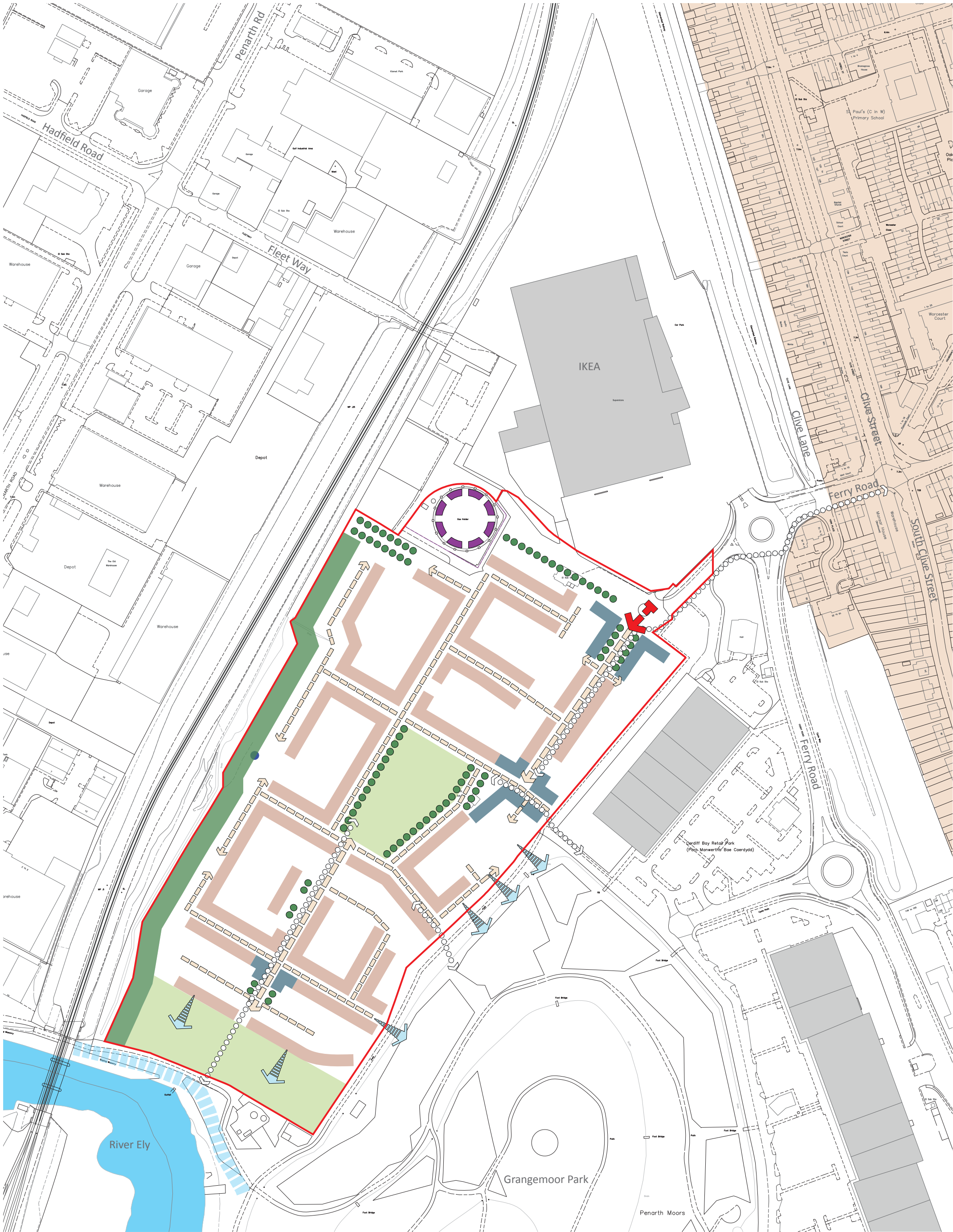


KEY

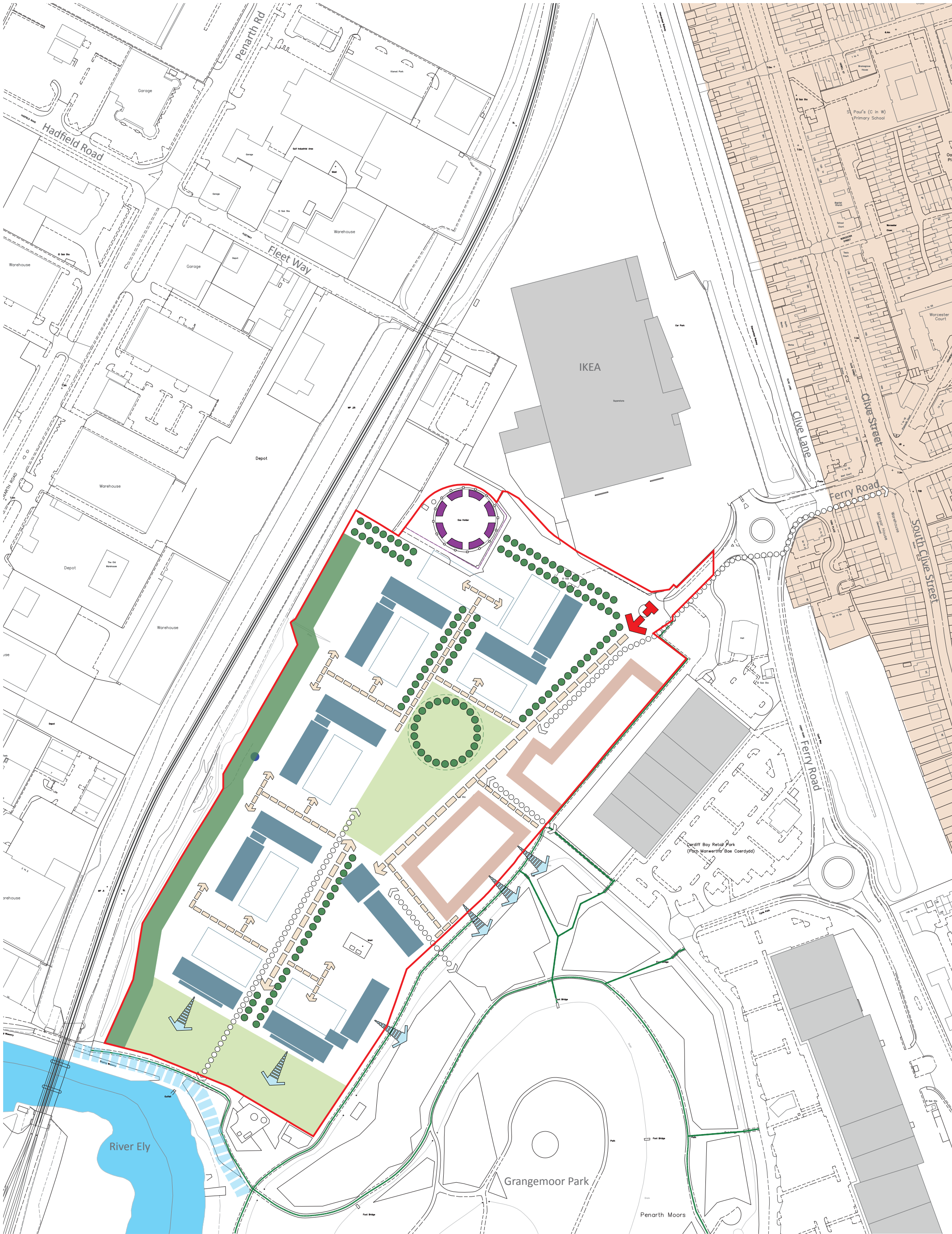
- Site boundary
- Site access
- Key gateway
- Key elevations
- Enhanced setting to gas holder
- Landscape buffer
- Enhanced boundary with park
- Enhanced pedestrian linkages
- Greater integration with riverside
- Buffer to railway
- Utilise attractive views
- Extension of park/ buffer to SINC
- Footpaths
- Footpath closure/ re-route
- Consider relocation of telecoms
- Consider appropriateness of pedestrian access from Fleet Way
- Retained gas governor



Appendix 5 - Illustrative Layout (IL31206-007)

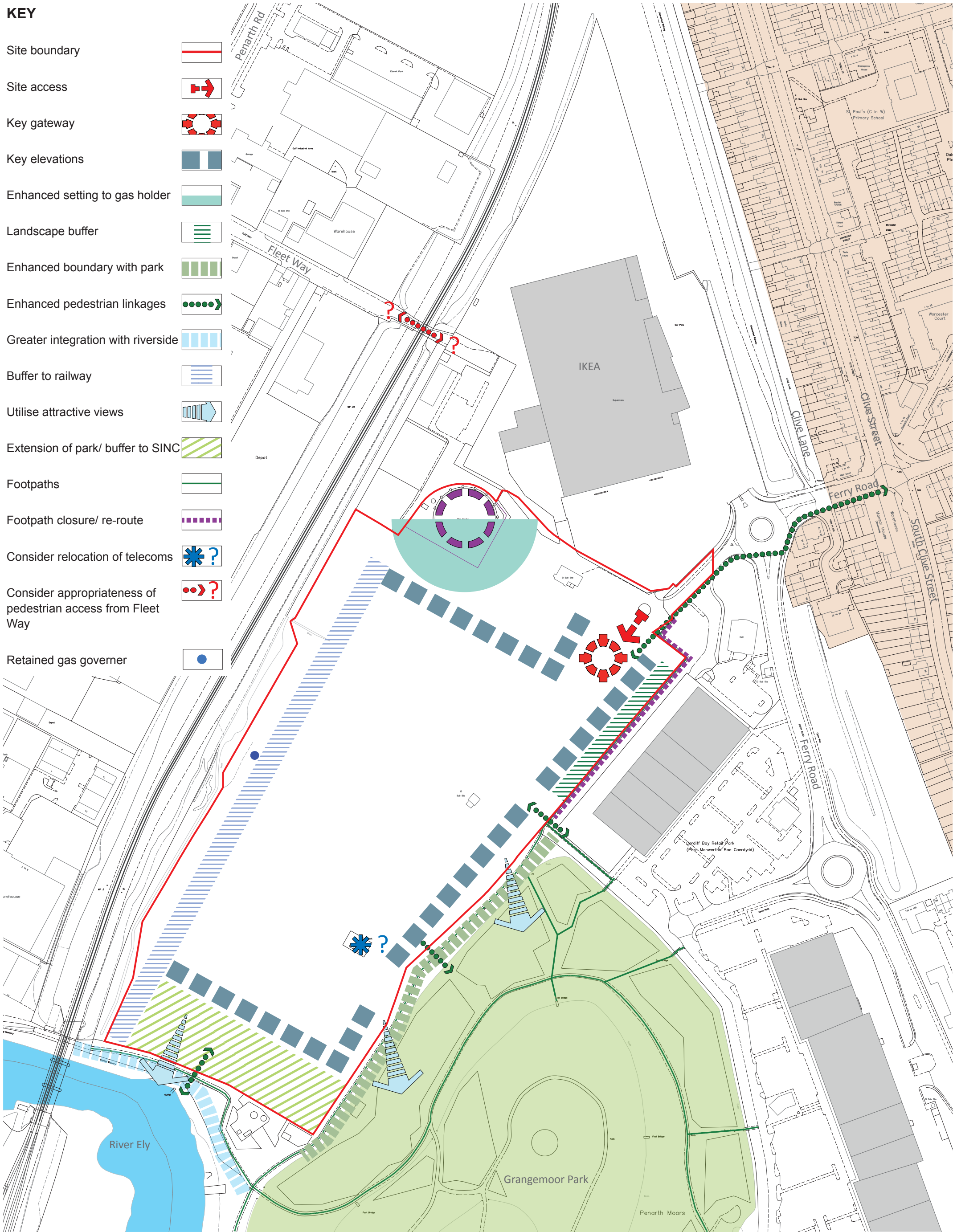


Appendix 6 - Alternative Illustrative Layout (IL31206-005)



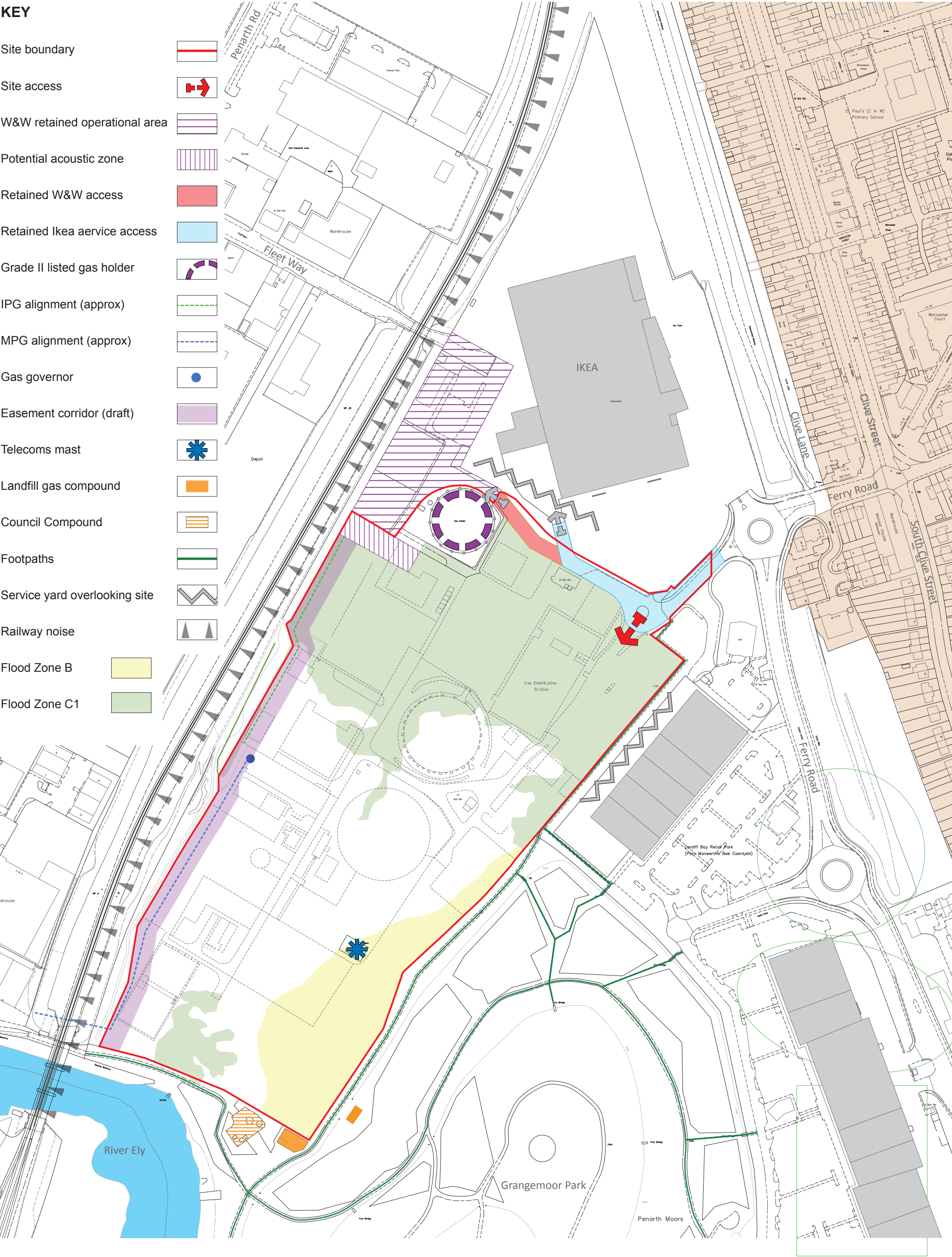
KEY

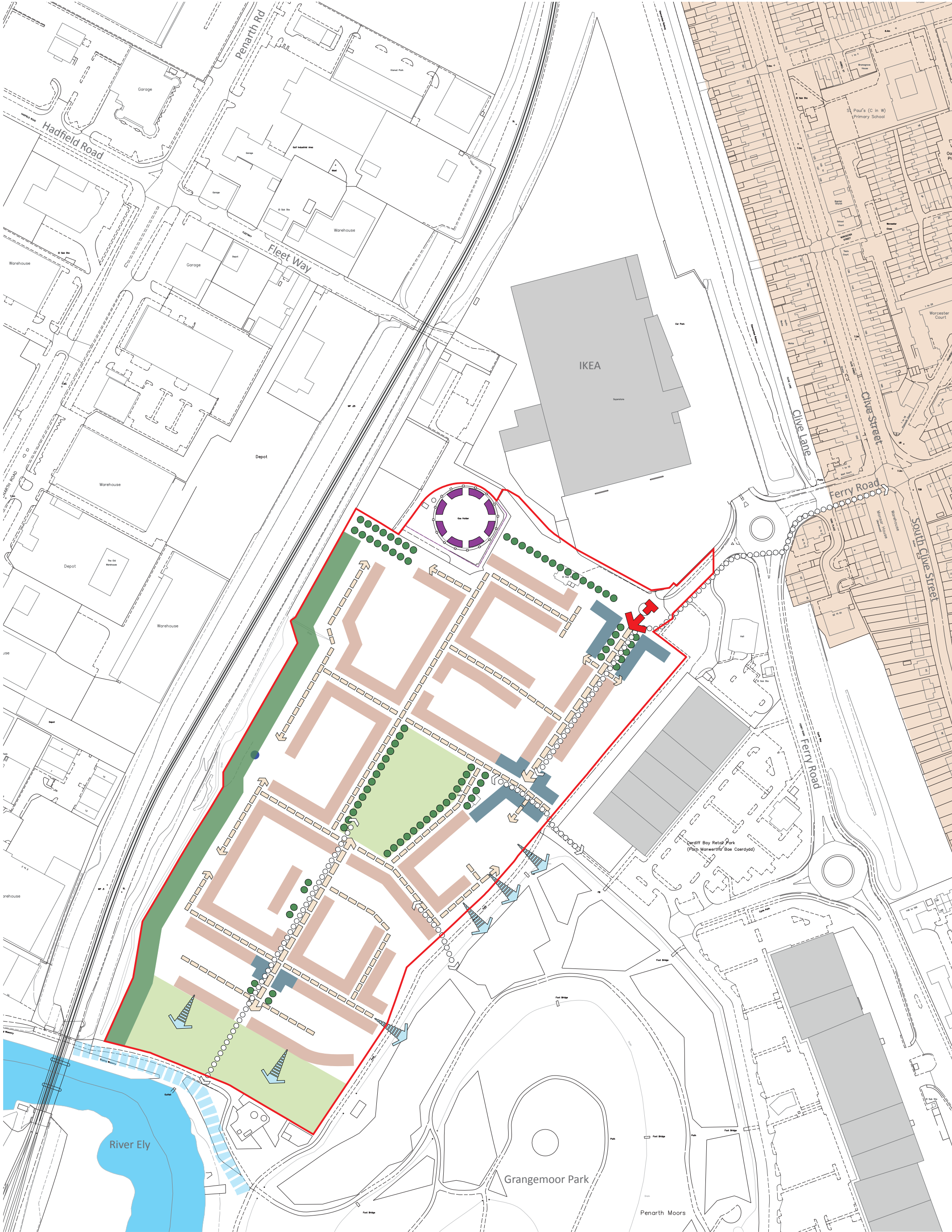
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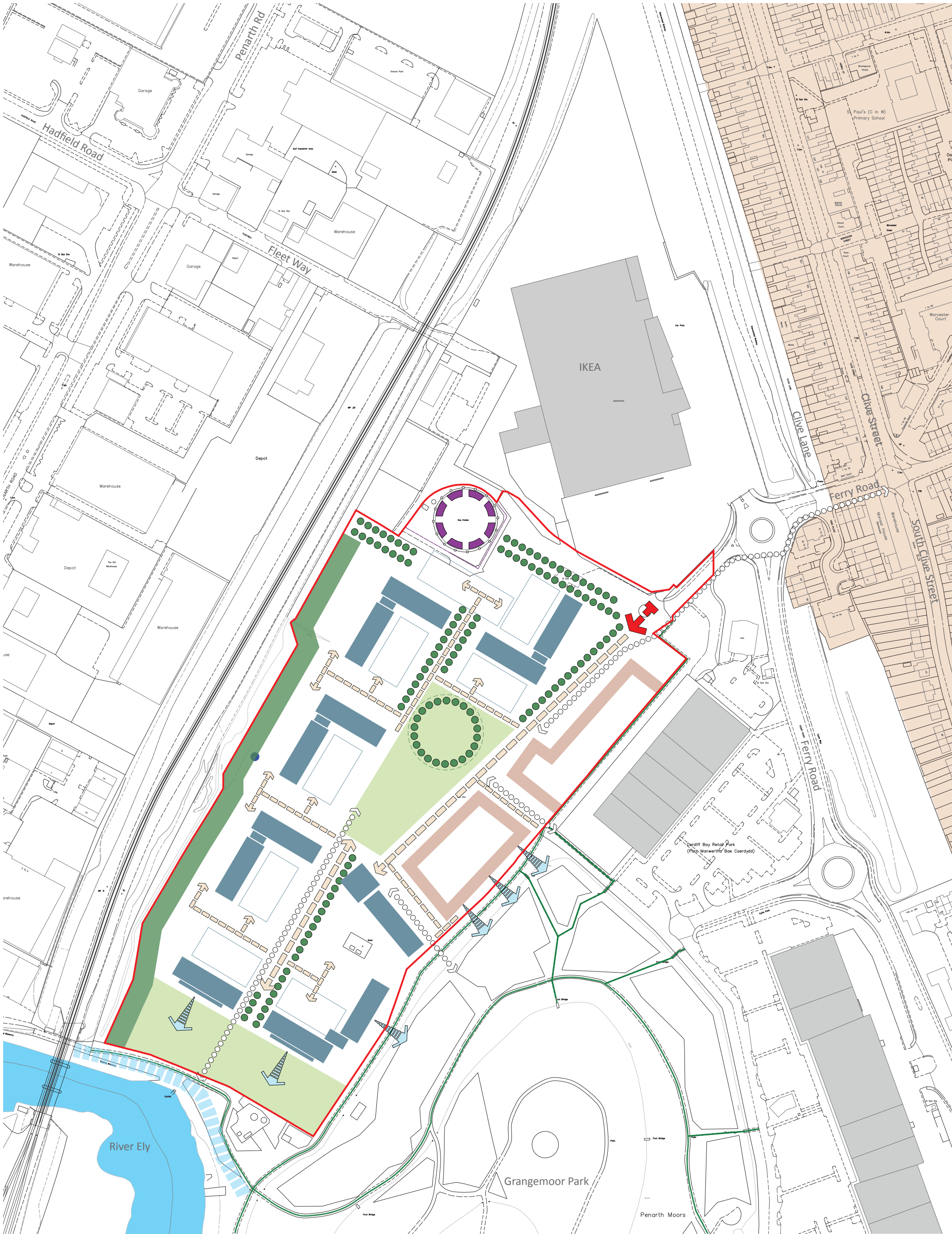


KEY

- Site boundary
- Site access
- W&W retained operational area
- Potential acoustic zone
- Retained W&W access
- Retained Ikea aervice access
- Grade II listed gas holder
- IPG alignment (approx)
- MPG alignment (approx)
- Gas governor
- Easement corridor (draft)
- Telecoms mast
- Landfill gas compound
- Council Compound
- Footpaths
- Service yard overlooking site
- Railway noise
- Flood Zone B
- Flood Zone C1







Transport Review

Former Gas Works, Ferry Road, Grangetown, Cardiff

TN01-W151645-IS-Transport Review-01

22nd April 2015

Introduction

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Site Accessibility

Walking

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3. The Ely Trail provides a pleasant and attractive walking route, and provides traffic free connections to Cardiff Bay and to Penarth Road. However, the Ely Trail is unlit, which reduces the attractiveness of the route in the hours of darkness.
4. The footway to the north of the site access connects to Site Access / Ferry Road Roundabout, and whilst this roundabout has some pedestrian provision, it is inadequate and unattractive, with sub-standard crossing facilities and an excessive provision of guard railing.

**Photograph 1 –
Site Access / Ferry Road Rbt**

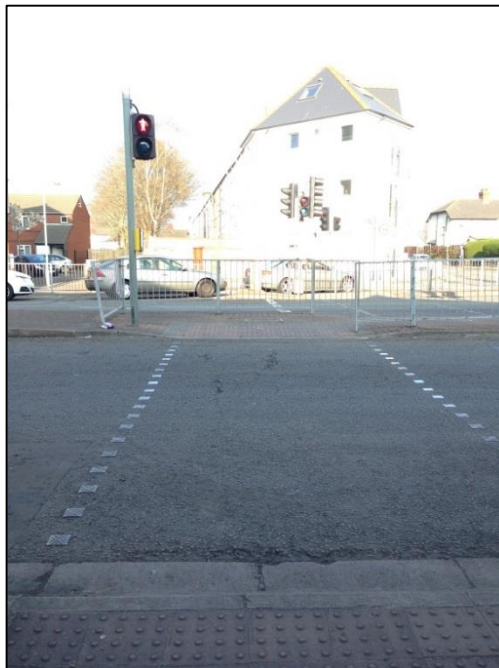


Photograph 2 – Site Access / Ferry Road Roundabout

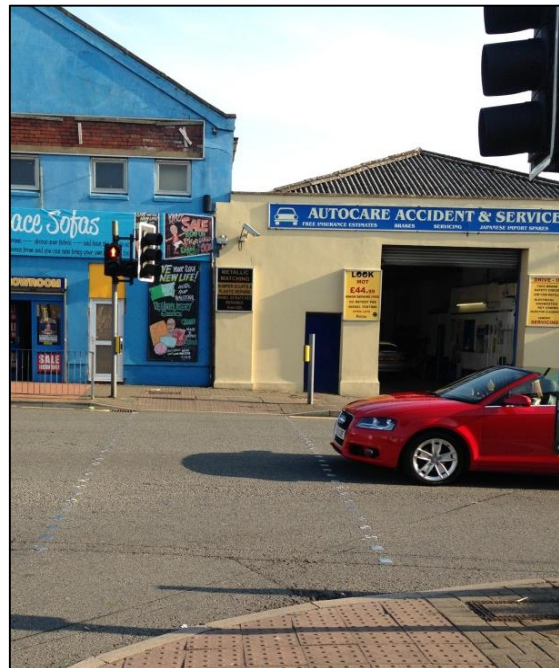


5. Therefore, pedestrian (and cyclist) improvements would be required at the Site Access / Ferry Road Roundabout to enhance the accessibility of the site.
6. The provision for pedestrians (and cyclists) at Ferry Road / Clive Street Junction is also sub-standard, with narrow footways / small pedestrian refuges and excessive guard railing, and environmental improvements to this junction to improve facilities for pedestrians (and cyclists) would be required to enhance the accessibility of the site.

**Photograph 3 –
Ferry Road / Clive Street Junction**



**Photograph 4 -
Ferry Road / Clive Street Junction**



7. Ferry Road extends south of the Site Access/ Ferry Road Roundabout and provides good pedestrian (and cycle) facilities. There is a segregated footway/ cycleway on one side of the road, and a footway exists on both sides. Lighting is present along the extent of this road.
8. North of Ferry Road/ Clive Street Junction, pedestrian provision is good, with street lighting present.
9. The Council has recently undertaken pedestrian and cycle improvement works on Penarth Road, providing a shared footway / cycleway adjacent to the southbound carriageway, enhancing the connectivity of Grangetown rail station. The potential may exist for the site to connect to this new footway / cycleway directly, by re-establishing a connection via Fleet Way, under the existing railway bridge.

Photograph 5 -

Footway / Cycleway – Grangetown



Photograph 6 –

Footway / Cycleway – Penarth Road



Cycling

10. The terrain in the immediate vicinity of the site is flat, and the topography of the city of Cardiff as a whole is conducive to cycling.
11. The site is well placed in terms of cycling, directly connected to the Ely Trail, and to the cycleway network leading to Cardiff Bay.
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Figure 1 – Cycle Infrastructure



13. In the vicinity of the site the Ely Trail is of a good standard, and benefits from route improvements on Penarth Road, with a toucan crossing provided to assist the movement of pedestrians and cyclists in this location.

Photograph 7 – Ely Trail



Photograph 8 – Ely Trail (Penarth Road)



14. A segregated cycleway is provided on Ferry Road towards Cardiff Bay, and between the site access and Ferry Road/ Clive Street junction there is a shared cycleway/ footway.

15. However, as noted in the previous walking section, environmental improvements would be required at Site Access /Ferry Road Roundabout and Ferry Road / Clive Street Junction to improve the accessibility of the site for cyclists.
16. Whilst the provision for cyclists travelling south along Ferry Road is good, provision for cyclists to the east and north is in the form of on-road routes, with limited dedicated provision for cyclists.

**Photograph 9 – Ferry Road (south)
Pedestrian/ Cycle Provision**



**Photograph 10 – Shared Cycle Footway
on Ferry Road (east)**



Bus

17. The nearest bus stops to the site on Ferry Road are 'Staples, south-east bound' and 'Staples, north-west bound'. These stops, which are circa 410 and 430 metres from the centre of the site respectively, are well equipped with shelters, benches, timetables and bins.

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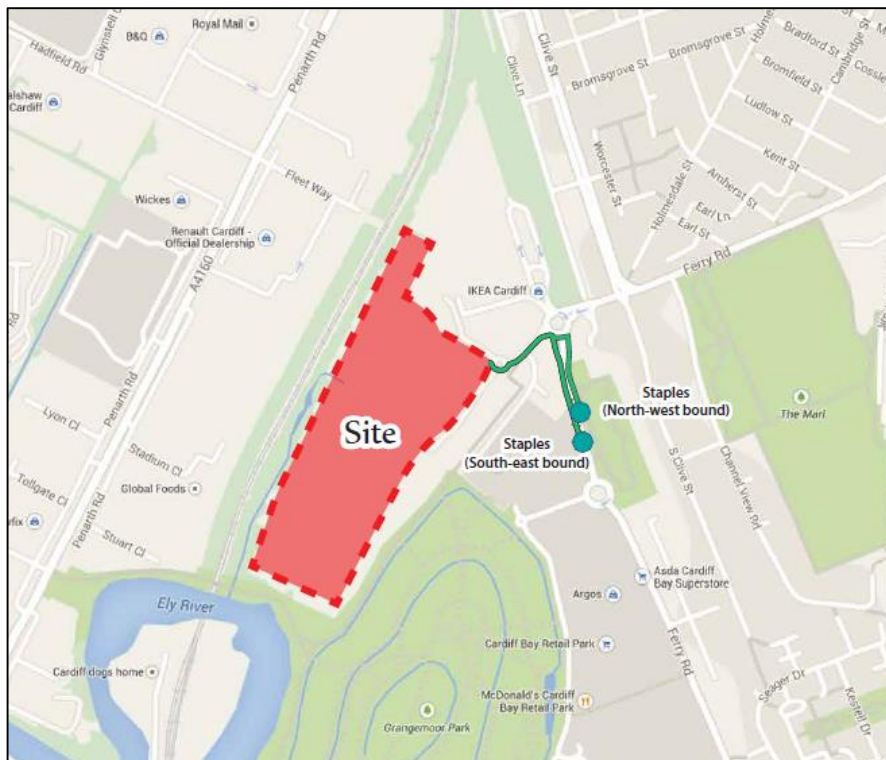


Photograph 12 – Staples, n-w bound



18. The walking route from the site to the 'Staples' bus stops is shown in **Figure 2**.

Figure 2 – Walking Route to 'Staples' Bus Stops



19. The nearest bus stops to the site on Penarth Road are 'Sorting Office, south-west bound' and 'Sorting Office, north-east bound'. These stops are located circa 630 and 1260metres respectively from the centre of the site via the potential route on Fleet Way. 'Sorting Office south-west bound' is equipped with a timetable and sign, whereas 'Sorting Office north-east bound' benefits from a dedicated layby, shelter, seat and timetable.

20. 'Sorting Office, north-east bound' is made difficult to reach by foot from the site due to a lack of appropriate crossing facilities over Penarth Road.

Photograph 13 – Sorting Office, s-w bound

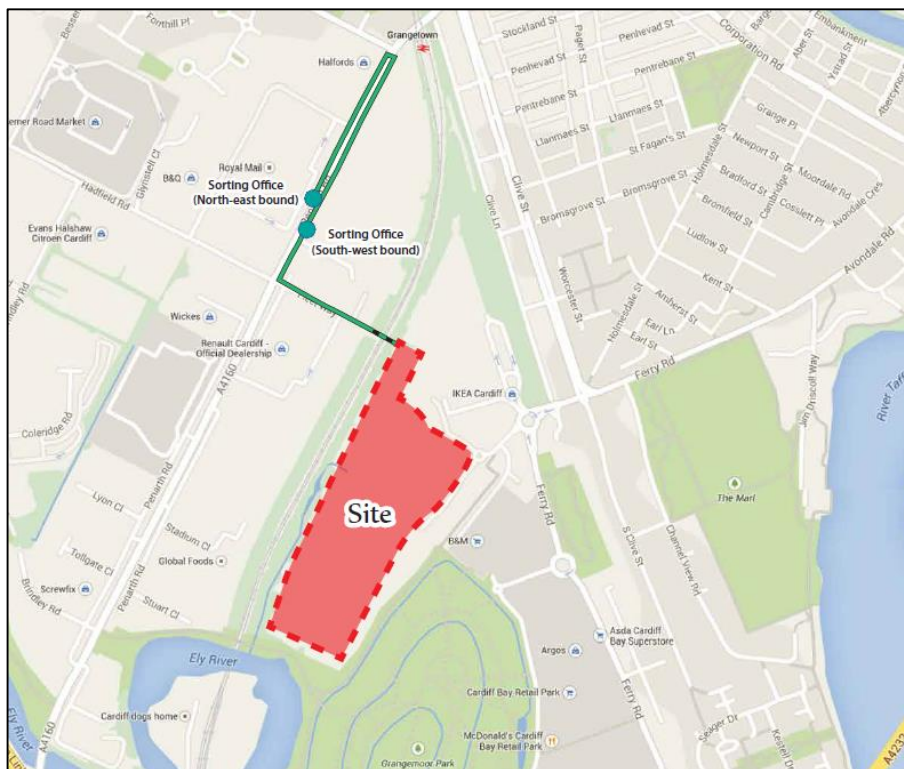


Photograph 14 – Sorting Office, n-e bound



21. The potential walking route from the site to the 'Sorting Office' bus stops is shown in **Figure 3**. The walking to the north-east bound bus stop is convoluted due to a lack of pedestrian crossing facilities at Hadfield Road / Penarth Road / Fleet Way Junction, and pedestrian improvements to this junction could be provided to enhance the connectivity of the site to public transport.

Figure 3 – Potential Walking Route to Sorting Office Bus Stops



22. A summary of the bus services serving the bus stops on Ferry Road and Penarth Road is provided in **Table 1**.

Table 1 – Summary of Bus Services

No.	Route	Frequency			Bus Stop
		Mon – Fri	Sat	Sun	
92	Cardiff – Penarth – St. Luke’s Avenue	3/ hour	3/ hour	1/ hour	Sorting Office (NE and SW bound)
93	Cardiff – Penarth – Dinas Powys – Barry	1/ hour	1/ hour	-	Sorting Office (NE and SW bound)
94	Cardiff – Penarth – Sully - Barry	3/ hour	3/ hour	1/ hour	Sorting Office (NE and SW bound)
9	Cardiff City Centre – Sports Village	3/ hour	3/ hour	2/ hour	Staples (NW and SE bound)
9B	Cardiff City Centre – Windsor Quay	3/ day	-	-	Staples (NW and SE bound)
89A	Cardiff – Cardiff Bay – Llandough – Dinas Powys	Every 2 hours	Every 2 hours	-	Staples (NW and SE bound)
89B	Cardiff – Penarth – Llandough	Every 2 hours	Every 2 hours	-	Staples (NW and SE bound)
304	Cardiff - Barry	1/ hour	1/ hour	Every 2 hours	Staples (NW and SE bound)
616	Cardiff Sloper Road – Bishop of Llandaff HS	School Bus – 1/ day in both directions	-	-	Staples (NW and SE bound)
93S	Grangetown – Penarth (St Cyres School)	School Bus – 1/ day in both directions	-	-	Staples (NW and SE bound)

23. **Table 1** demonstrates that the site is well placed in terms of bus accessibility, provided a connection to Penarth Road is established. Regular services on Penarth Road offer easy access to destinations including Cardiff City Centre, Penarth and Barry. Many of these services operate on a less-than hourly service.
24. Bus provision on Ferry Road includes routes operating at 3 per hour, hourly and 2 hourly basis to destinations such as Cardiff City Centre, Cardiff Bay, Penarth, Llandough and Barry.
25. Two dedicated school bus services run from Staples bus stops on Ferry Road, providing transport to Bishop of Llandaff High School and St Cyres School.

26. Currently, there is no direct access between the site and Penarth Road. However, there is the potential to open up a pedestrian and cyclist route between the site and Penarth Road via Fleet Way, utilising an existing route under the railway bridge. Further investigation would be required to understand the potential viability of bringing this route into public use, but improvement works would provide an area wide benefit, enhancing connectivity for all existing residents, particularly to bus stops on Penarth Road and Grangetown rail station. The existing route is shown in **Photograph 15**.

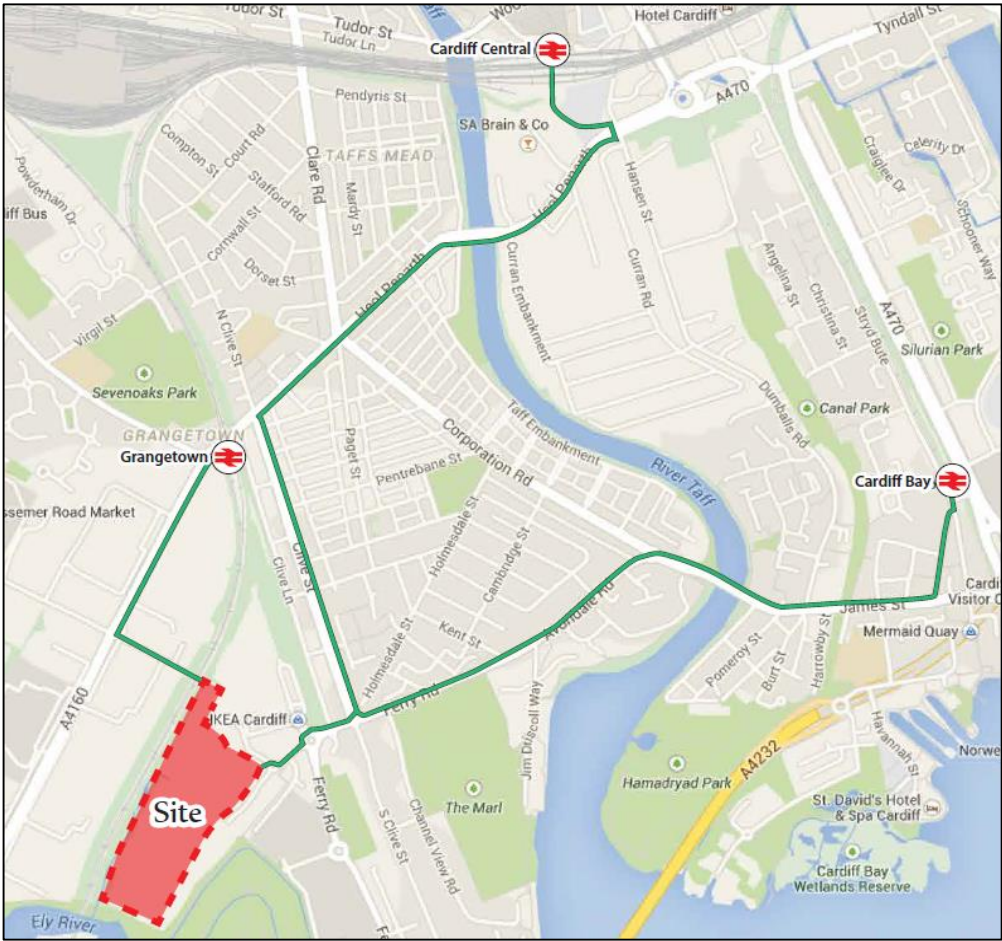
Photograph 15 – Existing Link connecting to Fleet Way



Rail

27. There are three rail stations within close proximity of the site, Grangetown (990 metres), Cardiff Bay (2.1km) and Cardiff Central (2.4km). The walking / cycling route to each rail station, on the basis that the route via Fleet Way is re-established, is shown in **Figure 4**.

Figure 4 – Walking Routes to Rail Stations



28. A summary of the key destinations served and the frequency of services is provided in **Table 2**.

Table 2 – Summary of Rail Services

Station	Destination	Journey Time	Frequency
Grangetown	Barry Island	26 minutes	Every 15 minutes
	Merthyr Tydfil	1hr 12 minutes	Every 30 minutes
	Penarth	11 minutes	Every 15 minutes
	Bargoed	53 minutes	Every 16 minutes
	Aberdare	1hr 12 minutes	Every 30 minutes
	Bridgend	52 minutes	Every hour
	Rhymney	1hr 10 minutes	Every 75 minutes
Cardiff Bay	Cardiff Queen Street	4 minutes	Every 12 minutes
Cardiff Central	Fishgaurd Harbour	2 hours 52 minutes	3/ day
	Radyr	18 minutes	5 – 15 minutes
	Treherbert	1 hour 4 minutes	Every 30 minutes
	Cheltenham Spa	1 hour 23 minutes	25-45 minutes
	Maesteg	53 minutes	Every hour
	Chester via Shrewsbury	2 hours 44 minutes	Every hour
	Coryton	22 minutes	Every 30 minutes
	London Paddington	2 hours 5 minutes	Every 30 minutes
	Portsmouth Harbour	3 hours 24 minutes	Every 25 minutes
	Ebbw Vale Parkway	57 minutes	Every hour
	Nottingham	3 hours 18 minutes	Every hour
	Manchester Piccadilly	3 hours 25 minutes	Every hour
	Swansea	55 minutes	16- 36 minutes

29. **Table 2** demonstrates that the three closest rail stations to the site serve a large number of key destinations. Grangetown is located nearest to the site, and sees frequent services to local key termini, whereas Cardiff Central allows rail travel wider afield to destinations including London, Nottingham, Manchester, and Portsmouth.

30. The site can be considered well placed in terms of rail provision.

Highway Network

31. Vehicular access to the site is via a four arm priority roundabout on Ferry Road, referenced as Site Access / Ferry Road Roundabout. Site Access / Ferry Road Roundabout operates satisfactorily, although at peak times there is some delay and inconvenience to car drivers at the roundabout, primarily due to traffic queuing back from Ferry Road / Clive Street Junction (four arm signal controlled junction) to the immediate east. At peak retail times, including bank holidays, inconvenience and delay to car drivers can be excessive in the vicinity of the site, primarily due to the proximity of Ikea, which is accessed via the same roundabout as the site, and Cardiff Bay Retail Park.
32. However, there is limited scope for highway capacity improvements in the vicinity of the site, and indeed this approach would be contrary to policy and contrary to the thrust of the Council's Deposit Local Development Plan (DLDP), which is currently part way through an Examination in Public.

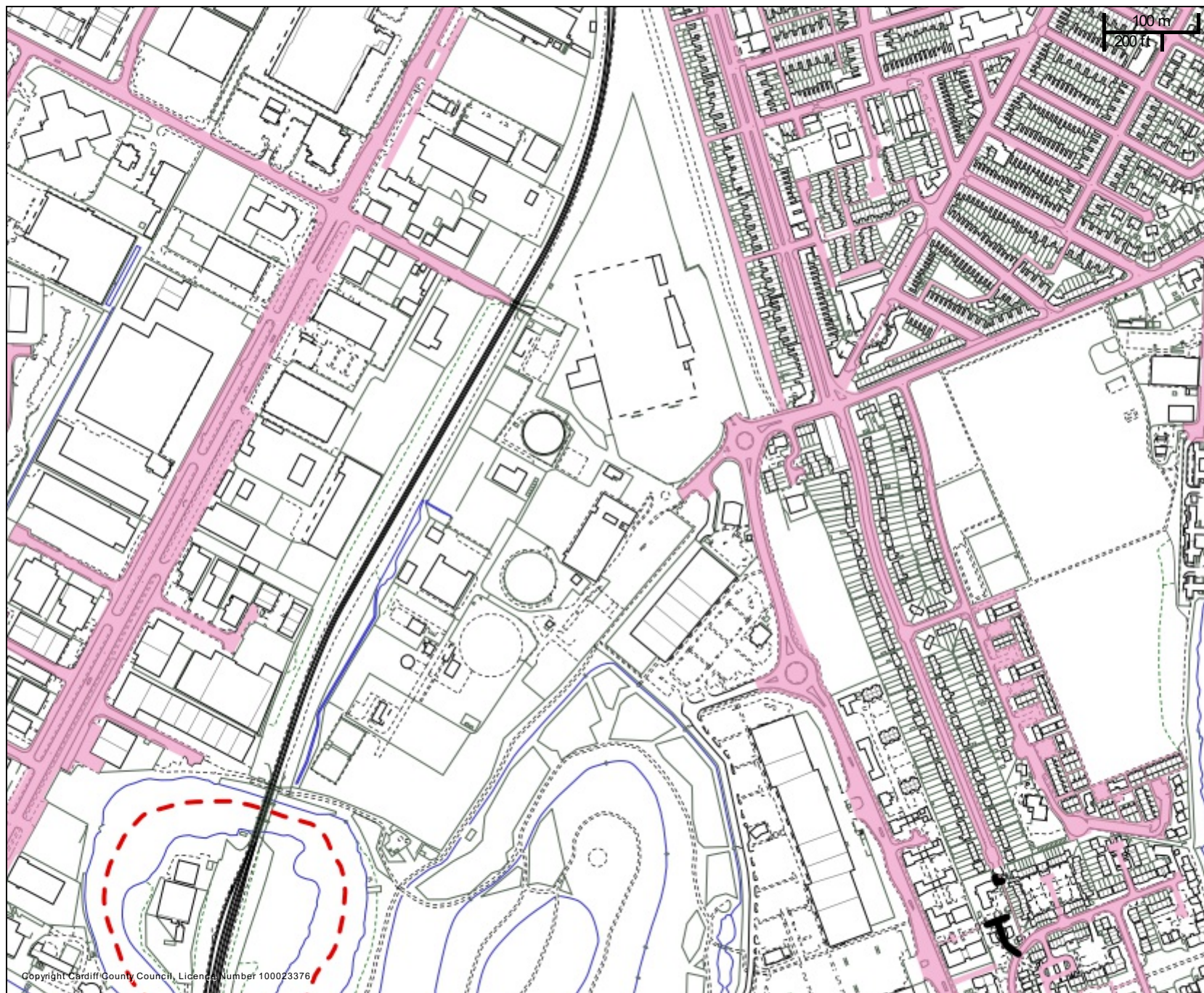
33. The DLDP includes the aim of achieving a 50:50 sustainable travel mode split in Cardiff for all journeys i.e 50% by car (33% driver, 17% passenger) and 50% by non-car modes. The DLDP includes a number of strategies to achieve this aim, including enhancements to non-car networks and behavioural change, and a number of strategic sites have been identified to deliver growth in the city in the prescribed manner.
34. Strategic Site B (the site) is well placed to deliver the aims of the LDP due to its location, minimising the distance of a significant proportion of journeys and therefore offering a real opportunity for these journeys to be undertaken on foot, by bicycle or on public transport, and (potential) connectivity to non-car modes.
35. There is real potential to deliver a development in this location which is not car reliant, and therefore the scope and extent of any highway works should focus on pedestrians, cyclists and highway safety improvements rather than highway capacity improvements.

Committed and Future Transport Improvements

36. The committed and future transport improvements in the vicinity of the site are in line with the ethos of the DLDP, and focus on enhancing pedestrian and cyclist connectivity, including:
 - The regeneration / environmental improvement of Penarth Road/ Clare Road/ Corporation Road Junction, including the provision of new pedestrian crossing facilities (at the expense of highway capacity), new pavements, road surface treatment, and the provision of bins, cycle stands and seating.
 - The development of Enfys Route 5, providing a link between Grangetown, the city centre, Cardiff Bay and Cardiff Enterprise Zone, and the provision of a connection between the Taff trail and the Penarth Road area, to connect Enfys Route 5 with the Taff Trail (Enfys Route 8) and the Ely Trail (Enfys Route 42). This route will use the shared cycle/ footway along the southern side of the carriageway on Penarth Road.

Cardiff Council's Deposit LDP

37. The Council's overarching strategy in the Deposit LDP is to achieve a 50:50 sustainable travel mode split for all journeys across the city. To achieve this, the Council will prioritise improvements to the walking, cycling and public transport networks, with less importance placed on highway capacity and the convenience of the car.
38. Therefore, the critical transport element in terms of the delivering any of the strategic sites is demonstrating the sustainability of the site, and the capacity of high capacity networks, such as walking, cycling and public transport, rather than accessibility by car. The high capacity networks in the vicinity of the site are well established, and with some improvement works, could support and deliver significant residential development in this location.



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Title
Scale: 1:6000
Printed on: 29/6/2015

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FERRY ROAD, GRANGETOWN

FLOOD RISK SCOPING REPORT

Introduction

FMW Consultancy have been appointed by Nathaniel Litchfield and Partners (acting on behalf of National Grid) to provide a Flood Risk Scoping Report for land at Ferry Road, Grangetown. The scoping report will be used to inform potential purchasers of the site of likely constraints related to flooding and drainage and provide guidance on the scope of work that would be needed to address these issues as part of a planning application.

Existing Conditions

In flood risk terms, the site (which is referred to as 77LBR in the Local Plan) is constrained as follows:

On the TAN 15 Development Advice Map the site is almost entirely within Zone C1. This means that in theory highly vulnerable development (such as residential development) is permissible subject to compliance with TAN 15 criteria.

In this instance the relevant criteria includes:

1. Whether the site is allocated in a Development Plan or is a Brownfield Site
2. Whether technical criteria, defined by TAN 15 relating to the severity of extreme flooding is complied with.

Fluvial and Tidal Flooding has been assessed in detail through hydraulic modelling. This modelling is a prime reference document for the Cardiff Council Strategic Flood Consequence Assessment (SFCA) 2011. This modelling shows that the site is flood free during a 100 year fluvial event. It also shows that the site is flood free during a 1 in 200 year tidal event. The northern part of the site is flooded during a 1 in 1000 year (0.1%) event, but flood depth and velocity maps suggest that flooding will be within acceptable limits as defined by TAN 15.

Surface Water flooding theoretically impacts upon the site. It is not clear at this stage where exactly the surface water flows originate. There is a medium to high risk of surface water flooding in the site.

Sewer flooding has been experienced in the past, most notably on Clive Road in 2001. DCWW hold numerous records of sewer flooding, and the SFCA advises that the potential adverse effect of development of Site 77 on the existing sewer network would need to be further investigated as part of site specific assessment.

Groundwater is not considered to be a significant issue within the catchment (as stated in the Ely and Taff Catchment Flood Management Plan). Groundwater monitoring is an ongoing

obligation for the Cardiff Harbour Authority until 2019. Discussions with Cardiff Land Drainage team (Gary Jenkins and Ian Tythterington) revealed that there have been no instances of groundwater flooding in the area, and this is not likely to be a development constraint.

Consultations

Natural Resources Wales (NRW): Consultation with Rebecca Loder (Flood Risk Specialist) revealed that NRW would accept the use of the Cardiff SFCA November 2011 as the prime reference document. As this report provides strong evidence supporting the fact that the site would be capable of delivering a TAN 15 compliant residential development, then in that case it is unlikely that NRW would object to such a proposal.

Cardiff Council (CC): Gary Jenkins, Cardiff's Land Drainage officer was consulted. Gary commented that in terms of flood risk and drainage his authority did not have any records of Council owned drainage in the area. Gary did comment that there were outfalls into the River Ely, and these were probably outfalls for either privately owned surface water sewers, or sewers owned by DCWW Welsh Water. During the site visit two outfalls were seen on site. Refer to photographs below.



Submerged Outfall



Large Culvert Outfall

Cardiff Council (CC): Gary Jenkins confirmed that whilst groundwater monitoring was ongoing, and had been since the construction of the Cardiff Bay Barrage, there had been no witnessed incidents of groundwater flooding, and this is not viewed as a major concern. It was noted however that the underlying ground was likely to be contaminated, meaning that soakaways were probably unsuitable even if infiltration rates proved to be good.

Surface Water Drainage

A detailed analysis of the current drainage regime falls outside the scope of this report. However, the following facts will help to provide guidance on the likely surface water drainage strategy that would be needed to support a planning application:

The existing site is extensively hard surfaced and will almost certainly have a positive drainage network leading to existing outfalls. It is likely that a residential development of the

site (even a dense residential development) will have the effect of reducing the hard surface and potentially reduce the rate of peak run off from the site. See photographs below which are typical of the surfacing across the site.



The site has a large area of impermeable surfacing

If it is reasonably assumed that infiltration methods will not be suitable (due to groundwater levels), then a positive drainage outfall to a watercourse is the preferred alternative option. In this instance a free discharge may be acceptable due to the hydraulic nature of Cardiff Bay where water levels are controlled. In this instance the maximum rate of discharge of surface water may be governed by the capacity of existing outfall pipes (rather than a calculation of greenfield run off). There appears to be two possibly watercourses for discharge: Firstly there is a minor watercourse adjacent to the western boundary between the development and the railway line. Secondly there is the River Ely to the south, into which existing culverts can be seen to be discharging (see previous photos).

The capacity of the existing surface water drainage outfall should be considered and this will determine the potential volume of attenuation (if any) that may be needed for the development.

Conclusions

In planning terms the entire site passes the most critical test: Complying with key TAN 15 criteria. This means that in principle the site can be developed for a wide range of uses including highly vulnerable housing.

A planning application will have to be accompanied by a robust Flood Consequence Assessment (FCA).

The key issues to address will be:

- ✓ To prove that the extreme fluvial and tidal events do not cause flooding that exceeds TAN 15 criteria. (This should be possible to demonstrate using existing hydraulic modelling so the potential costs of commissioning a new model should be avoidable)

-
- ✓ To prove that surface water flooding can be managed within the site ensuring that no property floods during a 100 year plus climate change event, and that flood risk is not increased outside the site boundary. (This will require a detailed understanding of overland flow routes and care during the masterplanning stage. Flood Risk and Drainage engineers will need to work in tandem with the layout designers and other professionals in the design team)
 - ✓ If dwellings are to be located within the 1000 year flood outline of zone C1 (the Northern end of the site), there may be an aspiration by the planning authority for flood resilient construction methods.
 - ✓ By a Sustainable Drainage Strategy ensure that run off from the development will not increase the risk of flooding offsite. Through negotiation with the local land drainage authority, it would seem reasonable to assume that ultimately there would not be a restriction on flow rates into the Bay (with the controlled water level).
 - ✓ It is almost certain that infiltration will not be viable, and this will limit the range of SUDs that could be incorporated.
 - ✓ Groundwater is unlikely to be a significant constraint but an assessment will almost certainly be needed to accompany the planning application

FMW Consultancy Ltd

17 April 2015



Briefing Note

Our ref 31206/JCO/SG
Date 11 June 2015
To Richard Williams, Stewart Kellie
From Sarah Goy
Copy Cem Kosaner, John Cottrell, James Blundell, Arwel Evans

Subject Ferry Road: Landfill Gas Apparatus

- 1.1 The following note provides a brief resume of the landfill gas (LFG) operation adjacent to the Ferry Road site. It is based upon a discussion with Dr. Neil Filkin, Technical Services and Initiatives Manager for Infinis, operators of the landfill gas facility <http://www.infinis.com/>
- 1.2 By extracting LFG from landfill sites Infinis fulfils an important role in helping waste management companies meet their environmental compliance obligations. The LFG is then used to generate power.
- 1.3 The bio-gas comprises approximately 60% methane and 40% carbon dioxide.
- 1.4 The sites are monitored from the company's headquarters in Northampton.
- 1.5 The process for the extraction and conversion of the gas into power is as follows:
- Gas wells are drilled into the site
 - Perforated plastic pipes (approx.. 10-15cm diameter) are sunk into the ground and connected to a wider collection network
 - LFG is pumped out and fed through to the compound
 - It is then fed into an engine which in turn generates power
- 1.6 Operationally the on-site generators also have oil tank storage.
- 1.7 The processing of the gas continues 24/7 and should there be an engine failure, or if the facility goes 'off grid' the LFG is burnt off – known as a 'flare'. These are infrequent. Some facilities have enclosed flares. Given Richard's knowledge we concluded that the Ferry Road site must have an open flare (although this should be confirmed). We discussed the potential opportunity for future developers to provide a closed flare in order to reduce the visual impact and possible perceived risk of danger resulting from any burn off.
- 1.8 On the question of noise emanating from the compounds, this is a result of the pumps and generators and as such is continuous, as is the production of exhaust gases. Exhaust emissions are regulated.

- 1.9 Air/noise modelling would be required to look at these specific issues in order that the local conditions can be understood, and inform 'set back' distances from the compounds. Such investigations are undertaken by developers.
- 1.10 Screening, acoustic fences and/or bunding of the compounds is often employed to mitigate against noise/ odour. Bunding to all four sides may restrict airflow or affect operations and as such, be avoided.
- 1.11 In conclusion the facilities are low risk but can be perceived as a poor neighbour to development, particularly residential. Air/noise modelling should inform appropriate proximity of development and mitigation measures.
- 1.12 Neil would be happy to discuss any further queries, his details are as follows:

Dr. Neil Filkin

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Infinis

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No. 3 Gasholder, Grangetown

Structural and Condition Assessment

18/11/2016





Executive Summary

The following report documents the findings of a structural and paint survey undertaken for No. 3 Gasholder, located at the former gasworks off Ferry Road, Grangetown.

The gasholder was generally found to be structurally sound but in need of remediation of the existing corrosion protection system. Abrasive blasting will be required to remove the existing paint and it is likely that the true condition of the wrought ironwork will only then become known. It is expected that some remedial works and repairs will be required.

It is recommended that Wales & West Utilities address the issues associated with a loose tie-rod and cantilever beam. It is also considered prudent to consider removing redundant plant and access ladders if allowed to do so within the restrictions for a listed structure. Several guide channels and brackets that are in poor condition could also be removed.

Document No.:	1302-RPT-001				
Title:	No. 3 Gasholder, Grangetown – Structural & Condition Assessment				
Rev	Date	By	Reviewed	Approved	Description
0	11/11/16	KVG	MGG	KVG	
1	16/11/16	KVG / IN / RR	LOD	LOD	Painting spec' and budget costs added.
2	18/11/16	KVG / IN / RR	LOD	LOD	WWU comments added.
Issue					
Rev	Date	To		Comments	
0	14/11/16	LOD		For comment.	
1	17/11/16	WWU		For comment.	
2	18/11/16	WWU			



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1 Introduction

Wales & West Utilities (WWU) own a now redundant gasholder at its Grangetown site off Ferry Road, Cardiff. The holder was constructed in 1881 and operated by the Cardiff Gas Light and Coke Company, British Gas, and Transco as a storage asset up to the 1990's. The framework of the holder is now Grade II listed as a recognition of the decorate formwork used in its construction.

The former Grangetown gas manufacturing site has been largely demolished, including other gas holders, buildings and offices. Jointly owned by National Grid, the site has considerable development potential and has already seen part of the site turned over to building with the construction of a large Ikea to the northeast.

WWU has commissioned the following work to outline the condition of the gasholder framework, and in turn a specification of works, together with indicative cost estimate, needed to ensure that it can be put in “good and safe” condition. This takes as read that preceding remedial works of crown removal and tank reinstatement, which WWU undertook previously, as meeting required standards and in accord with the listed consent WWU secured at that time.

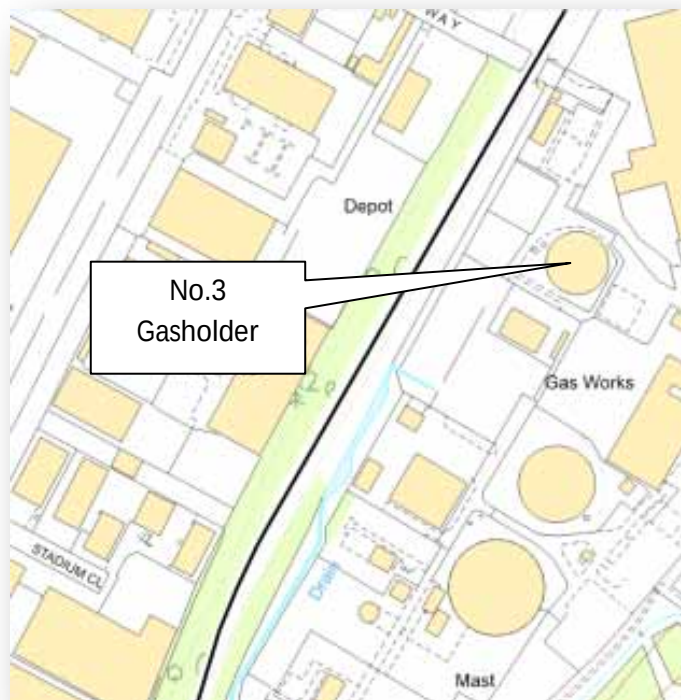


Figure 1 Location plan



2 Scope of Assessment

The study scope has been tasked with;

- Site visit and visual inspection;
- Condition assessment of columns, girders, roller guides and wind ties.
- Structural assessment of columns, girders, roller guides, wind ties and decorative iron / steel work.
- Identify defects and material issues to be addressed.
- Recommend remedial and repair works required.
- Compile the above into a written report detailing the findings, recommendations, specification for remedial works and cost estimate.
- Prepare a photographic Record of Condition.

3 Gasholder No. 3

Grangetown No. 3 water sealed gasholder was constructed in 1881 by the J. & W. Horton Company and comprised of a below-ground tank with two “lifts” for storage of gas. No. 3 gasholder was already decommissioned by the 20th August 1992 when the structure was Grade II listed by CADW (CADW Building ID 14067). The listing was specific to the structure and reason for listing given as “a striking C19 gasholder with literate architectural design to framework”.

The framing comprises of two tiers of 16 No. cast-iron Doric columns supporting panelled entablature blocks with cornices in the manner of Florentine C15 architecture. The Upper tier columns are slightly slimmer than the lower with lighter, narrower entablature blocks. Lattice girders run between the columns at entablature level of both tiers. ‘X’-shaped cross-bracing are affixed between columns on both levels.



Photograph 1 No. 3 Gasholder c.2000



4 Site History

A review of historic maps shows that the Grangetown gasworks comprised of six holders at one time before No.s 1 and 2 were removed in the 1970's. Ikea now occupies the site of these holders.

Water sampling was undertaken by the *Engineer* in c.2000 and a series of photos were taken at the time that shows the holder to be largely intact and complete. It can be observed that breakdown of the paint system was ongoing in c.2000 with visible discolouration of the columns.



Photograph 2 Column No. 1 (c.2000)



Photograph 3 Column No. 4 (c.2000)

The crown, lifts and guide rollers were in place at this time and inspection of the internals of the crown showed the onset of surface rusting and some corrosion at the truss joints. Given that the internal structure would have been subjected to a gaseous atmosphere for much of its life it is unlikely that the corrosion would be representative of other unpainted sections of the holder.



Photograph 4 Internal structure (c.2000)



Photograph 5 Internal structure (c.2000)



Works have recently been undertaken to remediate the Grangetown site including the removal of further gasholders to the south of No.3 Holder, offices and stores. No. 3 Holder crown and lifts were removed at the same time and the tank backfilled with clean suitable imported material. This has left the current structure standing today.



Photograph 6 No. 3 Gasholder 2016

5 Structural Survey

The structural survey was undertaken on Tuesday 25th October in dry and overcast conditions. The *Engineer* and *Coating Inspector* undertook close visual inspections of the columns, bases, guide rails, brackets and fixings from ground level. Access to higher parts of the structure was not attempted as no scaffold or cherry-picker were available. The existing ladders and man-platform were deemed unsafe for use. As such, inspection of higher reaches of the structure has been by visual assessment and use of telephoto camera followed by a final binocular study. The inspection methods were largely non-intrusive with the exception of removal of the corrosion protection system from some small selected areas to view the material or fixings beneath.

Columns are identified numerically from No. 1 through to No. 16. Although two of the columns have No. 3 written upon it, this relates to identification of the holder as part of the existing holder site and not the column itself. Column No. 1 has been taken as near the 10 o'clock position related to magnetic north. This particular column is immediately identifiable as one of two columns fitted with a cast-iron repair collar at its base. Column No. 16, to the immediate left when viewed from inside the structure, has the second.

The general method of inspection was by visual inspection of each column from inside the former tank including the 'x'-bracing and cross-members to the right before a closer study of the column base and walk round of the column. Once inspected the *Engineer* and *Coating Inspector* continued to the next column and repeated the exercise. This methodology ensured a logical photographic and written record.



The final inspection was from outside the security fencing where the *Engineer* worked in a clockwise direction inspecting each column in turn using binoculars.

6 Site Description

The site comprises the gasholder frame and structure which is surrounded by a wire security fence and heras fence panels. The gas holder tank has been backfilled with suitable imported material to correspond to the surrounding ground level. The tank is approximately 45.9m in diameter and is estimated to have been in excess of 30-feet (9m) deep and masonry lined. Some 32 No. vertical channel guides are distributed along the circumference of the tank, the tops of which being visible above the formed ground level. The tank rim is characterised by a concrete sill and kerbing. The kerb is punctuated by the cast-iron columns that are bolted through into the sill. A further concrete arise has been formed behind the kerb.



Photograph 7 Tank edging and kerb

Note tank roller guides between columns protruding above ground level



Photograph 8 Lower column

The column structure is thought to comprise of a substantial cast-iron block and circular plinth held by four long bolts sunken through the sill into the ground beneath. Period literature suggests that these bolts may be up to 14 feet (4m) in length (See Appendix 2). Cast-iron columns some 18m in height and 1.0m diameter sit upon the base. Paint loss suggests the columns are formed from ring like sections and are assumed to be joined using an internal bolted flange. A decorative cast entablature block is fixed above two rings midway up the column with further ring sections and a final entablature block topping the structure. The upper-tier columns appear to be slightly slimmer than the lower with narrower entablature blocks. The inner face of the column has twelve equally distributed cast brackets that hold vertical 150x70mm channel section and on which the guide wheels would have once borne.



Horizontal girders are fitted between neighbouring columns and attached at entablature block level. The girders appear to be formed of wrought iron upper and lower plates with riveted angle sections. Further vertical angle sections are interspersed along the length with flat cross-bracing set across the resulting gaps providing structural strength to the girder.

Finally, two rows of 'x'-shaped cross-bracing formed of 2-inch (50mm) rods meeting at a central ring, are set between the columns. The cross-bracing provides structural strength to the columns, which combined with the girders, prevents the columns toppling.

7 Survey Observations

Column Number (Sequentially numbered clockwise)	Observations and survey records	Percentage exposed metal due to paint loss	
		Column base	Column & entablature blocks
Column No. 1	Substantial cast reinforcement "boot" at column base. Paint loss on northern face (11 to 1 o'clock). Bubbling of paint system and water traps. Cast-iron is generally in good condition beneath paint. Roller guide rail slightly bent and cracked near ground level. Loss of metal on some, but not all, nuts on the reinforcement boot. Lower +ve tie-rods under limited tension and can be pulled on by hand.	15	40
Column No. 2	Steam line pillar +ve of column. Extensive loss of paint system. Loss of diagonal brace bar on +ve lower horizontal girder. Redundant telephone cable anchors affixed to girder. Rope wear/abrasion seen in paint. Redundant instrumentation pillar. Plate holding horizontal steam line heavily corroded. Corrosion at base of guide channel.	40	40
Column No. 3	Extensive paint loss on column. Corrosion and loss of paint on lower -ve 'x'-bracing bracket. Steel circumferential band affixed to column.	50	50
Column No. 4	Extensive paint loss on column. +ve lower 'x'-bracing bracket has been replaced. Marker's plaque obviously removed to allow replacement and two of the four fixings sheared off. Steam line bracket collapsed. Poor structural strength to steam line. Bottom of guide rail sat in water and corroded.	60	20
Column No. 5	Carries steel man ladder and intermediate platform, both suffering corrosion and likely to of poor structural strength . Steam line cladding damaged, galvanised pipe seen beneath. Guide channel heavily corroded near ground level and bracket bolts demonstrating advanced metal loss. Short length of metal seen to be cantilevering over top of upper horizontal girder - potential falling hazard .	20	30



Column No.6	Paint loss on northern face. Small No. 3 medallion affixed to column beneath maker's plaque. Corrosion evident on +ve lower horizontal girder.	10	25
Column No. 7	Steam line cut and concrete kerb removed (to allow for crown demolition). Guide badly buckled and loose at lower extents. Cast-iron guide rail brackets fractured. Vertical steam line seen to be heavily corroded with extensive pipe wall losses. 'X'-bracing bracket seen to have been replaced and heat applied to loosen. Concrete kerb cracked.	20	30
Column No. 8	Guide rail and brackets damaged. New lower 'x'-bracing bracket installed. 'Kent' height measuring instrument cabinet now redundant.	20	20
Column No. 9	Damage to guide rail. Guide rail bracket cracked. Seam between column rings visible through paint but no discernible gap. Paint loss on entablature seen where lower horizontal girder meets.	10	10
Column No. 10	Water trap on -ve face and corrosion. Steam line supply. Steel vessel redundant and may be removed. Paint loss on lower entablature.	10	5
Column No. 11	Some paint loss. Joint between rings visible.	5	5
Column No. 12	Paint loss on lower horizontal girder. Roller guide girder displaced at fourth bracket. -ve girder fixing to entablature observed to be poor condition.	5	10
Column No. 13	Paint loss on entablature. Several water traps in paint system.	5	25
Column No. 14	Damage to lower portion of guide channel. Lower guide bracket shattered. Redundant vertical steam line to tank. Water trapped under paint system on entablature. Upper column suffering coating loss. Coating loss on -ve lower horizontal girder.	10	20
Column No. 15	Guide channel deformed. 'X'-bracing bracket broken beneath +ve lower entablature and tie-rod resting against column.	15	20
Column No. 16	Corrosion at very top of guide channel. Water trap under paint system. Substantial reinforcement "boot" fitted.	10	20

Table 1 Survey observations



8 Survey Findings

8.1 Structural and Condition

The cast-iron columns are generally seen to be in good structural health and not suffering from adverse corrosion or loss of material strength. No doubt this is partly due to the continued application of different paint systems over the holder's life and material used. However, it is evident that the paint system has become detached in many places from the metal resulting in a void or water trap. The application of a small hammer in selected locations resulted in large sections of painting breaking off or indeed the release of a quantity of water. Paint loss is noticeable on all columns and particularly to the northern flank which is likely to be the worst weathered. A comparison of photographic records from c.2000 and 2016 (Photograph 9 and Photograph 10) clearly shows that much weathering has occurred.



Photograph 9 Column No. 4
photographed c.2000



Photograph 10 Column No. 4
photographed 2016

What cannot be ascertained from the visual inspection is to what extent water may be entering the structure and pooling at the bottom of the column.

The horizontal girders were difficult to adequately assess from the ground and perceived “defects” could simply be failure of the paint system. What has been observed is some damage to the diagonal struts in a very few locations and potential loss of material and frost damage where the girder meets the entablature.



Photograph 11 Missing diagonal brace bar



Photograph 12 Deformation of girder at attachment to entablature

The 'x'-bracings as a whole appear in good order and some of the lower fixings have been observed to have been replaced, either during the history of the structure or more recently to gain access to the tank and allow the crown to be demolished. An upper bracket on Column No. 14 has sheared and the tie-rod now rests upon the column face. This should be addressed as a matter of urgency as it is unlikely that the tie-rod has much strength other than in tension and could become displaced. Reattaching the bracket will be difficult owing to the inability to gain access to the internal nut. Lower brackets are easier to reach through the maker's plaque.



Photograph 13 Broken tie-rod bracket

Many of the vertical guide rails and their cast-iron brackets are deformed or damaged. It is notable that diametrically opposite pairs of rails show damage suggesting that the crown overly stressed the rails and fixings when dismantled. Although not structurally important to the holder columns, the channels themselves could deteriorate quite rapidly owing to water ingress at the joints and fatigue.



Photograph 14 Damaged roller guide



Photograph 15 Damaged guide bracket

The man access stairs and platform are seen to be in particularly poor condition and should be considered as 'unsafe'. The stairs are of more recent construction and has not weathered as well as other areas on the holder. The worsening condition is particularly evident when compared with photographs from c.2000. A length of steel cantilevering from the structure above the man access stairs would appear poorly secured and could be prone to falling and should be addressed.



Photograph 16 Man access platform



Photograph 17 Cantilever beam

Several items of redundant plant associated with the holder are present and show varying degrees of degradation. These include stream lines and pipes, vessels and instrumentation. These serve no purpose and could be removed.



Photograph 18 Redundant vessel



Photograph 19 Redundant "Kent" height gauge

8.2 Paint System

8.2.1 Columns and Column Bases

The existing paint system is in very poor condition and is not offering any corrosion protection to the structure. It would appear that Red Lead may be present in the primer and should be analysed in a laboratory before any paint removal is carried out. The undercoat layers of paint appear to be oil based and have expanded and crumbled over time. The finish coat is cream in colour with extensive rust staining visible.



Photograph 20 Paint breakdown and condition of exposed structure.



Photograph 21 Typical example of paint breakdown

The approximate percentage of exposed metal is shown in Table 1. The remaining paint is in very poor condition and has very little adhesion. Exposed areas of metal are in good condition and are not showing any signs of significant metal loss.



Photograph 22 Paint breakdown at joint

8.2.2 Guide Rails

The paint system on the guide rails and their brackets is in very poor condition and is not offering any corrosion protection.



Photograph 23 Corrosion at bottom of guide rail

8.2.3 Horizontal Lattice Girders

The paint system on the horizontal lattice pipework is difficult to assess. However observed through binoculars the wrought iron lattice work is in very poor condition with some of the metal work corroded away completely. The extent of damage will not be seen until abrasive cleaning is carried out.



8.2.4 Wind Ties

The paint system on the wind ties and central rings is in very poor condition and is not offering any corrosion protection.

9 Conclusions

The immediate conclusion from the structural survey is that the columns appear sound and in good structural condition. The cast-iron in particular shows little loss of wall thicknesses.

The detached 'x'-bracing to Column No. 15 is considered to be of some concern. At present the tie-rod appears to be resting upon the column and could buckle. Re-attaching the bracket will be difficult due to not being able to access the column internals. A new mild-steel encirclement bracket, fitted around the column with flanges for the tie-rod could address the issue.

The wrought iron and later steel additions have fared less well and fixings, particularly nuts, have corroded and are likely to be structurally less sound than when first fitted. It would be expected that many of the fixings would shear if any attempt were made to remove them.

The loss of paint system, water traps and staining does affect the visual perception of the structure. Removing the existing paint by abrasive blasting would be essential to apply a new paint system and it is suspected that the true condition of the horizontal girders would then become known. Minor in-situ repairs would be readily achievable. Whole girders could be fabricated in the workshop but accurately reproducing an entire girder, complete with rivets, would be a costly undertaking. Fixing such a girder could be difficult as it is unlikely that the original fixings would withstand being loosened and re-tightened. Accessing the columns and entablature to replace the fixings is unfeasible and alternative means of attaching the girder will be required. Chemical fixing or clamped arrangements are possible solutions that could be investigated.

The vertical roller guide channels and brackets show varying degrees of damage and WWU may wish to consider their removal completely if allowed to do so within the requirements of the historical listing. While not closely spaced, the brackets may invite vandals to climb upon the structure.

10 Recommendations

It is recommended that;

- The loose 'x'-bracing is temporarily fixed to prevent further slippage.
- The loose 'x'-bracing is permanently re-attached.
- The man ladders and platform are removed.
- The cantilevering length of steel above the ladder is removed.
- Analyse existing paint system for Lead content.
- The entire structure is abrasive blasted to bare metal.
- The horizontal girders are thoroughly inspected following abrasive blasting and repaired as necessary.
- Consider removing the vertical roller guides if allowed to do so.
- Remove any redundant plant and equipment, including the steam lines.



- Abrasive blast clean entire structure to BS 7079 SA 2½ standard, achieving a blast profile between 30 and 75 microns.
- Apply one coat of High Build Epoxy Aluminium Primer. (75 microns).
- Apply one coat of Epoxy Micaceous Iron Oxide. (75 microns).
- Apply one coat of High Build Epoxy undercoat. (75 microns).
- Apply one coat of Polyurethane finish. (40 microns).
- All painting activities to be carried out in accordance with Wales & West Utilities Specification T/SP/PA/10.
- Backfill the inlet/outlet pipe pit.

11 Budget Cost Estimate

WWU should allow the following budget costs for undertaking remediation and condition works. It should be noted that abrasive blasting may reveal severe damage requiring a re-assessment and major repairs. The budget cost presented does not include for major repairs and assumes that in-situ repairs of the girders may readily be undertaken as appropriate.

Future maintenance work to the structure following abrasive blasting, remedial activities and repainting should be limited to annual upkeep and visual inspection. It would be expected that no further wholesale repainting would be required for some ten years.

Description	Cost Estimate
MWC Construction (CSC)	£ 403,985
Project Services (SER)	£ 29,575
Project Inspection (INS)	£ 30,300
Design Works (DSG)	£ 5,000
Land Easement & Other (LAO)	£ 1,000
Network Services (CNS)	£ 4,600
Total Project Cost	£ 474,560

Table 2 Budget cost estimate



Appendix 1. **Column Sketch**

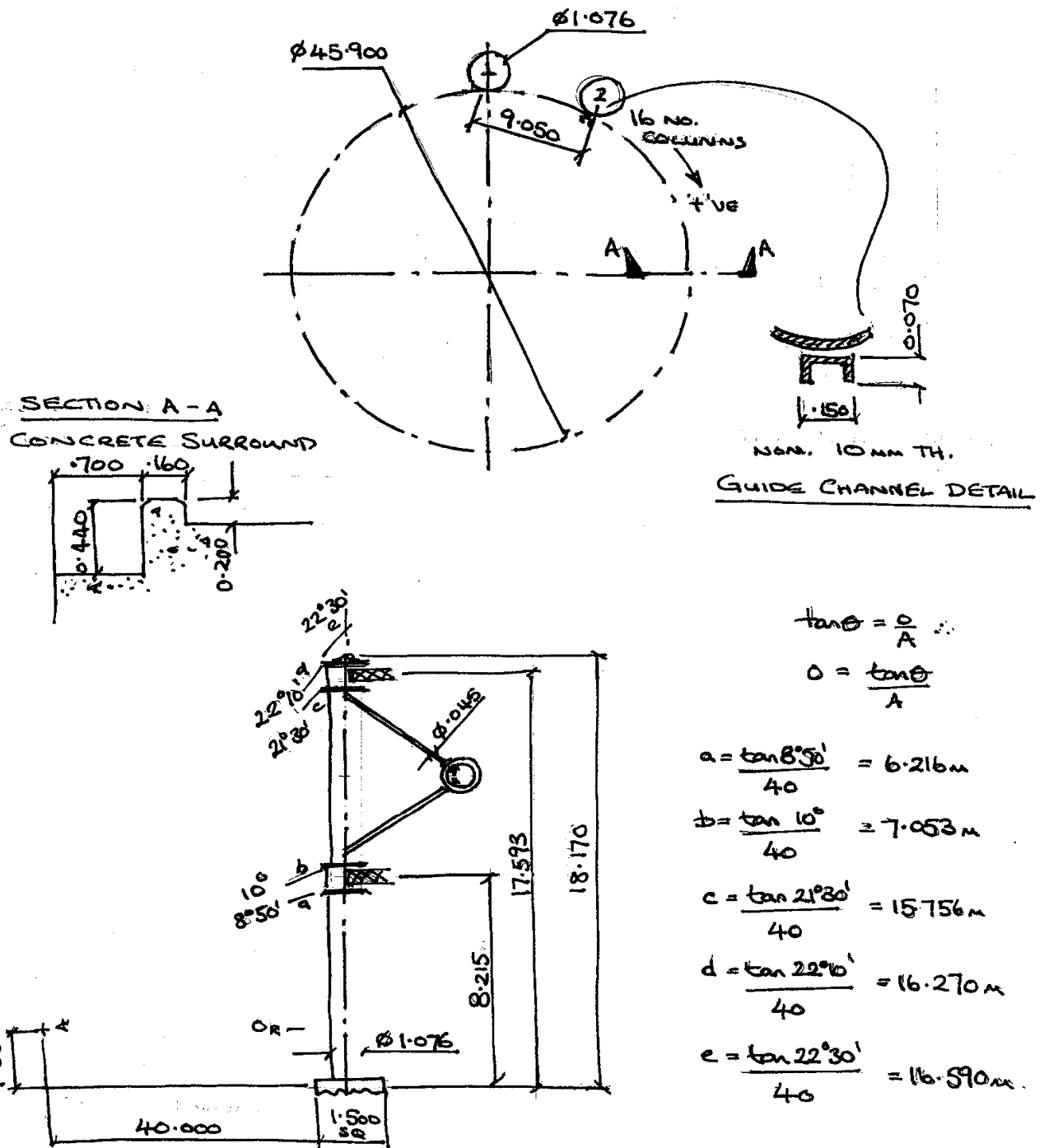


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C O N T R A C T S

Standard Datasheet
SKETCH SHEET

REV	DRWN	DATE	Document No.	1302-SK-001
0	KVG	25/10/2016		
			Project:	Grangetown Gas Holder Survey
			Client:	WWU
			Project No.:	1302

1302-SK-001 - SITE SKETCH

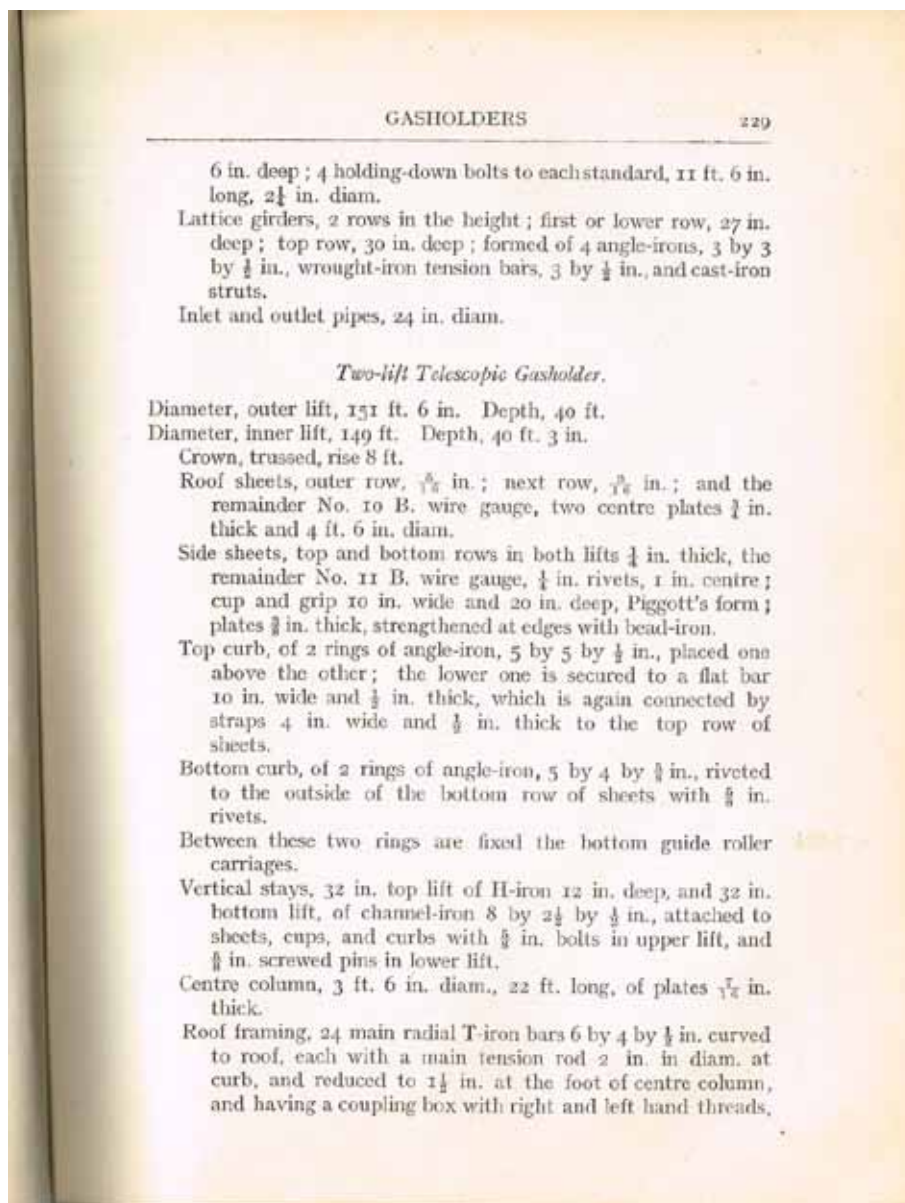


END



Appendix 2. Historic Description of Equivalent Structure

The following extract is taken from the *Handbook for Gas Engineers and Managers, Newbigging (eighth edition), 1913* and describes a gasholder of similar dimensions and construction.





4 struts and 4 tension rods form the bracing to each main bar, the former of cross-iron 4 by 4½ by ¾ in. placed vertically, and the latter of 1, 1½, 1¾, and 1⅞ in. round-iron placed diagonally, the strongest section being nearest the centre column; 48 secondary radial bars of 4 by ½ in. flat-iron, that is, 2 equidistant between the main radial bars, and extending from top curb towards centre, a distance of 26 ft., and then for a further distance of 16 ft., in direction of the centre, another bar of the same dimensions is fixed. 17 rings or rows of purlins, divided equally from curb to centre, are fixed between main and secondary bars; the first row from centre being of 6 by ½ in. flat-iron; next 4 rows of angle-iron, 1½ by 1½ by ¼ in.; next row of angle-iron, 2 by 2 by ¼ in.; next row of T-iron, 3 by 6 by ½ in.; next two rows, which are subdivided in length by the secondary radial bars above mentioned, are of angle-iron 1½ by 1½ by ¼ in.; next row extending from main bar to main bar is of I-iron 3 by 6 by ½ in.; next two rows are divided in 3 lengths between main bars by the two secondary bars, and are of 1½ by 1½ by ¼ in. angle-iron; next row extending from main to main is of T-iron, 4 by 6 by ½ in.; next row divided in 3 lengths as before of 1½ by 1½ by ¼ in. angle-iron, and the remaining two rows divided in 3 as before of 2 by 2 by ¼ in. angle-iron; 3 bars of flat-iron 2½ by ¾ in. cross diagonally in each bay formed by the two main bars.

Column, 16, of cast-iron, 83 ft. high, 3 ft. in diam. at base, and 2 ft. 8 in. at top, metal 1 in. thick; cast-iron channel guide up the column, 5 by 3 in. inside measure, weighing 56 lbs. per foot.

Girders, 16, at top 4 ft. deep, 7 in. wide, of 4 angle-irons 3 by 3 by ¾ in. and a top and bottom plate 7 in. wide by ¾ in. thick; diagonal brace bars 4 by ¾ in.; 16 intermediate girders 3 ft. 6 in. deep, 6 in. wide, of 4 angle-irons 2½ by 2½ by ¾ in., and top and bottom plates 6 in. wide by ¾ in. thick; diagonal brace bars 3 by ¾ in.; at the intersection of the brace bars a cast-iron star 12 in. in diam. is riveted.

Holding-down bolts, 4, 2 in. square and 14 ft. long.

Capacity 1,400,000 cub. ft.

Inlet and outlet pipes, 30 in. diam.



Appendix 3.

Reference Drawings

British Listed Buildings

History in Structure

If you [log in \(/me\)](#), you can comment on buildings, submit new photos or update photos that you've already submitted.

We need to upgrade the server that this website runs on. Can you [spare a quid \(/site/donate\)](#) to help?

Gas Holder at British Gas Grangetown Works, Grangetown

DESCRIPTION: Gas Holder at British Gas Grangetown Works

GRADE: II

DATE LISTED: 20 August 1992

CADW BUILDING ID: 14067

OS GRID COORDINATES: 317409, 174319

LATITUDE/LONGITUDE: 51.4613, -3.1890

LOCATION: Grangetown, Cardiff, Cardiff CF11 0JL

LOCALITY: [Grangetown \(/wales/cardiff/grangetown\)](#)

COUNTY: [Cardiff \(/wales/cardiff\)](#)

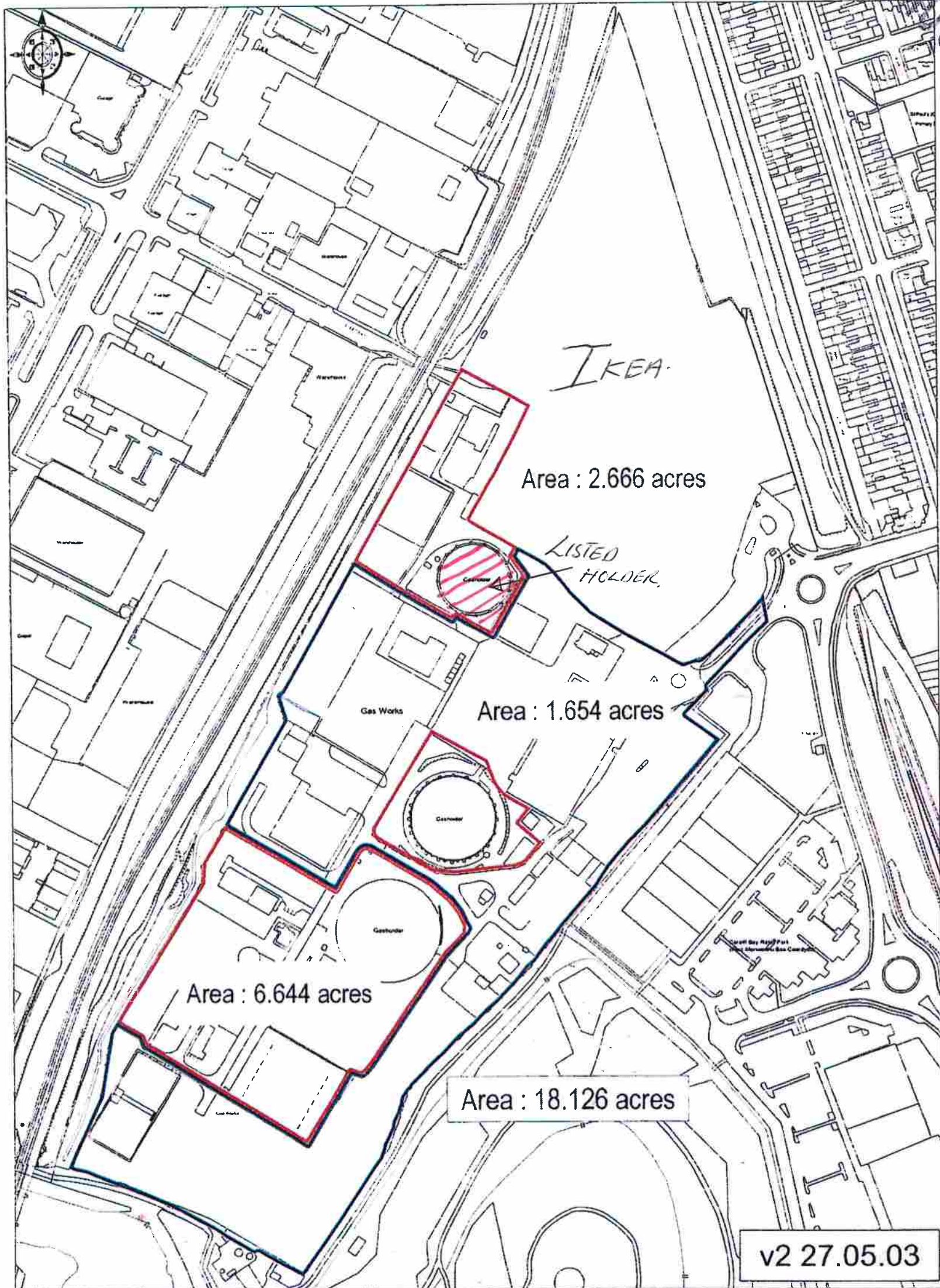
COUNTRY: [Wales \(/wales\)](#)

POSTCODE: CF11 0JL

Incorrect location/postcode? [Submit a correction!](#)

Grangetown,
Cardiff, South Glamorgan

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C O N T R A C T S



NATIONAL GRID AND WALES AND
WEST UTILITIES

THE LISTED GRANGETOWN
GASHOLDER AND SITE
FERRY ROAD
CARDIFF, WALES

INITIAL REVIEW OF
GRANGETOWN
GASHOLDER SITE

JULY 2015

5 Bolton Street
London
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EXECUTIVE SUMMARY

Introduction

Montagu Evans has been instructed by National Grid and Wales and West Utilities ("WWU") to provide advice related to the Grangetown Gasholder Site, Cardiff, Wales.

The site contains Gasholder No. 3, the only remaining gasholder and which is grade II listed having been designated in 1992.

The gasholder was constructed in 1881 by J & W Horton as a column-guided structure with two tiers of 16 cast-iron Doric Columns. It has been subject to several alterations with the notable phases comprising repairs following bomb damage during WWII and the removal of the tank and bell in 2012.

National Grid and WWU are now investigating the potential opportunities and constraints associated with the listed gasholder.

Summary Assessment and Recommendations

The heritage value of Gasholder No. 3

According to Historic England's typology (set out in the London Gasholder Survey, 2000) Gasholder No. 3 is a Type 14 Double-Order, Double-Tier Guide Frame. This type was adopted very widely in the following 25 years after 1858, when the first was most likely built at Bethnal Green (now demolished).

Gasholder No. 3 does not illustrate an innovative design and it is not important in the development of gasholder technology. In the wider UK context, it is not rare. In our experience the gasholder would most likely be turned down for listing in England.

1.0 INTRODUCTION

- 1.1 Montagu Evans has been instructed by National Grid and Wales and West Utilities ("WWU") to provide advice related to the Grangetown Gasholder Site, Cardiff, Wales.
- 1.2 The site comprises the former Grangetown Gasworks which lies to the northwest of the Cardiff Bay Retail Park. It is bounded by the Taff Vale Railway to the west, Grangemoor Park to the south, and an IKEA store the northeast.
- 1.3 The site contains Gasholder No. 3, the only remaining gasholder and which is grade II listed having been designated in 1992. The listing particulars are reproduced in **Appendix 1.0**.
- 1.4 The gasholder was constructed in 1881 by J & W Horton as a column-guided structure with two tiers of 16 cast-iron Doric Columns. It has been subject to several alterations with the notable phases comprising repairs following bomb damage during WWII and the removal of the tank and bell in 2012.
- 1.5 National Grid and Wales and West Utilities' property ownership is shown in **Plate 1.1**. A photograph of the site is provided as **Plate 1.2**.
- 1.6 National Grid and WWU are now investigating the potential opportunities and constraints associated with the listed gasholder.
- 1.7 We have completed a phase of desk-based research to inform our findings and recommendations. We have not visited the site. We have relied on secondary information in the form of historic evidence, photographs, unpublished reports submitted as part of previous planning applications, and our own professional judgement.

Structure of this Report

- 1.8 This report is structured in the following way:
- **Section 2.0** places the Grangetown site within the wider context of the gas industry as it developed from the 19th century onwards.
 - **Section 3.0** describes the historic development of the Grangetown Gasworks from 1837 when the Cardiff Gas Light and Coke Co was formed.
 - **Section 4.0** sets out the listing selection process and criteria for buildings in Wales. **Section 5.0** then assesses Gasholder No. 3 against that criteria to articulate whether the structure would be a credible candidate if it were to be listed today.
 - **Section 6.0** provides a summary of the planning policy context relating to the site, and how land-use considerations may have the potential to affect the future of the gasholder.
 - On the basis of the information supplied throughout this report, **Section 7.0** provides a summary and recommendations for next steps.

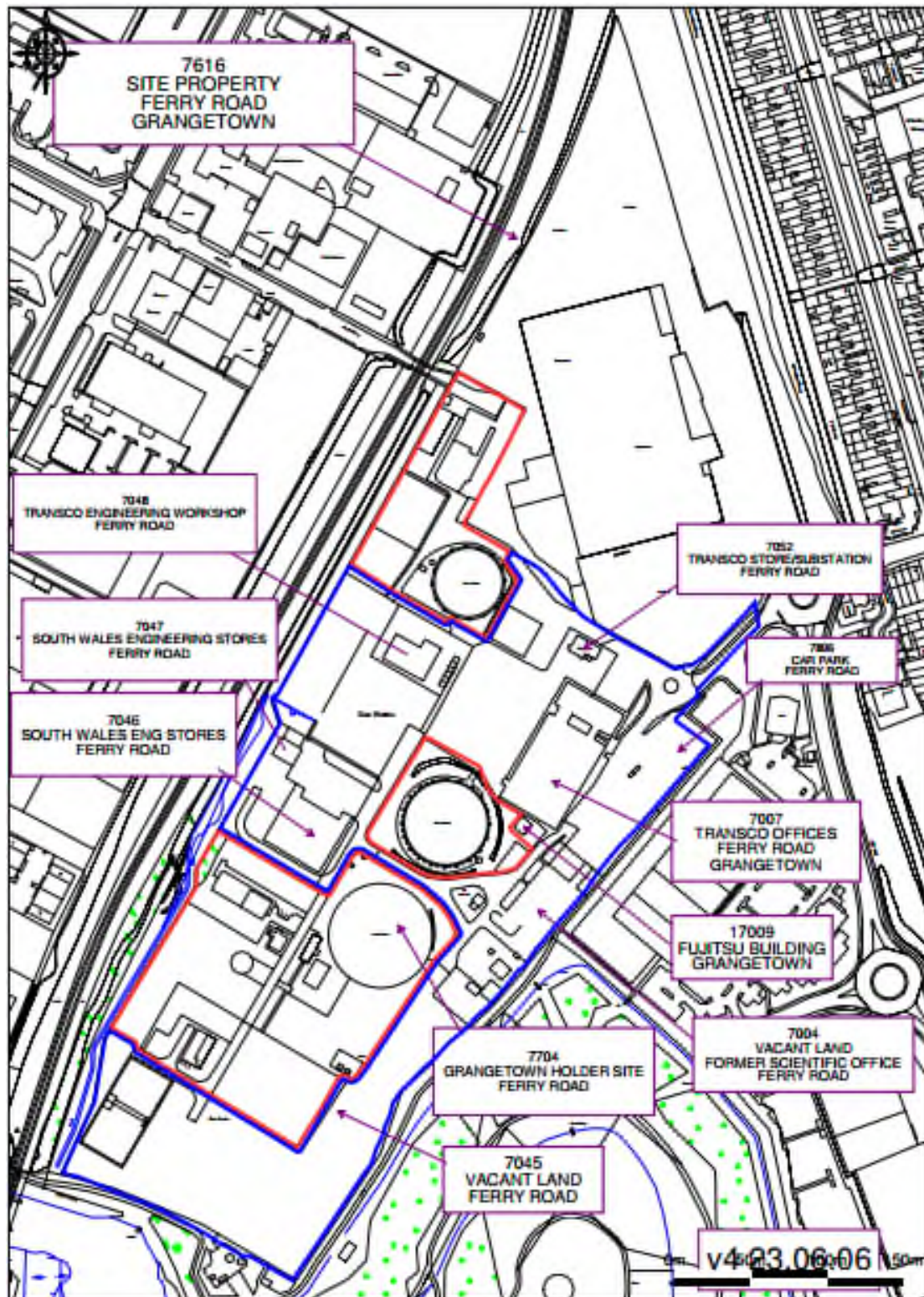


Plate 1.1: Land Ownership boundary at Grangetown, Cardiff. The blue and red lines indicate National Grid and Wales and West Utilities' ownership respectively.



Plate 1.2: Aerial photograph of the Grangetown site showing three remaining gasholders. Only one gasholder, the column-guided holder adjacent to IKEA, remains extant. (Source: Google Maps).

2.0 GRANGETOWN GASHOLDER IN CONTEXT

Historical Context

- 2.1 Gas-lighting was introduced on a commercial basis in the early 19th century. Originally, gas was manufactured from coal. Demand was mostly concentrated on winter evenings, so it was desirable to be able to store all of the gas produced each day to maximise the evening supply. The gasholders met this need for storage and peak dispersal. Additionally, a gasholder reduced the need for a gasworks to stay functional 24 hours a day. The pressure within could drive the gas through the distribution mains.
- 2.2 Demand for gas increased exponentially in the 19th century and dimensions of gasholders increased to keep pace, leading to a period of innovation within the industry. English Heritage's (2000) study of the development of gasholders produced a useful classification of different gasholder types.

History of the Gasholder

- 2.3 Lavoisier invented the first gasometer in 1782, which was used to store gas and transmit it at a constant pressure. It comprised of an inverted metal vessel (the bell), rising and falling in a tank of water. It could hold a volume of c. 3 cubic meters.

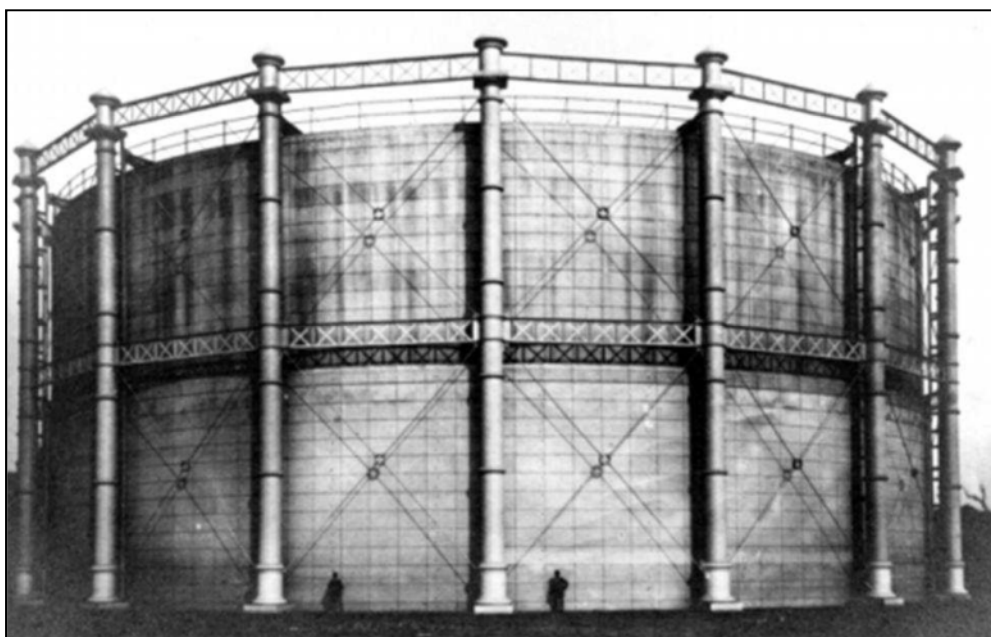


Plate 2.1: Column Guided holder with braces; the Grangetown gasholder is one of this type.

- 2.4 The first commercial gasholders were developed on these principles c. 1816, with water-sealed tanks and a movable bell, in which the gas was stored. By the early 19th century, the shape had moved from the initial rectangular holders to cylinders.

- 2.5 The first gasholders using underground tanks were of single-lift construction. The movement of the tank up and down was aided by wheels running along guided tracks on the supporting columns. Guide frames were added, first by John Malam, to resist lateral forces.
- 2.6 Guide frames were originally cast iron, with wrought iron used from 1876 (**Plate 2.1**). The design of the guide frame was dependent on the level of the lateral forces, which was affected by the dimensions of the gasholder and the number of lifts. Diagonal bracing provided additional strength. The design of gasholders therefore varied significantly across the country. Often they had decorative features such as emblems at joins in the braces. Every example is in effect unique but their design can be, and have been classified.
- 2.7 The first telescopic lift was designed by Tait and constructed in Leeds in 1826. The lifts consist of an inner bell which could fold down one into the other as the gas pressure fell and rose, assisted by guide rails. This was a useful innovation that increased the capacity of gasholders.
- 2.8 The spiral-guided gasholder was patented in 1887 by W. Gadd and W.F Mason, and the first was built in Northwich, Cheshire in 1890. The spiral-guided gasholder dispensed with the guide frame and used telescopic lifts guided by the one below, which rotated as they rose; the lateral forces were resisted by angled rails fixed to the outside (**Plate 2.2**).



Plate 2.2: Photograph of Gasholder No. 5, Aylestone Meadows, former Leicester Gasworks. It is a four-lift spiral guided holder built in 1930.

- 2.9 In general, spiral guided holders tend to have very little visual interest, resting below the ground surface with only the helical guide runners visible. They were the dominant type in the mid-20th century.
- 2.10 Waterless or dry-sealed gasholders were developed in the 20th century to store natural gas. These have a fixed, cylindrical structure (known as a 'shell' or 'container'), constructed from steel plates and vertical stanchions, with a polygon base. The foundation is of concrete and raised slightly above ground level and there is a ventilator in the conical roof. Inside the container there is a floating piston which uses oil or tar as a sealant to prevent gas entering the area above, which can be accessed.
- 2.11 Three types of waterless gasholders were constructed in Britain, which were designed in Germany and the USA, including the M.A.N holder, as used at Battersea (No. 7) (**Plate 2.3**). The M.A.N. holder was developed in Germany in 1915-1916 and the first was constructed in the UK in 1926-7. The volume of the waterless gasholders was generally much larger: up to 7.5 million cubic feet. They have a permanent profile so can be very prominent in the skyline, as at Battersea.



Plate 3.3: Photograph of the Battersea MAN Holder, 2013 © Ben Murphy.

- 2.12 High pressure holders were developed from the 1930s. It is a sphere or horizontal cylinder, constructed from strong steel, with dished ends. It holds gas at high pressure, which is released into distribution pipes through governors which reduce the pressure.
- 2.13 Gas production from coal ceased in 1976. Modern underground pipes have allowed for high pressure storage and distribution, so low pressure gasholders are no longer required. Therefore National Grid has decommissioned the majority of low pressure gasholders in the country.

Component Buildings of Gasworks

- 2.14 Gasholders were only one element of a gasworks, though obviously the most prominent and virtually the only component to find a continuing use after the replacement of coal gas by natural gas. The gasworks at Grangetown has been cleared with only minor buildings and the remaining gasholder extant. We provide the following detail to provide context.
- 2.15 As a starting point, the plan of an ideal gasworks drawn for the ninth edition of Encyclopaedia Britannica (1879) is shown in **Plate 2.4**. It was drawn by James Hislop, the manager of the Ayr gasworks and an innovative designer of gasworks equipment.

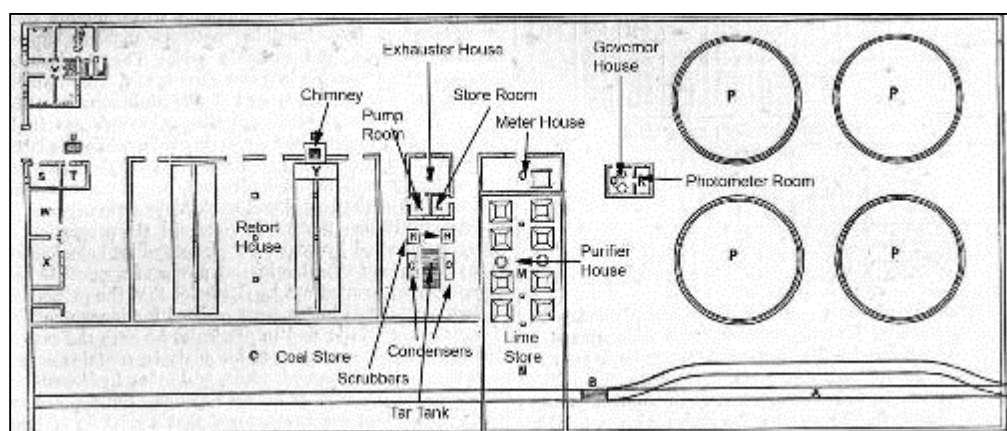


Plate 2.4: Ideal plan of a gasworks by James Hislop, 1879.

- 2.16 The production and distribution of coal gas was created through a series of processes which took place in certain buildings.
- 2.17 First, coal was placed in Retort houses (**Plate 2.5**), in special containers then heated by coke fires. This process breaks down to give a residue of coke and 'yield coal gas', heavily laden with various impurities. Initially the retorts were made of iron, but these expanded and contracted, breaking up the brickworks in which they were set, and were replaced by others made of clay or brick.

- 2.18 During the process, the gas was collected in ascension pipes and thence into the hydraulic main, and so after that into condensers. Tar and ammoniacal liquor collected in the base of the hydraulic main and condensers. The liquor was drawn off into a separator and the tar usually collected in an underground tank.
- 2.19 The gas was propelled by pumps working in conjunction with the exhaustor house. It was sent through further purifying processes. In Hislop's scrubber, the gas enters from below meeting a shower of water. Further, ammonia is taken out of the gas and the liquor is collected at the bottom. These pieces of equipment were normally free-standing.
- 2.20 The next major impurity was hydrogen sulphide. In earlier times the ammonia and hydrogen sulphide were removed together by passing the gas through limewater. This method not only removed the ammonia in such a way as to make its processing into a marketable commodity impossible, but the resulting saturated liquid, known as 'blue billy', was so noxious a pollutant, even by mid-19th century standards, its use was discontinued. In its place came a lime purifier which used slaked lime.

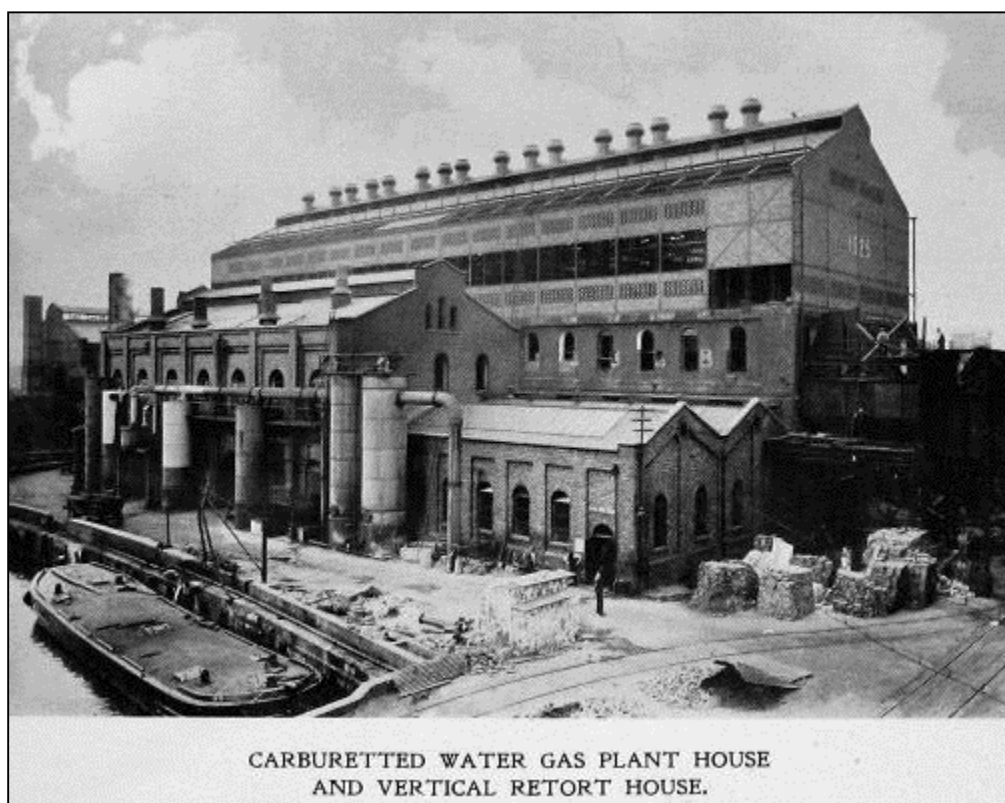


Plate 2.5: Photograph of one of the retort houses at Fulham, 1925.

- 2.21 King's *Treatise on Coal Gas* (vol.2, 1879) notes: '*The importance of the station meter in gas works, and more particularly in small establishments, where the utmost care and economy are necessary in order to earn a dividend, is hardly susceptible of exaggeration; for, by this instrument, all the gas made is measured and recorded hourly and daily...*' The essential part of the equipment is a drum partially filled with

water in which four measuring chambers are rotated by the passage of the gas, and gearing communicates this to indicator dials.'

- 2.22 After issue from the gasholder to its mains, the pressure needed to be controlled. This was done by the station governor (**Plate 3.6**), another device normally kept in a separate building. The role of the station governor was to ensure that gas delivered from the gasworks was at a uniform pressure at all times, and free from fluctuations. The governor was located between the gasholder and the district gas main. It would control the pressure exerted by the gasholders onto the gas mains, keeping it at a level that was sufficient for supply.
- 2.23 The station governor would consist of a small tinned iron bell floating freely in a cast iron tank containing water. When separate mains were used to supply different parts of a district, a governor is required for each.

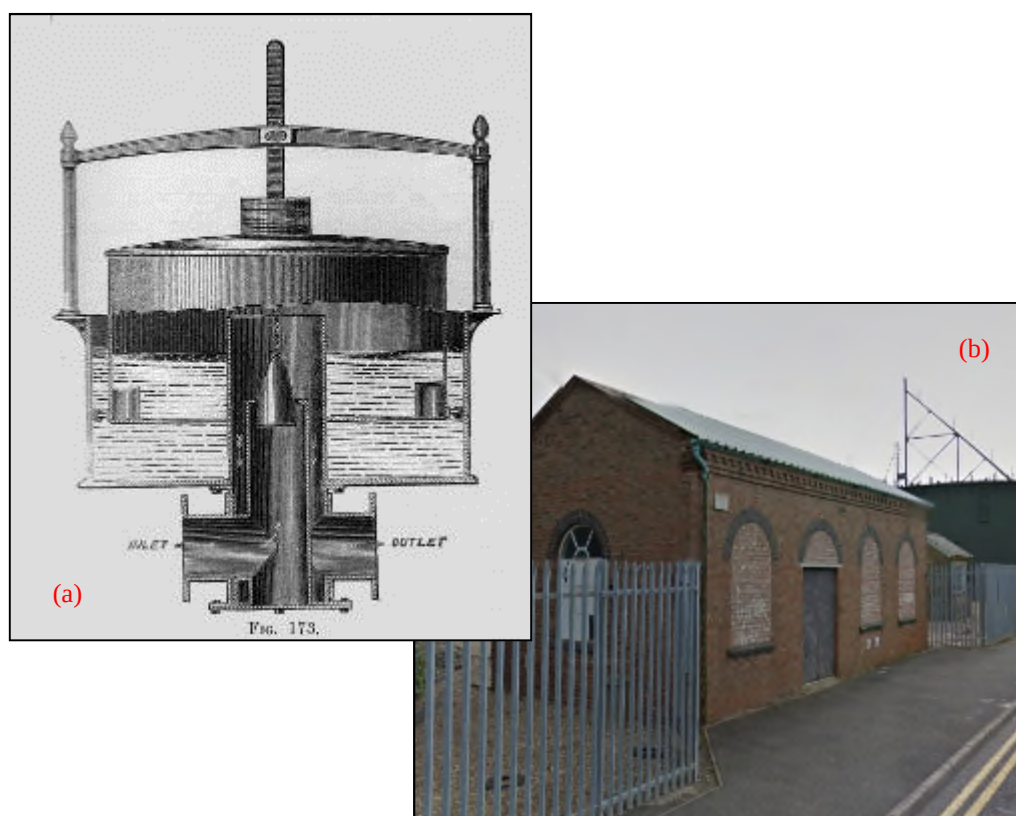


Plate 2.7: (a) Station Governor from King's Treatise on Gas (1879); (b) The building hosting the Station Governor at Station Road Site, Borehamwood.

- 2.24 Quality control of the lighting properties of the gas was provided by the photometer, another collection of apparatus housed in a separate room. This needed to be specially decorated to light-insulate the equipment. The basic principle of the photometer is the comparison of the light produced by the burning gas with a standardised light source.
- 2.25 Not all gasholder sites were active gasworks (where the coal gas was produced). During the late-19th century, some new sites were developed simply to store gas and

these were known as gasholder 'stations'. The Station Road Site at Borehamwood was such. Generally, the stations were built to provide further capacity within the local network for storage, or to provide a new supply to a burgeoning area. They did not, therefore, include much of the gas production apparatus found at gasworks such as the retort houses. This circumstance reduces the industrial and archaeological interest of gas station sites.

3.0 HISTORIC DEVELOPMENT OF GRANGETOWN GASWORKS

Grangetown Gasworks

- 3.1 The Grangetown gasworks were located to the west of Ferry Road, Grangetown.
- 3.2 The Cardiff Gas Light and Coke Co was formed in 1837 in Whitmore Lane/Bute Terrace by an Act of Parliament. However, as the town expanded, there was need for a larger gasworks and land was acquired at Grangetown in 1859, with the works opening in 1863.
- 3.3 The Grangetown gasworks was connected to the Bute Terrace works by an 18 inch main. By 1870, the works was supplying gas to light the new suburbs of Cogan, Whitchurch, Radyr and St Fagans in Cardiff. The works expanded again with the purchase of some of Grange Farm's land and land once used by Grangetown iron works
- 3.4 There is a booklet on the Grangetown Works, *The Cardiff Gas Light and Coke Company: Grangetown Works*, published by Western Mail and undated. It dates to after 1915 as a drawing in the booklet is dated then. According to the booklet the gasworks covered an area of 26 acres (10.5 ha) and was accessed from Clive Street and Penarth Road. The site comprised:
- No. 1 Retort House;
 - No. 2 Retort House
 - Condensers:
 - Exhauster Engine Houses
 - Washing and Scrubbing Plan
 - Purifying Houses;
 - Station Meters;
 - Five Gasholders – the largest in use at the time having a capacity of 1.5 million cu ft. A new tank and holder were in the course of erection and would have a storage capacity of 3 million cu ft.
 - Oil and Gas Plant.
- 3.5 The booklet includes several photographs of the works including a plan of the site and a photograph of the gasholders.

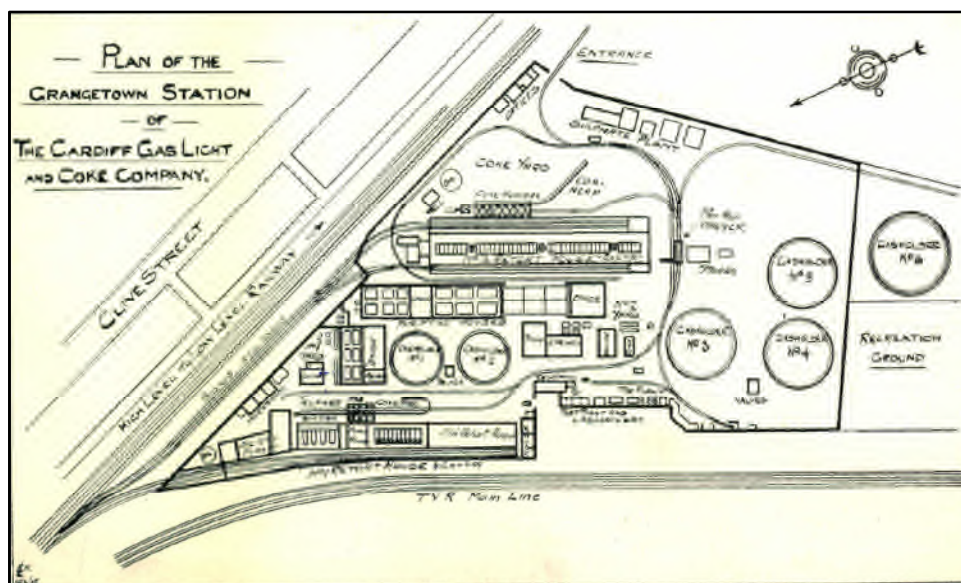


Plate 3.1: The Grangetown Works layout dated 18.03. 1915

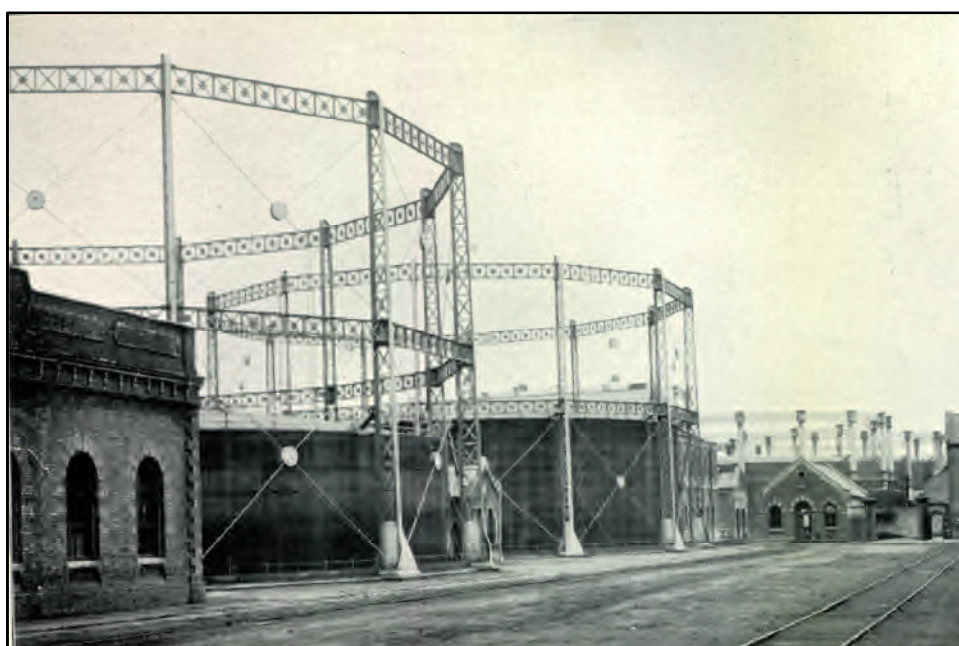


Plate 3.2: The Gasholders prior to March 1915, the gasholder subject to this report appears to be one of the holders in the background of the photo

- 3.6 **Plate 3.2** suggests that the design details of the gasholders across the site followed a similar format. The gasholders in the foreground have standards rather than columns. Both types are of two-tiers with cross braces and were of typical for gasholder designs of this date, that is, early 20th century. Similar types and designs of gasholders survive in England (see **Section 5.0**).
- 3.7 A visit to the Grangetown Works in 1914 is described in the *Journal of Gas Lighting, Water Supply, etc* (2 June 1914, pp649-650) includes the gas storage plan:

“The work of constructing a new gasholder tank has also just begun. This is to be of brick-and-puddle type, 180 feet in diameter by 33 feet deep, with a centre dumpling. The capacity of the holder will be slightly over 3 million cubic feet”.

- 3.8 A visit in 1922 reported in the *Gas Journal* (14 June 1922, 622-623) does not mention the gas storage facility. More detail is provided in the report of the visit in 1928:

“There are six telescopic gasholders at Grangetown and one at Bute Terrace, having a total capacity of 71/2 million c. ft., to deal with the supply of gas over an area of 66 square miles. From the holders, the gas is delivered to the trunk mains supplying the district, through a system of governors which control the supply to the various portions of Cardiff and suburbs. These governors also control the supply of gas to the Bute Terrace and Taffs Well stations, where holders are in operation to supply districts immediately adjacent.” (*Gas Journal*, 1928, pp963-965)

- 3.9 No photographs of the gasholders accompany the text.

Historic Ordnance Survey (OS) Maps

- 3.10 The historic OS maps provide a helpful overview of the development of the Grangetown Gasworks (see **Appendix 2.0** for OS maps and extracts below).
- 3.11 The 1880 map illustrates the Gas Works and two gasometers at the northern end of the site, suggesting that these were earlier gasholders probably relating to when the gas works opened in 1863 (**Plate 3.3**). To the east is the Taff Vale Railway, to the southeast the Grangetown Iron Works and to the West the Cardiff Rope Works. The Gasworks is relatively undeveloped at this date.

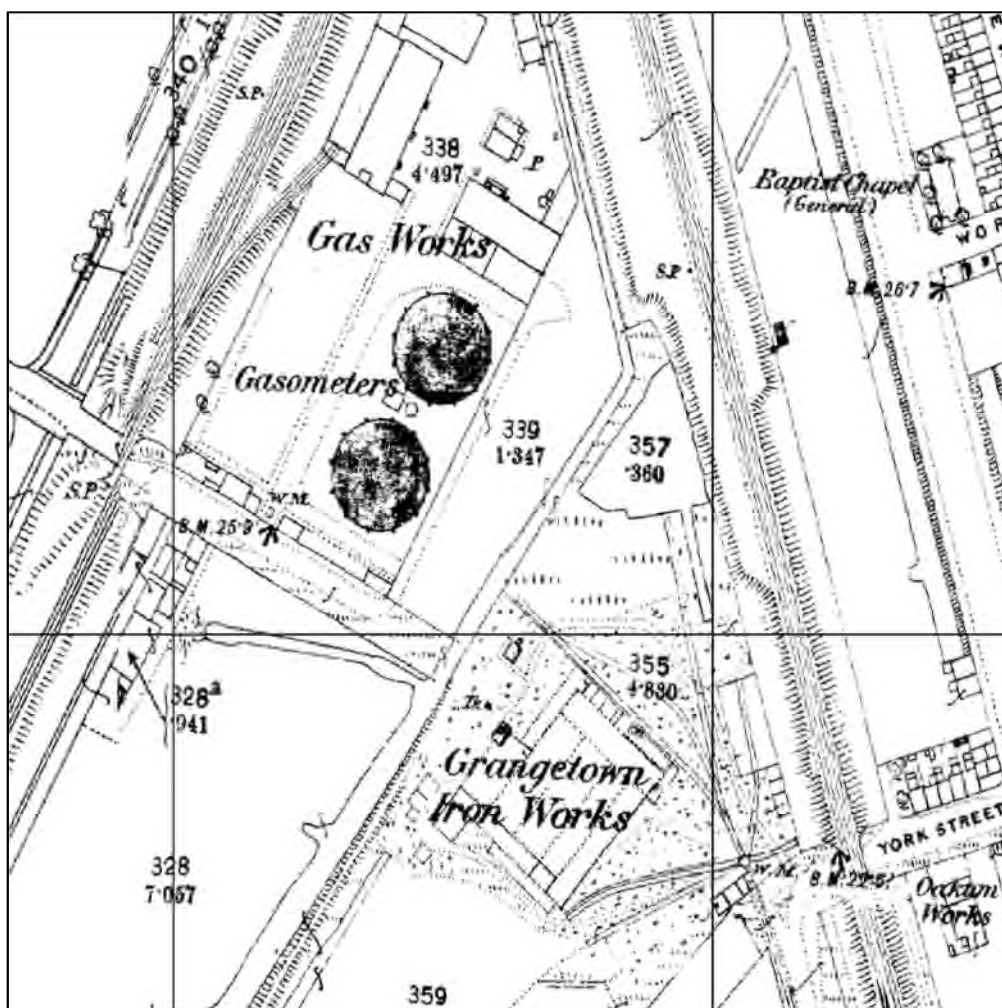


Plate 3.3: 1880 OS Map Extract

- 3.12 The 1920 OS map shows the Gasworks had developed considerably with five gasholders extant and one under construction, in addition to the large buildings of the Retort Houses (Plate 3.4). The two gasholders to the north of the site appear to be at the same locations as those on the earlier map.

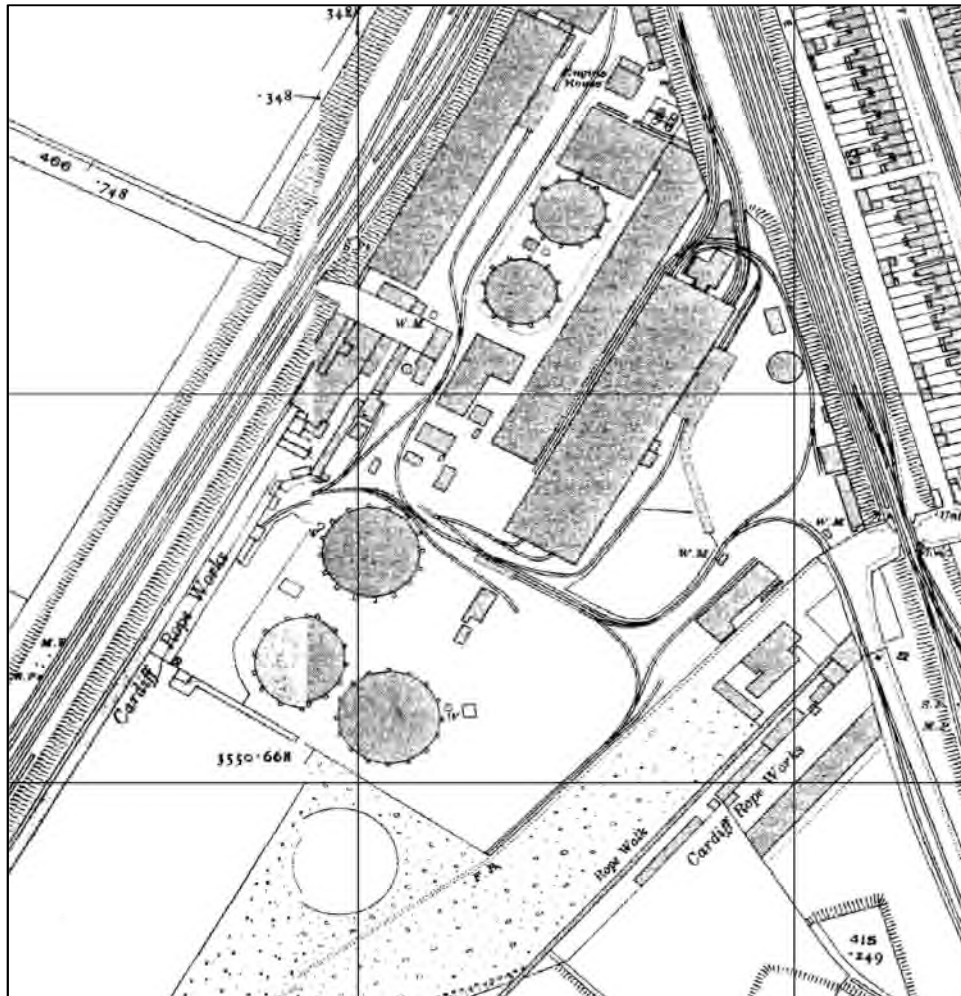


Plate 3.4: OS Map Extract, 1919-20

- 3.13 By 1941 six gasholders are illustrated. The Penarth Harbour & Dock Railway borders the Gasworks to the east and west (**Plate 3.5**). A similar situation is indicated on the OS map 1954-71 (**Plate 3.6**).

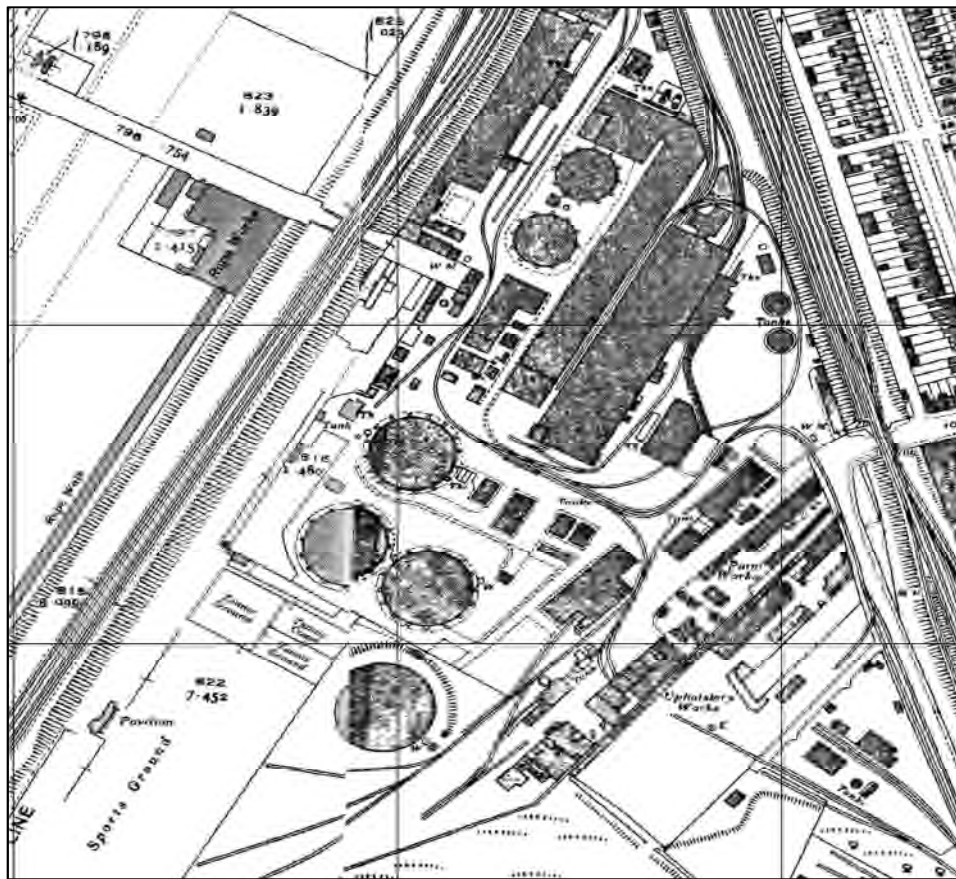


Plate 3.5: OS map Extract, 1941

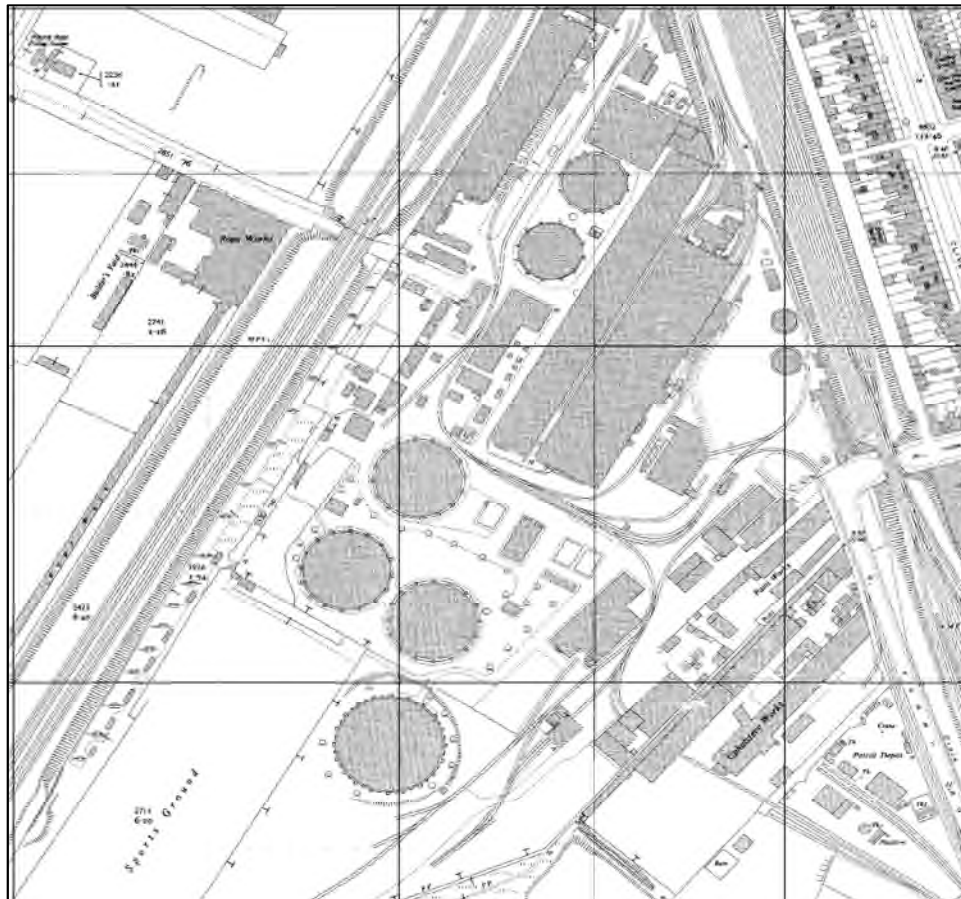


Plate 3.6: OS map Extract, 1954-71

- 3.14 The 1984 OS map indicates that several buildings have been demolished as well and only three gasholders remain extant (**Plate 3.7**). The location of a fourth is indicated but is presumably in the process of demolition at the time of survey.

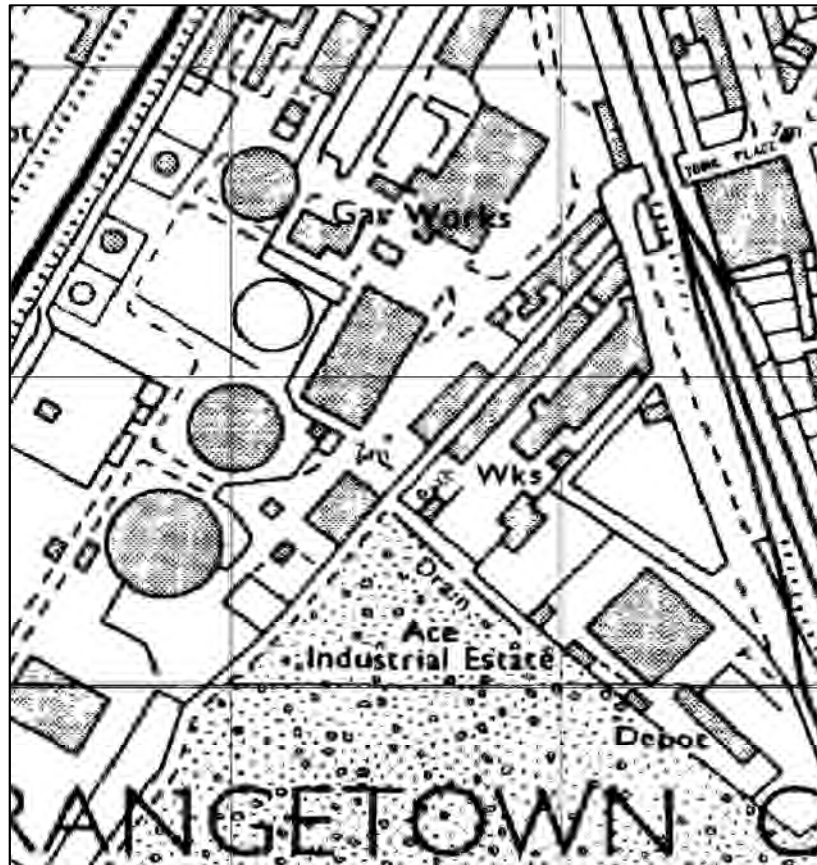


Plate 3.7: OS Map extract, 1984

- 3.15 The 1984 map shows that four gasholders remained extant. The listed gasholder is located at the northern end of the site and is located in a similar position to these early gasholders. It is dated 1881 by a plaque attached to its frame.

4.0 LISTING SELECTION PROCESS AND CRITERIA

4.1 Designation of listed buildings in Wales takes place in accordance with the Planning (Listed Buildings and Conservation Areas) Act 1990. Although this Act applies to both England and Wales, different bodies assess cases for listing and the decision to list or not. In Wales, the decision to list is made by the Welsh Assembly and advice is provided by Cadw. Previously, the decision was made by the Secretary of State for Wales.

4.2 Buildings are assessed against criteria set out in Circulars 61/96 and 1/98 (see below). Cadw have not published thematic selection guidelines providing clear advice on listing particular types of building. The guidelines published by Historic England below as these provide relevant and clear criteria for listing gasholder structures. Though listing is a national process and Wales has its own architectural traditions, this kind of structure – a product of industry and engineering – has comparators across England, Scotland and Northern Ireland.

Welsh Office Circular 61/96, 5 December 1996 – Planning and the Historic Environment: Historic Buildings and Conservation Areas

4.3 This Circular sets out advice on legislation and procedures relating to historic buildings and conservation areas. It conveys certain Directions the Secretary of State has made, which supplements that guidance. Part 3 of the Circular deals with listed buildings.

4.4 Section 1 of the Act (Planning (Listed Buildings and Conservation Areas), Act 1990) requires the Secretary of State for Wales to compile a list of buildings of special architectural or historic interest. The purpose of the list is to ensure that a building's interest is fully recognised and that any works for the demolition of a listed building or its alteration or extension which would affect its character as a listed building are brought within statutory control (paragraph 46).

4.5 In 1996 the list entries in Wales were:

Grade	Nos.
I	329 (1.7%)
II*	1,045 (5.6%)
II	16,845 (89.7%)
Old grades (churches)	569 (3.0%)

4.6 Paragraph 48 states:

“The main criteria which the Secretary of State applies in deciding which buildings to include in the statutory lists are set out at Annex C. The emphasis in these criteria is on national significance, though this cannot be defined precisely. For instance, the best examples of local vernacular building types will normally be listed. But many buildings which are valued for their

contribution to the local scene, or for local historical associations, will not merit listing. Such buildings will often be protected by conservation area designation (see Part 2). It is also open to planning authorities to draw up lists of locally important buildings, and to formulate policies for their protection through development control procedures. Policies should make clear that such buildings do not enjoy the full protection of statutory listing. Buildings are added to the statutory lists in two main ways:

- i. As a result of systematic resurvey of particular building types; or*
- ii. Following proposals from local authorities, amenity societies or other bodies or individuals that particular buildings should be added to the lists ('spot listing').*

4.7 Paragraphs 58-59 deal with requests to delist buildings.

"[58] The Secretary of State is prepared to review listing in the light of new evidence. There is no formal appeal procedure, but owners or others who believe that a listing should be considered should send the evidence to Cadw's Listing Branch, together with photographs of the building and a location plan. The evidence must relate to the special architectural or historic interest ascribed to the building: if the objection to listing is (for instance) related to a building's condition and the cost of repairing or maintaining it, or to plans for redevelopment, the appropriate application must be made under the listed building consent procedures. The local authority concerned will be notified by Cadw of any requests received to de-list buildings.

[59] The Secretary of State will not generally entertain an application for de-listing if the building is the subject of an application for listed building consent, or an appeal against refusal of consent, or if action by a local planning authority is in hand because of unauthorised works or neglect. Both listed building consent and enforcement appeal procedures give appellants the right to argue that a building is not of special interest and should be removed from the list. The issue of de-listing should normally be addressed in this way, rather than regarded as a means of avoiding the need for enforcement action."

Annex C: Listed Buildings – Principles of Selection for Wales

4.8 The following are the main criteria which the Secretary of State for Wales applies in deciding which buildings to include in the statutory lists:

- Architectural interest: the lists are meant to include all buildings which are of importance to the nation for the interest of their architectural design, decoration and craftsmanship; also important examples of particular building types and techniques (eg buildings displaying technological virtuosity) and significant plan forms;

- Historic interest: this includes buildings which illustrate important aspects of the nation's social, economic, cultural or military history;
- Close historical associations with people or events of importance to Wales; group value: especially where buildings contribute an important architectural or historic unity or are fine examples of planning (eg squares, terraces or model villages.)

4.9 Age and rarity are relevant, particularly where buildings are proposed for listing on the strength of their historic interest. The older a building is, and the fewer the surviving examples of its kind, the more likely it is to have historical importance. Thus, all buildings built before 1700 and survive in anything like their original condition are listed. Most buildings of about 1700 to 1840 are listed, though some selection is necessary.

4.10 After about 1840 greater selection is necessary to identify the best examples of particular building types and only buildings of definite quality and character are listed. This is due to the high number of buildings that were constructed during that period and which have survived.

4.11 Buildings that are less than 30 years old are normally only listed if they are of exceptional quality and under threat. The approach taken to 20th century buildings is to identify important examples for particular building types – industrial, educational, hospitals, etc.

Selectivity

4.12 Where a building qualifies for listing primarily on the strength of its intrinsic architectural quality or its group value, the fact that there are other buildings of similar quality elsewhere is not likely to be a major consideration. The listing of buildings primarily for historical reasons is to a greater extent a comparative exercise. Selectivity is therefore important where a substantial number of buildings of a similar type and quality survive. In such cases the Secretary of State will aim to list the best examples of each type.

Aesthetic Merits

4.13 The external appearance of a building – both its intrinsic architectural merit and any group value – is a key consideration in judging listing proposals. However, if the special interest of a building is due to technological innovation, for example, those elements will not always be reflected in obvious quality.

Historical Associations

4.14 Well-documented historical associations of a building's importance to Wales will increase the case for inclusion in the statutory lists. These buildings may justify a higher grading than would be otherwise appropriate, and may occasionally be the deciding factor.

- 4.15 However, the Secretary of State will normally take the view that there should be some quality or interest in the physical fabric of the building to justify the statutory protection. Either the building should be of some architectural merit in itself, or it should be well preserved in a form that directly illustrates and confirms its historical associations (eg because of the survival of internal features).
- 4.16 Where otherwise unremarkable buildings have historical associations, the Secretary of State's view is that these examples are best commemorated by other means and listing will be appropriate only in exceptional cases.

Welsh Office Circular 1/98 (2 February 1998): Planning and the Historic Environment: Directions by the Secretary of State for Wales

- 4.17 This Circular updates aspects of the Department's guidance relating to listed buildings and conservation area, especially in light of the House of Lords judgement in the case of Shimizu (UK) Ltd v. Westminster City Council (1997). The Circular restates directions previously set out in Circular 61/96 that have been amended.
- 4.18 The Circular provides a rewording of the section on Listing – Historical Association at Appendix F.

“Buildings may be listed on grounds of architecture or history and listing selection takes both into account. The claims of a building for listing largely on historical grounds will usually lie in its association with people and events significant in Welsh history. Assessment will consider the extent to which elements of a building's original contemporary character are retained. Well documented historical associations of a building's importance to Wales will increase the case for its inclusion in the statutory lists or for a higher grading to be given. In the Secretary of State's view normally there should be some quality or interest in the physical fabric of the building itself to justify the statutory protection afforded by listing. This may lie in the architectural merit of the building itself or in the preservation of features which directly illustrate and confirm its historical associations (eg because of the survival of internal features).”

Historic Environment (Wales) Bill

- 4.19 The Welsh Assembly introduced a Bill on 1st May 2015 and is expected to be presented for Royal Assent in Spring 2016. The introduction to the Bill states the Act will be:

“An Act of the National Assembly for Wales to make provision amending certain aspects of the law relating to ancient monuments and listed buildings; to establish a register of historic parks and gardens; to require local planning authorities to establish historic environment records relating to their areas; to establish an Advisory Panel for the Welsh Historic Environment; and for connected purposes.”

4.20 The Historic Environment (Wales) Bill forms part of a suite of legislation, policy, advice and guidance that makes important improvements to the existing systems for the protection and sustainable management of the Welsh historic environment. In broad terms, the Bill gives more effective protection to listed buildings and scheduled monuments; enhances existing mechanisms for the sustainable management of the historic environment; and introduces greater transparency and accountability into decisions taken on the historic environment.

4.21 The Bill creates new measures that:

- allow the Welsh Ministers to put an immediate halt to unauthorised works to scheduled monuments and make it easier for action to be taken against those who have damaged or destroyed monuments;
- enable authorities to act quickly if a listed building is under threat from unauthorised works and give them greater flexibility in dealing with historic buildings that require urgent works to protect them from further decay;
- make it easier for owners or developers to create sustainable new uses for unlisted historic buildings by relaxing the conditions for applications for certificates of immunity from listing;
- create a statutory register of Wales' historic parks and gardens;
- allow owners of historic assets to negotiate partnership agreements with consenting authorities for a period of years, eliminating the need for repeated consent applications for similar works and encouraging more consistent and coherent management of the buildings or monuments;
- secure a more stable future for Wales' historic environment records, which provide detailed information and advice on the historic environment to local planning authorities and the public;
- make existing structures for the designation of nationally important historic assets more open and transparent by introducing formal consultation with owners and establishing a mechanism to review decisions; and
- establish an independent panel to advise on historic environment policy and strategy at a national level in Wales.

Discussion

4.22 As noted earlier, there are no selection guides published to provide guidelines for assessing different types of buildings in Wales. The Historic England guidelines for *Utilities and Communication Buildings* does provide a useful framework for assessment.

4.23 The particular considerations in relation to *Utilities and Communications Buildings* (2011) for listing are summarised below (See also **Appendix 3.0**). There is a high degree of overlap with the guidelines set out in the *Industrial Buildings* (2011) Selection Guide (**Appendix 4.0**).

- intrinsic interest should be considered – for instance, special architectural, planning, engineering and technological interest;

- completeness – for instance, where important processes can be illustrated on one site;
- relative date and rarity;
- assessment of authenticity from an historical point of view based on level of alteration.

- 4.24 In assessing 'special interest', the selection guide notes the following in relation to 'Gas supply' buildings and structures:

"Early and innovative gasworks buildings will be listable on grounds of technical and historical interest...Other buildings will have intrinsic architectural interest. In some cases exceptionally well preserved integrated sites may be eligible but it is not normal practice to list multiple gas holders of late date and standardised design: technical claims and the structural interest of the structures will be key determinants."

- 4.25 Utilities buildings are a sub-set of the industrial category and consequently, the following 'eight key issues to address when considering industrial buildings for designation' are relevant to this assessment:

The wider industrial context – the wider setting including other buildings/structures which are associated with the same industrial process.

Regional factors – taking a regional perspective in order to achieve a representative sample of buildings from each sector of an industry. With regard to gasholders, Historic England (2000 & 2002) note that London was at the forefront of developments in the gas industry because of the sheer scale of the growing metropolis which far and away outstripped the growth of other cities in the UK. Thus it is entirely to be expected that it would be the focus of investment and innovation. However, the manufacture and distribution of gas was introduced in the 19th century and grew throughout the United Kingdom. We are not dealing with anything equivalent to the steel making industry in Sheffield or the lace making industry in Nottingham which are acknowledged as regional specialisms of national significance. This was a national industry, ie UK-wide. We are not aware of the Grangetown Gasworks being of particular importance regionally.

Integrated sites – if the process to which a building relates forms one of a number of components then the issue of completeness becomes overriding. Much of the Grangetown Gasworks has been demolished with the listed gasholder remaining on the northern part of the site. The gasholder therefore has no surviving relationship with any other building that formed part of the Gasworks.

Architecture and Process – the building should normally reflect in its design its specific function. This criterion is not applicable to civil engineering structures whose sole purpose is their function. A bridge looks like a bridge. A

gasholder looks like a gasholder. This criterion is not applicable in this case. The gasholder was listed in 1992. The details of the designation will be made apparent following the Freedom of Information Request submitted to Cadw.

Machinery – the special interest of some sites lies in their machinery and where this has been lost, eligibility is less. There is no associated machinery with these gasholders. In fact, as the records of the gas industry make clear, they were procured as machinery. The telemetry associated with them is contemporary not historic. Where machinery survives in the associated site buildings this is generally not original and/or of limited interest.

Technological Innovation – some buildings may have been the site of the early use of important processes, techniques or factory systems. Technological significance may also reside in the design and structure of the building itself. The list description does not mention any innovative processes or techniques associated with the Grangetown Gasholder.

Historic Interest – where survival of physical evidence of important elements of industrial history survives well, a high grade may be justified. In some cases historical associations with notable achievements may be sufficient to list. The historical interest of the Grangetown Gasworks has already been recognised by the listing of the Gasholder at Grade II. However, we are not aware of any particular historical associations with persons or places in Wales.

Rebuilding and Repair – a high level of reconstruction can often be a reason not to list. Equally, the partial repair and reconstruction of industrial buildings as associated with industrial processes may be significant enough to warrant protection. The Grangetown Gasworks were established in 1863 and the gasholder dates to 1881. It is documented that the gasholder sustained bomb damage during WWII, and was subsequently restored. This detail is included in the list description. The gasholder's tank has been demolished and infilled, only the frame, ie the upper part of the holder survives. These aspects of repair have eroded the architectural integrity of the frame.

5.0 ASSESSMENT OF THE GRANGETOWN GASHOLDER AGAINST THE SELECTION CRITERIA

- 5.1 In this section we consider the Grangetown Gasworks and the listed gasholder in the national context and against the selection criteria for listed buildings.
- 5.2 The Grangetown Gasworks are not known nationally, i.e. within the history of the gas industry in England and Wales, for any particular technological development in relation to the gas industry. The site appears to have been a city gasworks, similar to many of the gasworks sites across the UK in large cities, and very common by the turn of the 20th century.
- 5.3 The Gasholder No. 3 is dated 1881 by a plate mounted on its frame "J & W Horton 1881". It is a column guided holder with a two-lift frame supported by 16 columns.
- 5.4 According to Historic England's typology (set out in the London Gasholder Survey, 2000) the structure is a Type 14 Double-Order, Double-Tier Guide Frame. This type was adopted very widely in the following 25 years after 1858, when the first was most likely built at Bethnal Green (now demolished). In strict terms, then, the Grangetown guideframe is not innovative.
- 5.5 The listing description is provided below and in **Appendix 1.0**:

History

Dated 1881. Gasholder and support frame built for Cardiff Gas Light and Coke Company. Dated by inscription on plate mounted on frame, 'J & W Horton 1881 Smethwick'. Some restoration after bomb damage during Second World War

Reason for Listing

Listed as striking C19 gasholder with literate [sic] architectural design to framework.

Exterior

Shallow domed crown of holder has, at circumference, brackets with wheels running on vertical rails attached to supporting framework which consists of two tiers, each of 16 cast-iron Doric columns supporting panelled entablature blocks with cornices in the manner of Florentine C15 architecture. Upper-tier columns slightly slimmer than lower with lighter, narrower entablature blocks. Lattice girders between columns at entablature level of both tiers, and x-shaped cross-bracing between columns on both levels.



Plate 5.1: Grangetown Gasholder



Plate 5.2: Grangetown Gasholder detail

- 5.6 The description refers to the 'literate architectural design' which, we presume, refers to the classical detailing and proportions of the gasholder. However, this is unclear because any structure that refers to an architectural style could be described as having a "literate" design.

- 5.7 A description of the gasholder is included within the Pevsner guide for Glamorgan:

"FERRY ROAD GASHOLDER, W of the N end of Ferry Road. Built in 1991 [sic] for the Cardiff Gas Light and Coke Company by J. & W. Horton of Smthwick. Cylindrical gasholder of plated metal supported within two tiers of sixteen cast iron Doric columns. The entablature blocks crowing each tier are linked by lattice girders with tensioning rods to the heads and feet of adjacent columns." (page 292)

- 5.8 In 2012 the tank of Gasholder No. 3 was removed following the granting of listed building consent by Cardiff Council (Application Reference: 12/1200/DCI [LBC]). The tank was removed to allow remediation of the land within and around the gasholder.
- 5.9 About fifteen gasholders are listed nationally. One dates from 1820, and then a group are in England. These date from 1855, and between 1860s and 1880s.
- 5.10 In London, there are some good examples where the industry and engineering was well developed. The four grade II gasholders at St. Pancras, dating from the 1860s and the 1880s, a group of unusually elaborate design with their multi-tiered cast iron classical order of considerable distinction. The other listed example is in Fulham. This was erected in 1820 and is reputed to be the oldest in the world.
- 5.11 By the time the Grangetown gasholder had been built, the hollow cast-iron column gasholder (identified as Type 14 as noted above) was the most common form of frame-guided holder. As such, it is also the most common type to be already designated.
- 5.12 The six examples at Bromley-by-Bow (plus a modified three-tier example), listed at grade II, date from between 1872 and 1882 and were identified by English Heritage in 2001 as being better survivals than another example at Bethnal Green.
- 5.13 Amongst other un-designated surviving examples of this type are Old Kent Road No.10, (1867) Kennington Nos. 4 and 5 (1874 and 1876) and Bootle No. 5 (1881).
- 5.14 Gasholder No. 3 at Grangetown is therefore a common type in England, where a number have been designated.

Discussion

- 5.15 On the basis of the discussion above, if an application was made to designate the gasholder in England it is very likely that Gasholder No. 3 would not be listed.
- 5.16 Within a Welsh context the Grangetown gasholder is the only designated example (according to a list released by Cadw in 2012). This means that it is the only designation that captures a gasholder at all. This raises its value in a national context.

- 5.17 The value of the gasholder would be increased if it survives as the only extant gasholder in Wales as asserted by Quad Consult Ltd (<http://quadconsult.co.uk/?projects=grangetown-gas-holder-cardiff-uk>). We have not been able to clarify this statement.
- 5.18 Structures dating from 1840 onwards are given greater scrutiny when they are considered for listing; however, where fewer examples of a particular type of building survive, there is less emphasis on capturing the finer quality examples.
- 5.19 We have established that there are a number of Type 14 gasholders in England that are finer quality. However, Grangetown would be assessed in a different context despite the development of gas infrastructures being a UK-wide industry since its inception. Cadw and the Welsh Assembly would consider the structure in this way, and reasonably their separate policy position and the emerging new policy which is stronger on heritage matter.
- 5.20 We are also aware of public comments made by Cadw in 2001 in response to the planning application for the IKEA store adjacent to the site:

"The Welsh historic monuments body Cadw described the gasometer as an "architectural masterpiece..."

"The gasholder may not be everyone's idea of a national treasure but any student of architecture would see its merits," said the spokeswoman."
(Appendix 6.0)

6.0 LAND USE PLANNING CONTEXT

- 6.1 This section discusses the land-use planning context at a high level, for information and in order to inform how we consider the listed gasholder may be treated by the City of Cardiff Council.

Development Plan

- 6.2 Section 38(6) of the Planning and Compulsory Purchase Act 2004 applying to England and Wales requires planning applications to be determined in accordance with the policies of the statutory development plan unless material considerations indicate otherwise.
- 6.3 The statutory Development Plan for Cardiff comprises
- Adopted City of Cardiff Local Plan (January 1996); and
 - South Glamorgan (Cardiff Area) Replacement Structure Plan (April 1997).
- 6.4 Other material considerations comprise national planning policy (set out in Planning Policy Wales and associated Technical Advice Notes), technical evidence prepared by the Council and any relevant adopted Supplementary Planning Guidance.
- 6.5 Progress towards a replacement development plan can also be a material consideration, with the weight to be attached dependent on how far the preparation of that plan has advanced.
- 6.6 Cardiff County Council consulted on the Draft Cardiff Local Plan (2006-2026) in September 2013. In June 2014 the Council submitted the Draft Local Plan to the Welsh Government and Planning Inspectorate for examination. The Examination in Public (EIP) was held in February 2015.
- 6.7 The Cardiff County Council is currently consulting on Draft Matters Arising Changes Schedule (May 2015) which set out proposed changes to Submission Draft Local Plan, to address matters that arose during the Examination in Public (EiP) hearing. The consultation closes on 23 July 2015. The Inspector's Report is expected in August 2015. Therefore the new plan is likely to be adopted late 2015.
- 6.8 Given the advanced stage of the consultation process, significant weight can be attached to the Draft Local Plan.

Planning Designations

- 6.9 In the adopted Local Plan (1996), the Grangetown Site is designated as "Business, Industrial and Warehousing" use.
- 6.10 However, within the emerging Local Plan, the Grangetown Site is identified as a Strategic Site (Policy KP2). Strategic Sites are defined as those sites that will deliver

500 or more residential units and/or significant employment/mixed uses and have the potential to deliver significant benefits to the city.

- 6.11 The Consultation Draft Matters Arising Changes Schedule (May 2015) proposes changes to the Strategic Site policies which was originally included within the Draft Local Plan. The Schedule proposes a detailed policy regarding the redevelopment aspirations of KP2 (B) Former Gas Works, Ferry Road.
- 6.12 The full text of Draft Policy KP2 (B) is included in **Appendix 7.0**. In summary the policy states the Grangetown Site will deliver a residential-led scheme of 500 units with associated community use and essential, enabling and necessary supporting infrastructure, which will be delivered on a phased basis.
- 6.13 The infrastructure requirements include improved pedestrian access to public transport facilities and new and enhanced pedestrian/cycle links to the local area; contributions to off-site provision of community facilities and education; and the onsite provision of a minimum of 1.2 hectares of open space.

Planning Applications of Potential Relevance

- 6.14 Of the recent applications submitted at the site, the following are relevant.
- 13/01722/DCI - On 28 October 2015 Cardiff Council granted prior approval for the demolition of the former Transco office on the Site.
 - 12/01200/DCI – On 23 October 2012 Cardiff Council granted listed building consent for alterations to the subterranean elements of the listed gas holder. The alterations included removals/desludging of the chamber, the removal of the steelwork and backfilling the void with a clean fill.

7.0 SUMMARY AND CONCLUSIONS

- 7.1 The purpose of this report has been to describe the heritage value of Gasholder No. 3 at Grangetown and place it within the national context of Wales and other listed examples in England.
- 7.2 The gasholder was constructed in 1881, a late date for a Type 14, and has been subject to repairs following bomb damage during WWII and recent works to remove the tank and bell.
- 7.3 It is clear that Gasholder No. 3 does not illustrate an innovative design and it is not important in the development of gasholder technology. In the wider UK context, it is not rare. In our experience the gasholder would most likely be turned down for listing in England.
- 7.4 From our research it is clear that Gasholder No. 3 comprises the only listed example of a gasholder in Wales. Indeed, secondary evidence suggests that it is the only gasholder in Wales. This factor, in itself, is a weighty consideration and raises the structure's interest considerably. Moreover, Cadw has previously publicly expressed its appreciation of the structure, though this opinion was expressed in 2001.

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User ID:	richard.williams1	Low Pressure Medium Pressure Intermediate Pressure High Pressure Some examples of plant items: Valve Depth of Cover Syphon Diameter Change Material Change <tr><td>Date:</td><td>13/06/2016</td></tr><tr><td rowspan="2">Grid Ref:</td><td>Easting: 317416</td></tr><tr><td>Northing: 174215</td></tr><tr><td colspan="2">Internal Use Only</td><td> TITLE: GRANGETOWN MAINS The plan shows those pipes owned by Wales & West Utilities (WWU) in its role as a Licensed Gas Transporter (GT). The information shown on this plan is derived from historic information and may have involved re-scaling plans, and the accuracy of it cannot be guaranteed. Service pipes, valves, syphons, stub connectors, etc. may not be shown but their presence should be anticipated. No warranties are therefore given in respect of it. WWU, its employees and contractors do not accept any liability for any inaccuracy or incompleteness in it. You must use safe digging practices, in accordance with HS(G)47, to establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you or near gas apparatus. The information shown on this plan should not be used beyond 28 days from the date of issue of this plan as it is subject to updating. The plan also provides indications of gas pipes owned by other GTs, or otherwise privately owned, which may be present in the area. This information is not information of WWU and WWU is unable to verify this information or to confirm whether it is accurate or complete. It is supplied voluntarily to assist the user in determining whether they make contact with other GTs or others. The user must obtain such information from the other GT or person concerned. WWU, its employees and contractors do not accept any liability for this information or any inaccuracy or incompleteness in it. <tr><td colspan="2"></td><td> WALES&WEST UTILITIES Wales & West Utilities Ltd., Wales & West House, Spooner Close, Celtic Springs, Coedkernew, Newport, NP10 8FZ. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved. Ordnance Survey License number 0100044308. </td></tr> </td></tr>	Date:	13/06/2016	Grid Ref:	Easting: 317416	Northing: 174215	Internal Use Only		TITLE: GRANGETOWN MAINS The plan shows those pipes owned by Wales & West Utilities (WWU) in its role as a Licensed Gas Transporter (GT). The information shown on this plan is derived from historic information and may have involved re-scaling plans, and the accuracy of it cannot be guaranteed. Service pipes, valves, syphons, stub connectors, etc. may not be shown but their presence should be anticipated. No warranties are therefore given in respect of it. WWU, its employees and contractors do not accept any liability for any inaccuracy or incompleteness in it. You must use safe digging practices, in accordance with HS(G)47, to establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you or near gas apparatus. The information shown on this plan should not be used beyond 28 days from the date of issue of this plan as it is subject to updating. The plan also provides indications of gas pipes owned by other GTs, or otherwise privately owned, which may be present in the area. This information is not information of WWU and WWU is unable to verify this information or to confirm whether it is accurate or complete. It is supplied voluntarily to assist the user in determining whether they make contact with other GTs or others. The user must obtain such information from the other GT or person concerned. WWU, its employees and contractors do not accept any liability for this information or any inaccuracy or incompleteness in it. <tr><td colspan="2"></td><td> WALES&WEST UTILITIES Wales & West Utilities Ltd., Wales & West House, Spooner Close, Celtic Springs, Coedkernew, Newport, NP10 8FZ. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved. Ordnance Survey License number 0100044308. </td></tr>			WALES&WEST UTILITIES Wales & West Utilities Ltd., Wales & West House, Spooner Close, Celtic Springs, Coedkernew, Newport, NP10 8FZ. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved. Ordnance Survey License number 0100044308.
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Grangetown Remediation

Proposal & Cost Estimate to Relocated Penarth IP/MP PRI to Existing Operational Area

Executive Summary

The following proposal is for the construction, installation, testing and commissioning of a replacement Pressure Reduction Installation at the Wales & West Utilities above ground site at Grangetown, Cardiff. The existing Pressure Reduction Installation supplies gas to Penarth and occupies a central position within the Grangetown site.

Aside from non-compliance issues with the current installation, the equipment sterilises a large portion of the site which has development potential. It is proposed to replace the installation and move it to a more advantageous area of the site. A significant amount of pipework can be made redundant by the proposal and shall be removed.

Document Title: Grangetown Remediation - Proposal & Cost Estimate to Relocated Penarth IP/MP PRI to Existing Operational Area					
Rev	Date	By	Reviewed	Approved	Description
0	13/7/16	KVG	SL	SL	First Issue
Issue					
Rev	Date	To		Comments	
0	13/7/16	WWU		First Issue	

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1 SCOPE OF WORK AND TERMS OF REFERENCE

The following proposal by Wales & West Utilities (WWU) is for the construction, installation, testing and commissioning of a Pressure Reduction Installation (PRI), remediation and abandonment of redundant pipe. The new PRI once commissioned will replace an existing PRI and allow the site to be ratified.

1.1 BACKGROUND

Grangetown Above Ground Installation (AGI) is located in southwest Cardiff.

The approximate grid coordinates for the site are:

 Northing: 317250, Easting: 174500

The site address is:

 Grangetown Works,
 Off Ferry Road,
 Grangetown,
 Cardiff.
 CF11 0XR

1.2 EXISTING PLANT

Natural gas is supplied to Grangetown AGI via a 450mm Nominal Bore (NB) Intermediate-Pressure (IP) pipeline, identified as IS180. The site was formally a gas manufacturing site and gas holder station, however only three holders now remain. All three have been decommissioned. Extensive plant and equipment associated with the gas holders is present but not in use. A number of PRI's are located across the site to supply outgoing mains at Medium-Pressure (MP) and Low-Pressure (LP).

The Grangetown site has significant development potential and WWU are proposing to ratify the plant layout to reduce the sterilized area and remove pipework and equipment that is no longer required. WWU therefore propose to undertake a wholesale refurbishment of the site.

2 CONTRACT WORKS

The works shall comprise the construction of a new PRI to supply MS350, an outgoing 300mm NB steel MP main to Penarth. To maximise future development the new PRI will be located adjacent to operation equipment in the north-western corner of the site. The existing Penarth PRI shall be decommissioned and removed, a section of IS180 currently operating at IP will be down-rated and utilised as an extension to the MP and connected to the new PRI. A temporary bypass will be laid during the works to maintain supplies and several under-pressure connections made. Once the new plant has been constructed, tested and commissioned, the existing apparatus is to be decommissioned and abandoned.

Abandoned and redundant pipe work, equipment and civil structures are to be removed from the site by the Contractor. All redundant holder pipework will be removed prior to locating the new PRI to allow safe working areas.

Permanent pipe materials, fittings and components will be provided 'free-issue' by WWU to the Contractor.

The principal work elements shall include but not be limited to that described below.

2.1 SUMMARY OF MECHANICAL WORKS

- Undertake a site survey for hazardous materials, with particular emphasis on asbestos and potential contaminants pertaining to the former use as a gasholder site.

- Confirm below ground plant locations.
- Locate, trial pit to confirm position and mark (colour coded) all utility apparatus.
- Undertake valve closures to isolate redundant gas holder plant and equipment.
- Install a 200x100x250 PRI, kiosk and foundation.
- Connect and install a 300mm NB steel PRI inlet to off an existing Flange.
- Connect and install a 300mm NB steel outlet between the PRI and IS180.
- Hot-Tap MS350 and install a temporary 180mm Polyethylene (PE) bypass operating at MP between MS350 and the new PRI outlet.
- Back-out existing Penarth PRI, vent, purge and remove.
- Sever IS180 downstream of new Penarth PRI and reduce pressures to MP.
- Tie-in down-rated IS180 to the outlet of the new Penarth PRI and MS350.
- Decommission and remove temporary 180PE bypass.

2.2 MECHANICAL SPECIFICATION

The mechanical works are set out as a sequence of operations as per the project drawings.

2.3 GOVERNOR BASE AND GOVERNOR SKID

The general slab specification is a 5.5mx4.0mx0.3m thick slab poured with C30 concrete and to include reinforcing mesh. The slab is to be founded upon compacted imported fill (by Contractor) and such that the surface is flat, level and float finished. The finished slab shall be approximately 100mm above finished ground level with the perimeter profiled to suit the kiosk manufactures installation instructions.

The slab is to be cast with cut-outs to correspond with the inlet and out connections of the PRI skid. Duct entries for electrical cabling and E&I are to be incorporated within the slab. Positions will be confirmed by WWU.

2.4 CIVIL WORKS

- Complete backfill of trenches (including procurement and supply of selected backfill where applicable).
- Make good cut-outs in PRI slab.
- Notify WWU in good time to arrange governor kiosk delivery to site.
- Clear sufficient area to take delivery of governor kiosk and allow lift (by hiab). Kiosk fitting to base by others.
- Prepare ducting runs, instrument bases and E&I bases.
- Install 100NB ducts at a minimum depth of cover of 400mm for electrical, instrumentation, CCTV, earthing and cathodic protection (CP) cables.
- Fit CP posts at locations to be confirmed by WWU.
- Complete chambers around valves.
- Complete 300x300mm concrete section chambers around fire valves operating at MP.

2.5 ELECTRICAL AND E&I

- All E&I install requirements will be undertaken by WWU personnel.

2.6 COMMISSIONING

- Install all vent pipes, loggers and other equipment as necessary in the new governor kiosk.
- Purge new mains and governors.
- Commission new PRI and E&I equipment under Non-Routine Procedure (NRO).
- Provide monitoring and recording over 3 days (minimum) while existing PRI is 'backed out'. Liaise with System Control and Network Services during monitoring process.

- Once proved, decommission existing PRI and E&I equipment, and monitor PRI (duration to be confirmed).

2.7 DEMOLITION

- All redundant pipework and equipment is to be removed by the Contractor.

2.8 FINAL FINISHES

- Remove and transport surplus materials from site. The Contractor shall be responsible for disposal costs.
- Lay weed suppressing membrane and 20mm clean stone to a depth of 50mm within the new compound.
- Demobilise and leave site clean, safe and secure.
- Reinstatement of the fences, roadways, paths, etc.

3 CONSTRUCTION WORKS

3.1 GENERAL

The construction philosophy is to provide an installation “fit for purpose” without compromising safety, security, reliability or the environment. The new proposals for the installation will match the design criteria for any existing plant and all current design standards as appropriate.

3.2 DELIVERABLES

The Contractor will be expected to include for the following deliverables and associated works required to fulfil the activities listed in Section 2:

- Joint site visit with WWU Project Manager prior to commencing physical work.
- Site briefing.
- Weekly updates of all ongoing site works.
- Make contact and liaise with WWU Network Services to confirm proposed works.
- Set up Welfare Facilities.
- Preparation of Health and Safety File.
- Locate and mark up all below ground utility apparatus.
- Remove shrubs/undergrowth as appropriate.
- Remove detritus from work area and disposal.
- Secure site from unauthorised access and install temporary fencing.
- Undertake the works as required and described in the Contract Works.
- Assist WWU Personnel to commission the new equipment.
- Assist WWU Personnel to decommission the redundant equipment.
- Remove scrap and special waste from site.
- Inspect fittings supplied as free issue by WWU and notify WWU of any unsuitability, defects, etc prior to their requirement.
- Clear and secure site after every working day and when all work is completed on the site.
- Assess by risk assessment the requirement for security and security provision where deemed necessary.
- Prepare Non Routine Operations (NRO) in accordance with WWU Safe Control of Operations (SCO) for inspection by WWU Network Controller.
- Contractor to provide a price for supply of a Competent Person.
- Provide P/9 welder, welder's certification and weld procedures for review and approval by WWU Welding Inspector.
- Assist and comply with the requirements of the WWU appointed SPI.

- Prepare, collate and present project closure documentation (including 'as-built' drawing) to WWU within 2 weeks of physical completion.

4 LEGISLATION AND CODES OF PRACTICE

4.1 GENERAL

This scope makes reference to recognised standards, specifications and codes of practice.

It is important to note the documents listed are not exhaustive and other standards may apply, however, this does not relieve the commitment to carry out the work in compliance with the relevant standards.

In the event of a variation from a standard, specification or code of practice, a statement shall be submitted to WWU for approval identifying the area of nonconformity. The terms to be used are as follows:

Non-compliant - Does not fully meet the requirements of the specification.

Alternative - A proposal which does not fully comply with the specification but which an alternative solution is available while meeting operational requirements.

Any variations shall clearly state how the proposal differs from the requirements. If clarification of any requirements is required this shall be sought as soon as possible.

4.2 LEGISLATION

Key legislation applicable to the project will include but not be limited to:

- Gas Act, as amended
- New Roads and Street Works Act.
- Town and Country Planning Act.
- Health and Safety at Work etc. Act.
- The Control of Substances Hazardous to Health Regulations.
- The Electricity at Work Regulations 1989.
- Management of Health and Safety at Work Regulations.
- Pressure Systems Safety Regulations (PSSR).
- Pipeline Safety Regulations (PSR).
- Construction (Design and Management) Regulations (CDM).

5 PRINCIPAL STANDARDS

The works will be constructed and tested in accordance with:

- IGEM/TD/3 Edition 5: Steel and PE pipelines for gas distribution.
- IGEM/TD/13 Edition 2: Pressure regulating installations for transmission and distribution systems.
- IGE/GL/1 Edition 2: Planning of gas distribution systems, etc.
- IGE/GL/5 Edition 2: Procedures for managing networks, modifications and repairs.
- T/PM/SCO/1: Safe control of operations.
- T/PM/SCO/2: Management procedure for issue of Permits to Work and Forms of Authority on the Network.
- T/PM/SCO/4: Management procedure for control of Non-Routine Gas Supply Operations.
- IGE/SR/18 Edition 2: Safe working practices to ensure the integrity of gas pipelines and associated installations.

- HSE guidance document HSG47: Avoiding danger from Underground Services.
- T/PM/MSL/1: Management procedure for main laying and service laying.
- GIS/L2: Specification for steel pipes 21.3 mm to 1,219 mm outside diameter for operating pressures up to 7 Bar (Supplementary to BS EN 10208-1)).
- GIS/PL2 Part 1: Technical specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas Part 1 - Pipes for use at pressures up to 5.5bar
- GIS/PL2 Part 4: Technical specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas Part 4 - Fusion fittings with integral heating element(s).
- GIS/C8: Specification for grey or ductile iron castings for split tee type fittings, including collars, for use at pressures up to 7bar.
- GIS/F7: Technical specification for steel welding pipe fittings 15mm to 450mm inclusive nominal size for operating pressures not greater than 7 bar.
- GIS/V7 Part 1: Technical specification for distribution valves Part 1 - Metal-bodied line valves for use at pressures up to 16bar and construction valves for use at pressures up to 7bar.
- T/SP/CW/5: Specification for field applied external coatings for buried pipework and systems.
- T/SP/CW/6 Part 1: Specification for the external protection of steel line pipe and fittings using fusion bonded powder and other coating systems – Requirements for coating materials and methods of test.
- T/SP/CW/6 Part 2: Specification for the external protection of steel line pipe and fittings using fusion bonded powder and other coating systems – Factory applied coatings.
- T/SP/F/4: Specification for hot tap and stopping off connections (for operating pressures 2 bar to 100bar inclusive).
- T/SP/V/6 Part 2: Technical specification for steel valves for use with natural gas at normal operating pressures above 7 bar Part 2 - 80mm nominal size and below (*where specifying plug valves and outside the scope of GIS/V7 Part 1*).
- T/SP/PA/10: Technical specification for new and maintenance painting at works and site for above ground pipeline and plant installations.
- T/SP/P/1: Specification for welding steel pipe operating at pressures not greater than 7 bar.
- T/SP/P/9: Specification for the welding of fittings to steel pipes operating at pressures of 2 bar and above (supplementary to BS 6900).
- T/SP/PA/9: Technical specification for paint systems - properties and performance requirements.
- T/SP/PA/10: Technical specification for new and maintenance painting at works and site for above ground pipeline and plant installations.
- T/PL/ECP/1: Policy for corrosion control of buried steel systems.
- All documents, standards and codes of practice referred to in the above.

All relevant WWU specifications, standards and codes of practice applicable to this type of system shall apply and unless otherwise specified the latest editions of these documents including all addenda and revisions shall apply.

6 DELIVERY PROGRAMME

The timescales for the key deliverables shall be confirmed.

APPENDIX 1 - Cost Estimate

The estimated budget cost for the works is:

Relocation of Penarth IP - Mp Governor			
Item	Task	Material estimate	Labour estimate
1	Isolate redundant pipework with Valve closures	£500	£1,500
2	Remove redundant Pipewok		£20,000
3	Install new IP - Mp Governor in phase 3 area	£76,000	£2,000
4	Connect new IP - MP Governor to valve on IS180 downstream of Phase 3		£21,000
5	Lay approx 300m of 180 MDPE from new Governor to outlet of existing Penarth IP - MP rig	£3,438	£2,200
6	Fit 300mm Steel Split Tee to outlet of existing Penarth IP MP Governor, drill, spade and connect to 180mm MDPE	£1,500	£2,500
7	Commission new IP - MP governor to feed new 180mm and open valve at 300mm Steel split tee. Back out existing Governor so new governor supplies Penarth (MS350)		£1,100
8	Close inlet Valve to Penarth IP - MP Governor and Stopple IS180 at rear of Dutch Barn	£16,000	£27,500
9	Cut IS180mm at rear of Dutch Barn and tie in to new IP -MP Governor outlet, DO NOT COMMISSION	£2,200	£1,000
10	Close outlet valve from existing Penarth IP - MP rig and cut cap outlet	£0	£0
11	Connect outlet valve to severed IS180	£550	£1,000
12	Commission IS180 at Medium Pressure via new IP-MP Penarth Governor	£2,200	£500
13	Decommission and remove 180mm MDPE bypass	£1,100	£500
<i>Sub Totals</i>		<i>£103,488</i>	<i>£80,800</i>
Total estimated cost		£184,288	

Notes and clarifications

- Costing as current for July 2016.
- WWU will undertake a GL/5 Design Appraisal prior to contract start.
- All PE and steel fittings and valves to be supplied to the Contractor by WWU as free issue.
- The Contractor shall supply all materials and fittings required for pressure testing and blank flanges for temporary blanking valves.



Grangestown Remediation

Proposal & Cost Estimate for Reconfiguring Pressure Reduction Apparatus

Executive Summary

The following proposal is for the construction, installation, testing and commissioning of three pressure reduction skid units at the Wales & West Utilities above ground site at Grangetown, Cardiff. Several existing governor sets scattered across the site currently supply areas of Cardiff and Penarth at low-pressure and medium-pressure will be rendered redundant by the proposed works.

Aside from non-compliance issues with the current installations, the existing equipment sterilises a large portion of the site which has development potential. Replacing the site infrastructure allows modern and efficient equipment to be installed within a discrete defined area of the site.

Document Title: Grangetown Remediation - Proposal & Cost Estimate for Reconfiguring Pressure Reduction Apparatus					
Rev	Date	By	Reviewed	Approved	Description
0	17/8/16	KVG	SL	SL	First Issue
Issue					
Rev	Date	To		Comments	
0	17/8/16	WWU		First Issue	

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1 SCOPE OF WORK AND TERMS OF REFERENCE

The following proposal by Wales & West Utilities (WWU) is for the construction, installation, testing and commissioning new Pressure Reduction Installations (PRI) to be located within a common housing. Supplies to the new PRIs will be off the existing Intermediate-Pressure (IP) inlet to the site. The individual PRIs will have outlets operating at Low-Pressure (LP) to supply the district, Medium-Pressure (MP) to the district and MP to feed Penarth.

The new PRIs once commissioned will replace the existing above ground infrastructure at Grangetown allowing the site to be ratified.

1.1 LOCATION

Grangetown Above Ground Installation (AGI) is located in southwest Cardiff.

The approximate grid coordinates for the site are:

Northing: 317250, Easting: 174500

The site address is:

Grangetown Works,
Off Ferry Road,
Grangetown,
Cardiff.
CF11 0XR

1.2 EXISTING PLANT

Natural gas is supplied to Grangetown AGI via a 450mm Nominal Bore (NB) Intermediate-Pressure (IP) pipeline, identified as IS180. The site was formally a gas manufacturing site and gas holder station, however only three holders now remain. All three have been decommissioned. Extensive plant and equipment associated with the gas holders is present but not in use. A number of PRI's are located across the site to supply the following outlets;

- Cardiff district LP;
- Canton district LP;
- Roath district LP;
- Penarth Road district LP;
- Canton Road / Whitchurch district LP;
- Grangetown MP (MS300);
- Cardiff MP Ring Main West (MS100); and
- Penarth MP (MS350).

The Grangetown site has significant development potential and WWU are proposing to ratify the plant layout to reduce the sterilized area and remove pipework and equipment that is no longer required. WWU therefore propose to undertake a wholesale refurbishment of the site.

2 PROPOSED WORKS

The works shall comprise the demolition of an existing 'Dutch Barn' and clearance of a storage area to make way for three new skid mounted PRI units. A new connection will be made to IS180 and pipe run to form a common header to the new PRIs. New outlet supplies shall be run to various locations across the site to tie-in to the existing district LP outlet pipelines, MS300 and MS100. Commissioning the new PRIs to gas will allow the existing plant to be 'backed-out', isolated and made redundant.

The supply to Penarth, MS350, will require reconfiguration of existing pipework and down-rating of existing mains from IP to MP. This operation will require a temporary supply across the site to maintain supplies while the necessary valve closures, isolations and tie-ins are made.

Once the new plant has been constructed, tested and commissioned, the existing apparatus is to be decommissioned and abandoned.

The principal work elements shall include but not be limited to that described below.

2.1 SUMMARY OF MECHANICAL WORKS

- Undertake a site survey for hazardous materials, with particular emphasis on asbestos and potential contaminants pertaining to the former use as a gasholder site.
- Confirm below ground plant locations.
- Locate, trial pit to confirm position and mark (colour coded) all utility apparatus.
- Undertake valve closures to isolate redundant gas holder plant and equipment.
- Demolish existing 'Dutch Barn' and clear works area.
- Install a 13m x 12m concrete base.
- Connect to IS150 and run 500mm Polyethylene (PE) to a common header with PRI Inlet Valves (PRIIV) upstream of the new PRIs.
- Install three PRI skid units identified as Cardiff IP/LP, Cardiff IP/MP Ring and Penarth IP/MP.
- Install a PRI Outlet Valve (PRIOV) and lay 630PE from Cardiff IP/LP PRI terminating in a buried manifold close to the existing exiting LP supplies.
- Undertake under-pressure connections to Cardiff district LP, Canton district LP, Roath district LP, Penarth Road district LP and Canton Road / Whitchurch district LP and cross-connect to the newly installed manifold.
- Commission to gas before isolating and permanently severing the redundant upstream LP apparatus.
- Install a PRIOV and lay 630PE from the outlet of Cardiff IP/MP Ring PRI to proposed connections points to MS300 and MS100.
- Operate valves on the existing MS300 system to allow a section to be vented to LP before deploying bag stops and severing the main.
- Connect MS300 and MS100 to the new PRI outlet.
- Commission Cardiff IP/MP Ring PRI to gas before backing out the former MP supply.
- Isolate and decommission the MP apparatus.
- Run an 180PE temporary bypass from the new Penarth IP/MP PRIOV to MS350.
- Commission the bypass to gas before backing-out and removing the existing Penarth governor.
- Isolate the IP supply to the former Penarth governor and let the pressure decay to MP.
- Cross-connect the now down-rated MP section of main to the new Penarth IP/MP PRI outlet and MS350.
- Commission the down-rated system before removing the temporary bypass.

2.2 MECHANICAL SPECIFICATION

The mechanical works are set out as a sequence of operations as per the project drawings.

2.3 GOVERNOR BASE AND GOVERNOR SKIDS

The general slab specification is a 13m x 12m slab poured with C30 concrete and to include reinforcing mesh. The slab is to be founded upon compacted imported fill (by Contractor) and such that the surface is flat, level and float finished. The finished slab shall be approximately 100mm above finished ground level with the perimeter profiled to suit the kiosk manufactures installation instructions.

The slab is to be cast with cut-outs to correspond with the inlet and out connections of the PRI skids to be installed. Duct entries for Electrical and Instrumentation (E&I) cabling are to be incorporated within the slab.

2.4 CIVIL WORKS

- Complete backfill of trenches (including procurement and supply of selected backfill where applicable).
- Make good cut-outs in PRI slab.
- Arrange governor kiosk delivery to site.
- Clear sufficient area to take delivery of the governor kiosk and allow lift.
- Prepare ducting runs, instrument bases and E&I bases.
- Install 100NB ducts at a minimum depth of cover of 400mm for electrical, instrumentation, CCTV, earthing and cathodic protection (CP) cables.
- Fit CP posts at locations to be confirmed by WWU.
- Complete chambers around valves.
- Complete 300x300mm concrete section chambers around fire valves operating at MP and LP.

2.5 ELECTRICAL AND E&I

- All E&I install requirements will be undertaken by WWU personnel.

2.6 COMMISSIONING

- Install all vent pipes, loggers and other equipment as necessary in the new PRI housing.
- Purge new mains and governors.
- Commission new PRIs and E&I equipment under Non-Routine Procedure (NRO).
- Provide monitoring and recording over 3 days (minimum) while existing PRIs are 'backed out'. Liaise with System Control and Network Services during monitoring process.
- Once proved, decommission existing PRI and E&I equipment, and monitor PRI (duration to be confirmed).

2.7 DEMOLITION

A large quantity of plant and equipment will be rendered redundant by the works and shall be cleared from site by the Contractor. This shall include the breaking of redundant concrete bases and pipe supports and their removal.

2.8 FINAL FINISHES

- Remove and transport surplus materials from site. The Contractor shall be responsible for disposal costs.
- Lay weed suppressing membrane and 20mm clean stone to a depth of 50mm within the new compound.
- Demobilise and leave site clean, safe and secure.
- Reinstatement of the fences, roadways, paths, etc.

3 CONSTRUCTION WORKS

3.1 GENERAL

The construction philosophy is to provide an installation "fit for purpose" without compromising safety, security, reliability or the environment. The new proposals for the installation will match the design criteria for any existing plant and all current design standards as appropriate.

3.2 DELIVERABLES

The Contractor will be expected to include for the following deliverables and associated works required to fulfil the activities listed in Section 2.

The Principal Contactor will be expected to fulfil the following:

- Joint site visit with WWU Project Manger prior to commencing physical work.
- Site briefing.
- Weekly updates of all ongoing site works.
- Make contact and liaise with WWU Network Services to confirm proposed works.
- Set up Welfare Facilities.
- Preparation of Health and Safety File.
- Locate and mark up all below ground utility apparatus.
- Remove shrubs/undergrowth as appropriate.
- Remove detritus from work area and disposal.
- Secure site from unauthorised access and install temporary fencing.
- Undertake the works as required and described in the Contract Works.
- Assist WWU Personnel to commission the new equipment.
- Assist WWU Personnel to decommission the redundant equipment.
- Remove scrap and special waste from site.
- Inspect fittings supplied as free issue by WWU and notify WWU of any unsuitability, defects, etc prior to their requirement.
- Clear and secure site after every working day and when all work is completed on the site.
- Assess by risk assessment the requirement for security and security provision where deemed necessary.
- Prepare Non Routine Operations (NRO) in accordance with WWU Safe Control of Operations (SCO) for inspection by WWU Network Controller.
- Contractor to provide a price for supply of a Competent Person.
- Provide P/9 welder, welder's certification and weld procedures for review and approval by WWU Welding Inspector.
- Assist and comply with the requirements of the WWU appointed SPI.
- Prepare, collate and present project closure documentation (including 'as-built' drawing) to WWU within 2 weeks of physical completion.

4 LEGISLATION AND CODES OF PRACTICE

4.1 GENERAL

This scope makes reference to recognised standards, specifications and codes of practice.

It is important to note the documents listed are not exhaustive and other standards may apply, however, this does not relieve the commitment to carry out the work in compliance with the relevant standards.

In the event of a variation from a standard, specification or code of practice, a statement shall be submitted to WWU for approval identifying the area of nonconformity. The terms to be used are as follows:

- Non-compliant - Does not fully meet the requirements of the specification.
- Alternative - A proposal which does not fully comply with the specification but which an alternative solution is available while meeting operational requirements.

Any variations shall clearly state how the proposal differs from the requirements. If clarification of any requirements is required this shall be sought as soon as possible.

4.2 LEGISLATION

Key legislation applicable to the project will include but not be limited to:

- Gas Act, as amended
- New Roads and Street Works Act.
- Town and Country Planning Act.
- Health and Safety at Work etc. Act.
- The Control of Substances Hazardous to Health Regulations.
- The Electricity at Work Regulations 1989.
- Management of Health and Safety at Work Regulations.
- Pressure Systems Safety Regulations (PSSR).
- Pipeline Safety Regulations (PSR).
- Construction (Design and Management) Regulations (CDM).

4.3 PRINCIPAL STANDARDS

The works will be constructed and tested in accordance with:

- IGEN/TD/3 Edition 5: Steel and PE pipelines for gas distribution.
- IGEN/TD/13 Edition 2: Pressure regulating installations for transmission and distribution systems.
- IGE/GL/1 Edition 2: Planning of gas distribution systems, etc.
- IGE/GL/5 Edition 2: Procedures for managing networks, modifications and repairs.
- T/PM/SCO/1: Safe control of operations.
- T/PM/SCO/2: Management procedure for issue of Permits to Work and Forms of Authority on the Network.
- T/PM/SCO/4: Management procedure for control of Non-Routine Gas Supply Operations.
- IGE/SR/18 Edition 2: Safe working practices to ensure the integrity of gas pipelines and associated installations.
- HSE guidance document HSG47: Avoiding danger from Underground Services.
- T/PM/MSL/1: Management procedure for main laying and service laying.
- GIS/L2: Specification for steel pipes 21.3 mm to 1,219 mm outside diameter for operating pressures up to 7 Bar (Supplementary to BS EN 10208-1)).
- GIS/PL2 Part 1: Technical specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas Part 1 - Pipes for use at pressures up to 5.5bar
- GIS/PL2 Part 4: Technical specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas Part 4 - Fusion fittings with integral heating element(s).
- GIS/C8: Specification for grey or ductile iron castings for split tee type fittings, including collars, for use at pressures up to 7bar.
- GIS/F7: Technical specification for steel welding pipe fittings 15mm to 450mm inclusive nominal size for operating pressures not greater than 7 bar.
- GIS/V7 Part 1: Technical specification for distribution valves Part 1 - Metal-bodied line valves for use at pressures up to 16bar and construction valves for use at pressures up to 7bar.
- T/SP/CW/5: Specification for field applied external coatings for buried pipework and systems.
- T/SP/CW/6 Part 1: Specification for the external protection of steel line pipe and fittings using fusion bonded powder and other coating systems – Requirements for coating materials and methods of test.
- T/SP/CW/6 Part 2: Specification for the external protection of steel line pipe and fittings using fusion bonded powder and other coating systems – Factory applied coatings.
- T/SP/F/4: Specification for hot tap and stopping off connections (for operating pressures 2 bar to 100bar inclusive).

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- T/SP/V/6 Part 2: Technical specification for steel valves for use with natural gas at normal operating pressures above 7 bar Part 2 - 80mm nominal size and below (where specifying plug valves and outside the scope of GIS/V7 Part 1).
 - T/SP/PA/10: Technical specification for new and maintenance painting at works and site for above ground pipeline and plant installations.
 - T/SP/P/1: Specification for welding steel pipe operating at pressures not greater than 7 bar.
 - T/SP/P/9: Specification for the welding of fittings to steel pipes operating at pressures of 2 bar and above (supplementary to BS 6900).
 - T/SP/PA/9: Technical specification for paint systems - properties and performance requirements.
 - T/SP/PA/10: Technical specification for new and maintenance painting at works and site for above ground pipeline and plant installations.
 - T/PL/ECP/1: Policy for corrosion control of buried steel systems.
 - All documents, standards and codes of practice referred to in the above.

All relevant WWU specifications, standards and codes of practice applicable to this type of system shall apply and unless otherwise specified the latest editions of these documents including all addenda and revisions shall apply.

5 DELIVERY PROGRAMME

The timescales for the key deliverables shall be confirmed.

Appendix 1. Cost Estimate

The estimated budget cost for the works is:

Phase 1 Installation of three new District Governors on current location of Dutch barn

Item number	Task	Budget Labour	Budget Materials
1	Demolish existing Dutch Barn Structure and clear area of stored pipe and material	5,000	
2	Cast Base, approximate dimensions 13m x 12m	3,840	4,500
3	Hot Tap 18" x 18" Tee and Valve to IS 180 drill and spade	7,000	8,500
4	Fabricate inlet legs to new Governor location, 1 x 500mm, 1 x 400mm, 1x 200mm	7,000	14,000
5	Locate Governors on base connect inlet riser legs	3,000	210,000
6	Fabricate outlet legs from new Governor location, 1x 600mm, 1x 500mm, 1x 250mm, terminating with Valves	10,000	8,000
7	Locate Governor Kiosk	500	57,500
7A	5 weeks preliminary works	32,000	
Subtotal		68,340	302,500

Phase 2 Commissioning of new Cardiff IP - LP Governor

Item number	Task	Budget Labour	Budget Materials
8	Excavate on 12" LP Penarth Main	3,840	
9	Fit and drill under pressure tee, spade valve	1,665	500
10	Lay 315mm to Manifold	1,280	378
11	Excavate on 24" LP Canton Main	3,840	
12	Fit and drill under pressure tee, spade valve	2,045	3,289
13	Lay 630mm to Manifold	1,280	903
14	Excavate on 24" LP Roath Main	3,840	
15	Fit and drill under pressure tee, spade valve	2,045	3,289
16	Lay 630mm to Manifold	1,280	903
17	Excavate on 18" LP Whitchurch Main	3,840	
18	Fit and drill under pressure tee, spade valve	2,005	2,504
19	Lay 630mm to Manifold	1,280	903
20	Excavate on 630mm LP at Header and lay 630mm to Manifold Valve to be fitted at header	6,400	2,703
21	Connect new Manifold (630mm) to 9, 12 15, 18	2,560	4,500
22	Commission new Governor to feed into Penarth, Canton, Roath and Whitchurch	1,280	
23	Isolate Penarth, Canton, Roath and Whitchurch by closing Valves 077, 081, 083, 086	1,280	
24	Isolate Grangtown 500mm PE with bag stops adjacent to rising main	6,000	
25	Bagstop 12" LP Penarth Main	7,000	
26	Stopple 24" LP Canton Main	30,000	4,140
27	Stopple 24" LP Roath Main	30,000	4,140
28	Stopple 18" LP Whitchurch Main	10,000	400
29	Isolate 500mm Grangtown main by closing valve 078	1,280	
30	Connect 500mm Grangtown main to new 630mm manifold	2,560	900
31	Isolate Existing Low Pressure Outlet from phase 3	2,560	
Subtotal		129,160	129,160

Phase 3 commissioning of new Cardiff IP - MP Governor

Item number	Task	Budget Labour	Budget Materials
32	Excavate on 24" MP Steel main at Gas Works Lane	5,120	
33	Weld 24" Full Encrolement Tee, Drill and Spade Valve	6,000	4,500
34	Connect to new 630mm PE manifold	1,280	
35	Lay 630mm to new Valve in 33 and adjacent to 630mm adjacent to rising main	5,120	3,200
35A	Isolate 630mm PE Mp main (Grangtown) by closing Valve 042 on header and closing Valve at entrance to IKEA	2,560	
36	Venting section to Low Pressure will allow Low Pressure bags to be installed at connection point to negate need to purge	1,280	
37	Cut 630mm PE Mp main (Grangtown) and connect to new 630mm PE Manifold	5,120	1,200
38	Commission new IP - LP Governor to feed into Ring Main	1,280	
39	Stopple 24" Steel MP Main at Gas works lane and cap	30,000	4,140
40	Isolate Existing Pressure Outlet from phase 3	1,280	
Subtotal		59,040	59,040

Phase 4 relocation of Penarth IP - Mp Governor

Item number	Task	Budget Labour	Budget Materials
41	Connect new IP - MP Governor to valve on IS 180 downstream of phase 3	18,000	6,000
42	Lay approx 300m of 180 mdpe from new Governor to outlet of existing Penarth IP - MP rig	3,438	2,200
43	Fit 315mm Branch saddle to outlet of existing Penarth IP MP Governor, drill, spade and connect to 180mm MDPE	3,000	1,100
44	Penarth	1,280	1,100
45	Close inlet Valve to Penarth IP - MP Governor and Stopple IS180 at rear of Dutch Barn	31,000	11,500
46	Cut IS 180mm at rear of Dutch Barn and tie in to new IP -MP Governor outlet, DO NOT COMMISSION	2,200	1,000
47	Close outlet valve from existing Penarth IP - MP rig and cut IS 180 at closest point	1,280	0
48	Connect outlet valve to severed IS 180	550	1,000
49	Commission IS 180 at Medium Pressure via new IP-MP Penarth Governor	2,200	500
50	Decommission and remove 180mm MDPE	1,100	
	Telemetry for all PPI's	15,000	100,000
At this stage Phase 3 and the old Penarth IP - MP Governor are decommissioned and the Network is being supplied by the new Governors		77,768	124,400
Total of all prices		335,588.0	615,100.0
Grand Total		950,688.0	