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Remediation Strategy Report Langstone Technology Park, Havant

Prepared for AG Langstone B.V.

November 2021

10/1425/005 Rev. 01

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1.0 Introduction

1.1 Background

Clancy Consulting Limited has been instructed by AG Langstone B.V. to prepare a Remediation Strategy report for a site located at Langstone Technology Park, Havant. A site location plan is shown in Appendix I.

The primary objective of this report is to document a suitable, detailed strategy for the safe, legislatively compliant and controlled regeneration of the land for continued commercial use in a manner that will ensure that no unacceptable level of risk exists with regard to future site occupants, residents within the wider area or to the environment and controlled waters.

This Remediation Strategy report should be read in conjunction with Clancy Consulting's previous investigation reports for the site, summarised in Section 2, below.

1.2 Site Location & Description

The wider Langstone Technology Park comprises a roughly rectangular parcel of land occupying an area of approximately 16Ha. The site is located toward the southern periphery of Havant, 600m south of the town centre and 1.5km south-east of Junction 5 of the A3(M).

The wider site comprises a series of large buildings subdivided into leased units of mixed uses. Occupying the centre of the site are a series of buildings including two plant buildings ('Building 2000 and 3000'), offices and amenity complex with associated courtyards ('Building 4000'), a large data and distribution centre ('Building 5000') with a waste storage area to the west, along with three-storey office buildings ('Building 6000 and 7000'). A small nursery is present to the south of Building 5000.

Located in the north of the site is 'Building 1000', a single storey structure built on top of a man-made embankment and understood to contain a number of offices, manufacturing and laboratory units with access tunnels running from the car park to the north to beneath the building.

Toward the south-western corner of the site is a small gymnasium, vehicle washing area (with associated subsurface drainage), a storage area and a number of circular historic tank bases.

Access infrastructure and soft landscaping covers the rest of the site, which include a number of engineered slopes. The remainder of the site is currently occupied by car parking areas (including the majority of the south of the site).

1.3 Historical Development

Historical OS maps of the area indicate the site was undeveloped until the early 1900s, when a large sewage works and engine house occupied the north-eastern section of the site. During the subsequent decades this facility underwent significant expansion. In the mid 1950s, an allotment garden occupied the centre of the site. In the early to mid 1970s, the site had undergone large-scale redevelopment, resulting in the construction of many of the existing commercial / industrial units. A large building and an electrical sub-station occupied the southern section of the site, within the existing car-parking area. By the early 1990s the building / electricity substation across the south of the site had been replaced by the existing car park and the site is understood to have been in its current configuration. The surrounding area has comprised a mix of undeveloped, and industrial land uses including mills, sewage works, works and industrial units and a retail park with associated infrastructure.

1.4 Redevelopment Plan

It is proposed to partially demolish and reconfigure part of B1000 in the northern section of the site and to construct twelve light industrial / commercial units with associated parking in the southern section of the site..

Proposed site layouts and floor plans are shown in Appendix I.

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1.5 Environmental Setting

The site is underlain by a Secondary A Aquifer, relating to the River Terrace Deposits, followed by a Principal Aquifer, relating to the White Chalk Subroup. However, the site is not located within a groundwater Source Protection Zone (SPZ) and the nearest groundwater abstraction is located approximately 460m to the north of the site. The Langstone Mill Channel is present beyond the eastern boundary of the site.

2.0 Previous Site Investigation

Clancy Consulting Ltd have carried out a number of phases of site investigation at Langstone Technology Park, which are covered by the following documents:

- 10/1425/001: Geo-Environmental Appraisal Report, dated August 2019;
- 10/1425/003: Report on Hand Dug Pits in the Vicinity of Building 1000, dated June 2020; and
- 10/1425/004: Supplementary Site Investigation Report, dated September 2020.

Relevant information from the above assessments are summarised in the section below.

2.1 Site Investigation Works

The following intrusive investigation works were completed across the site as part of the assessments summarised above:

- Six cable percussion boreholes (BH01 to BH06) to depths ranging from approximately 20.00m to 30.00m below ground level (bgl);
- 32 window samples boreholes (WS01 to WS32) to depths ranging from approximately 4.45m to 5.45m bgl;
- Installation of groundwater and ground gas monitoring wells in selected boreholes;
- Two machine excavated trial pits (SA01 and SA02) to depths of up to approximately 2.00m bgl; and
- Nine hand dug foundation inspection pits (HPT1 to HPT4 and TP01 to TP05) to depths of up to 1.40m bgl.

Ground gas monitoring was undertaken within wells installed in boreholes BH01, BH03, WS03 and WS04 on four occasions from 12th to 30th September 2019.

Groundwater was collected for chemical laboratory analysis from five wells screened within the River Terrace Deposits (WS03, WS09, WS14, WS20 and WS29) and two wells screened within the White Chalk Subgroup (BH05 and BH06).

2.2 Ground Conditions

Ground conditions encountered in exploratory holes comprised up to 3.10m thickness of Made Ground, underlain by River Terrace Deposits to depths of up to approximately 6.00m bgl. The White Chalk Subgroup was recorded beneath the River Terrace Deposits and proven to a maximum depth of approximately 25.00m bgl.

Groundwater was recorded in the River Terrace Deposits from depths of approximately 2.00m bgl. Groundwater in the superficial deposits are considered to be in hydraulic conductivity within groundwater in the underlying White Chalk Subgroup Principal Aquifer.

Visual and olfactory evidence of hydrocarbon contamination was recorded within the Made Ground and shallow River Terrace Deposits in boreholes WS02 and WS05 as part of the August 2019 site investigation, located in the west of the site in the vicinity of a historical waste storage area and former fuel tanks. Further visual and olfactory evidence of hydrocarbon contamination was recorded in boreholes WS19, to WS21, WS29, WS31 and WS32, drilled in September 2020 in the vicinity of boreholes WS02 and WS05 to delineate previously recorded contamination.

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2.3 Contamination Assessment

Contaminants of concern were recorded in groundwater sampled from beneath the site. However, concentrations were only marginally elevated above adopted assessment criteria.

TPH compounds were recorded in Made Ground and natural strata at concentrations in excess of their solubility limits in two hotspot locations focused around boreholes WS02 and WS05. A number of VOC and SVOC compounds were also recorded within samples collected from the hotspot locations. However, no published assessment criteria for these contaminants are currently available. The excavation and off-site disposal of contaminated soils in these locations will lead to the betterment of groundwater quality beneath the site. Excavation works should take place under the supervision of a qualified geo-environmental consultant. Soil samples should be collected for chemical laboratory analysis to confirm that remaining contaminant concentrations in soils are at acceptable levels.

No significant soil based source of PAH contamination in groundwater was identified beneath the site. It is considered that this is representative of either an off-site source, or an on site source not identified during intrusive investigation works undertaken to date. A contamination watching brief by a qualified geo-environmental consultant is therefore recommended during the groundworks phase of the proposed development on site. If visual or olfactory evidence of contamination is encountered during development, outside those identified during this study, the consultant would collect additional samples for further assessment into the potential risk these soils pose to groundwater. Guidance would then be given regarding the treatment / disposal of contaminated soils off-site.

Other contaminants were not recorded at concentrations considered to represent a significant risk to human health.

2.4 Ground Gas Results

Four rounds of ground gas monitoring were completed as part of the initial site investigation in August 2019. Monitoring recorded carbon dioxide concentrations of up to 7.2% by volume. Although ground gas flow rates were low and the ground gas screening level indicated that CIRIA Characteristic Situation 1 (CS1) would apply to the site, given the elevated concentrations of carbon dioxide recorded it was recommended that protection measures were adopted in accordance with guidance provided in BS 8485: 2015 “Code of Practice for the Design of Protective Measures for Methane & Carbon Dioxide Ground Gases for New Buildings”.

2.5 Revised CSM / Risk Assessment

The assessments summarised above identified a number of pollutant linkages associated with the site that would potentially be active following the proposed redevelopment. These included:

- The potential risk to future site users in enclosed areas from elevated concentrations of carbon dioxide recorded in monitoring wells installed beneath the site;
- The potential risk to groundwater resource receptors from hydrocarbon contamination recorded in soil samples collected in the vicinity of boreholes WS02 and WS05 in the west of the site; and
- The potential risk to future site users and groundwater resource receptors from an off-site, or previously unidentified on site source of PAH contamination.

A number of measures were recommended to break the pollutant linkages summarised above. These are discussed in detail in the section below.

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3.0 Site Remediation

3.1 Summary of Mitigation Measures Required

Based on the information obtained during the Site Investigations, summarised above, the necessary ground preparatory and remediation works are set out below:

- Site Setup/H&S Provision by appointed contractor.
- Watching brief by a qualified geo-environmental consultant during removal of known contamination hotspots and during groundworks across the site in general, in order to identify potential previously unidentified sources of contamination.
- Careful inspection of the areas where olfactory evidence of organic contamination is identified and use of PID to assess suitability of material for retention on site.
- Excavation and removal of hydrocarbon contamination hotspots (plan provided in Appendix I).
- Collection of soil samples from the base and sidewalls of resulting excavations by a qualified consultant for chemical laboratory analysis.
- Collection and laboratory analysis of soil samples from finished formation level across the site to verify that residual contaminant concentrations are below assessment criteria protective of future commercial site users.
- Provision of 300mm clean soil cover in all soft landscaped areas including a minimum of 150mm thickness topsoil.
- Collection of samples from clean topsoil cover by a qualified consultant for chemical laboratory analysis.
- Installation of ground gas protection measures beneath new buildings corresponding to CIRIA CS2, in accordance with guidance provided in BS 8485: 2015 “Code of Practice for the Design of Protective Measures for Methane & Carbon Dioxide Ground Gases for New Buildings”.
- Independent verification of the installation of gas protection measures by a qualified third person.
- Provision of verification report documenting the remediation works undertaken to assist with discharge of planning conditions relating to contaminated land.

The mitigation measures summarised above are discussed in further detail below.

3.2 Site Set Up and Safety

The Principal Contractor should provide all site personnel with a site-specific health and safety induction prior to commencement of work on site.

During the remediation works, all personnel on site will comply with guidance provided in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following shall be provided:

- Protective clothing, footwear, gloves and eyewear (personnel should be instructed in why and how they are to be used).
- Hand-washing facilities.
- Smoking limited to designated areas.

Site-specific precautions will be required as a result of the contamination status of the site, and due to the presence of potentially harmful vapours. A full set of site safety requirements will be established by the Principal Contractor as part of their Risk Assessment / Method Statement, however the following additional issues / recommendations should be included.

The appointed groundworks contractor should be made aware of the possible ACMs within the Made Ground soils and a watching brief should be set up to identify potential ACMs within excavations. If identified, appropriate PPE and precautionary measures should be adopted when working in this part of the site.

During redevelopment it is possible that construction workers, and future maintenance workers may become exposed to elevated ground-gas concentrations, and depleted oxygen levels in confined and sub-surface

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excavations. All works within confined spaces or below ground should therefore be suitably risk assessed and appropriate health & safety measures/site procedures put in place to ensure the safety of workers. This may include but should not be limited to; the checking and monitoring of the atmosphere in any such excavations or spaces prior to entry of personnel, site induction for all staff and visitors on ground-gas risks, training / safety awareness courses and the issue of personal protective equipment/RPE.

3.3 Contractor Responsibilities

The appointed Principal Contractor should, where necessary, undertake the following:

- Establish the boundaries of the site and the working areas.
- Liaise with the Local Authority regarding working hours, noise / dust / odour control, and protected trees.
- Liaise with the Local Water Company regarding any proposed discharge to sewer.
- Prepare the necessary COSHH statements and Health & Safety Plan in accordance with CDM regulations.

It will be the responsibility of the appointed Principal Contractor to assess the risk to site personnel from contamination and vapours identified at the site in order to determine the level of precautions required.

As a precursor to site construction works investigation, boreholes and monitoring wells located beneath the proposed building structures will be formally decommissioned in accordance with EA publication (2005) 'Decommissioning of Redundant Boreholes and Wells'. Each borehole should be filled and reinstated using a low permeability grout in order to prevent the establishment of a preferential pathway for ground gases and migrating contaminants.

The contractor shall also ensure:

- Good practices relating to personal hygiene are adopted.
- Suitable precautions are taken to prevent the spread of mud and debris on public highways.
- Refuelling of mobile plant is undertaken in a designated area.
- Above ground oil storage tanks complies with current statutory/best practice guidance.

A spill kit shall be kept on site, adjacent to the designated refuelling area.

3.4 Excavation and Removal of Contaminated Soils

Visual and olfactory evidence of hydrocarbon contamination was recorded within the Made Ground and shallow River Terrace Deposits in boreholes WS02 and WS05 as part of the August 2019 site investigation, located in the west of the site in the vicinity of a historical waste storage area and former fuel tanks. Further visual and olfactory evidence of hydrocarbon contamination was recorded in boreholes WS19, to WS21, WS29, WS31 and WS32, drilled in September 2020 in the vicinity of boreholes WS02 and WS05 to delineate previously recorded contamination. Chemical laboratory analysis of soil samples collected from these locations identified TPH compounds at concentrations in excess of their solubility limits. This was considered to represent a potential risk to groundwater resource receptors beneath the site. Therefore, if was recommended that these contamination hotspots be excavated and disposed of appropriately off-site. Solubility limits are a temperature dependent expression of the mass of a substance that will dissolve completely in water, used directly within the CLEA model. An ambient soil temperature of 10 degrees Celsius has been assumed. These limits are provided in Appendix II.

The delineation of hydrocarbon in the vicinity of borehole WS05 was restricted by the presence of concrete tank bases. It is considered possible that further contamination may be present beneath these structures. These will therefore need to be broken out and any identified contaminated soils beneath excavated and disposed of appropriately.

The excavation of contaminated soil in these locations should be supervised by a qualified geo-environmental consultant. The consultant will identify visual evidence of contamination in soils and direct excavation works. A Photo Ionisation Detector (PID) will be used to identify volatile contaminant of concern in soil arisings. PID

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readings in excess of 10ppm will justify the sampling of soils for chemical laboratory analysis and/or further excavation to remove impacted soils.

It is anticipated that excavations will, as a minimum, extend beyond the base of the Made Ground and into the shallow natural soils at depths of approximately 2.00m bgl. However, this will be confirmed by the supervising consultant on site. It may be necessary to deepen excavations locally to chase out visual and olfactory evidence of contamination.

Contaminated soils excavated from these hotspot areas will be stockpiled in designated areas prior to disposal Stockpiled will be placed on impermeable hard surfacing or plastic sheeting to prevent leaching of contamination into shallow soils.

Materials exported to landfill should be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991 and the Landfill Regulations (England and Wales) 2002. A transfer note should be completed, signed and retained by the parties involved. The transfer note should include the volume and nature of the waste material, details of the source, disposal site and the haulier.

Once contaminated soils have been excavated, the supervising consultant shall collect soil samples from the sides and floor of the resulting excavation. Samples will be analysed for speciated TPH compounds by a UKAS accredited analytical laboratory. The results will be compared against relevant solubility limits for the compounds, as well as assessment criteria protective of future site users. If recorded concentrations are below these limits, remaining residual contamination in surrounding soils will be considered to be below safe limits and the excavation may be backfilled with clean, inert material. If results are recorded in excess of these limits, additional soils will be removed and the excavation extended. Sampling and testing of soil samples from the wall and base of the excavation will be repeated.

Soils samples will also be collected from finished formation level across the site on a grid pattern of approximately 100m and submitted for chemical laboratory analysis to verify that residual contaminant concentrations are below assessment criteria protective of future commercial site users.

The appointed groundworks contractor should be made aware that Asbestos Containing Materials (ACMs) may be present in the Made Ground soils and to ensure that a watching brief is undertaken to identify potential ACMs. Appropriate PPE and mitigation measures should be adopted if ACMs are encountered. Should significant quantities of suspected ACMs be identified, works in the vicinity should be halted expert advice sought. A qualified person may need to collect samples for laboratory analysis before removing ACMs for appropriate disposal off-site.

Following completion, works to remove identified contamination hotspots will need to be detailed in a Verification Report. This will be required by the Local Authority to demonstrate that specified remediation works have been carried out successfully and to discharge planning conditions relating to the remediation of identified ground contamination.

The works summarised above would apply to the remediation of previously unidentified contaminated soils recorded across the proposed development area during the groundworks phase of the proposed development. Suspected contamination identified on site shall be brought to the attention of the supervising geo-environmental consultant.

3.5 Clean Cover System

A 300mm layer of verified clean cover, including at least 150mm thickness topsoil, will be required in soft landscaped areas to provide a barrier between site users and contaminants present in Made Ground beneath the site. Given the prevalence of Made Ground beneath the site and recorded concentrations of contaminants of concern, it is considered that a geotextile ‘no dig’ barrier should be placed at the base of the clean cover system to prevent mixing with underlying soils and inadvertent excavation into contaminated material by maintenance staff.

Following placement of the clean cover, samples should be collected from each soft landscaped area by a qualified geo-environmental consultant, or one sample per 100m^3 in large landscaped areas, whichever is the

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greater. The samples should be analysed by a UKAS accredited laboratory for a wide range of organic and inorganic contaminants, including metals, asbestos, PAH and TPH. The analysis results should be compared against S4UL assessment criteria protective of commercial site workers to confirm its suitability for use. If contaminants of concern are recorded at concentrations in excess of these assessment criteria, or if asbestos is recorded at concentrations in excess of 0.001% by weight, the soil in the corresponding landscaped area should be removed and disposed of appropriately off-site and replaced with clean material. This replacement material would require further sampling and analysis for verification purposes.

Topsoil provided in the top 150mm of the clean cover should be compliant with the specification provided within British Standard BS 3882:2015.

The thickness of the clean cover provided should be confirmed by the geo-environmental consultant at the time of sampling by excavating a hand dug pit to the base of the clean cover. One pit should be dug to confirm thickness for each soft landscaped area, or one per 100m^3 in large landscaped areas, whichever is the greater. Scaled photographs should be taken of each pit, demonstrating the thickness of clean cover provided.

Where contaminant pathways other than direct contact / ingestion by future site users are present (such as inhalation of vapours in enclosed areas, or where contaminants pose a risk to controlled water receptors), impacted soils should be removed in line with the recommendations in Section 3.4 prior to placement of the clean cover system.

3.6 Potable Water Supply Pipes

Concentrations of hydrocarbon contaminants recorded in Made Ground beneath the site are generally in excess of UK WIR assessment criteria for the use of standard polymeric potable water supply pipes. Barrier pipe should be used, or pipes laid in lined, dedicated trenches and backfilled with clean, inert material.

3.7 Re-use of Material-Waste Management

Should site won material be intended for re-use on site, a Materials Management Plan, produced by a suitably qualified environmental consultant in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP), will be required.

3.8 Gas Protection Measures

Four rounds of ground gas monitoring were completed as part of the initial site investigation in August 2019. Monitoring recorded carbon dioxide concentrations of up to 7.2% by volume. Although ground gas flow rates were low and the ground gas screening level indicated that CIRIA CS1 would apply to the site, given the elevated concentrations of carbon dioxide recorded it is recommended that protection measures are adopted in accordance with guidance provided in BS 8485: 2015 “Code of Practice for the Design of Protective Measures for Methane & Carbon Dioxide Ground Gases for New Buildings”.

A range of options are provided within British Standard BS 8485: 2015 for the provision of ground gas protection measures. An example of a suitable protection system for the proposed development (based on the development comprising ‘Type C commercial type buildings and CIRIA CS2 applying to the site) may comprise:

- A cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations;
- A pressure relief pathway (usually formed of low fines gravel or with a thin geo-composite blanket or strips terminating in a gravel trench external to the building); and
- A suitably durable gas resistant membrane.

It should be noted that other combinations of protection measures may be adopted, as long as they’re compliant with BS 8485: 2015.

The installation of ground gas protection measures should be verified by a qualified independent third party. This person will take photographs and suitable measurements demonstrating the correct installation of gas

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protection measures and provide a verification report in accordance with the requirements of CIRIA 735 for submission to the Local Authority.

4.0 Site Certification

On completion of the remediation works discussed above, a verification report, produced by a qualified consultant, should be provided to the Local Planning Authority as evidence that the works have taken place in accordance with this remediation strategy document.

This document should include the following:

- Daily records of the site activities.
- Date and weather conditions.
- Variations to the agreed Remediation Strategy.
- Validation sampling and/or chemical test certificates for imported and/or site-derived materials, as well as their origin and location on site
- Validation sampling and chemical test certificates associated with excavated contamination hotspots.
- Volumes of materials exported to landfill.
- Plans showing remediated and validated areas as appropriate.
- Record of consultations with regulators (if required).
- Photographic records.
- Details of the Materials Management Plan where materials are assessed, retained and translocated within the relevant red-line area or the wider technology park site under the Definition of Waste Code of Practice (DoWCOP).
- A narrative of remediation works and verification sampling undertaken, and how this has affected the scope & extent of works.

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APPENDIX I

DRAWINGS

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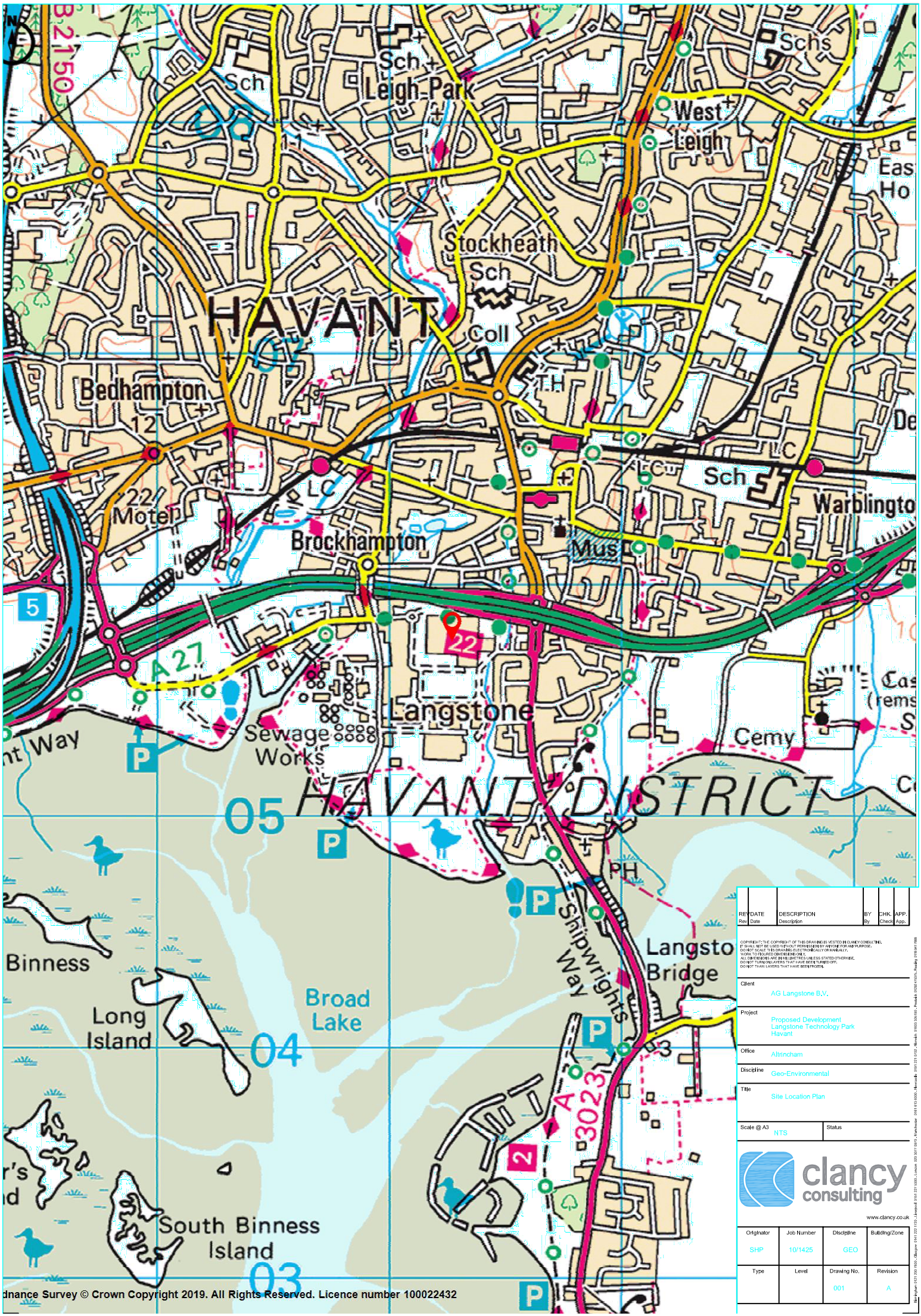

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Project: Proposed Development Langstone Technology Park Havant

Office: Altrincham

Discipline: Geo-Environmental

Title: Site Location Plan

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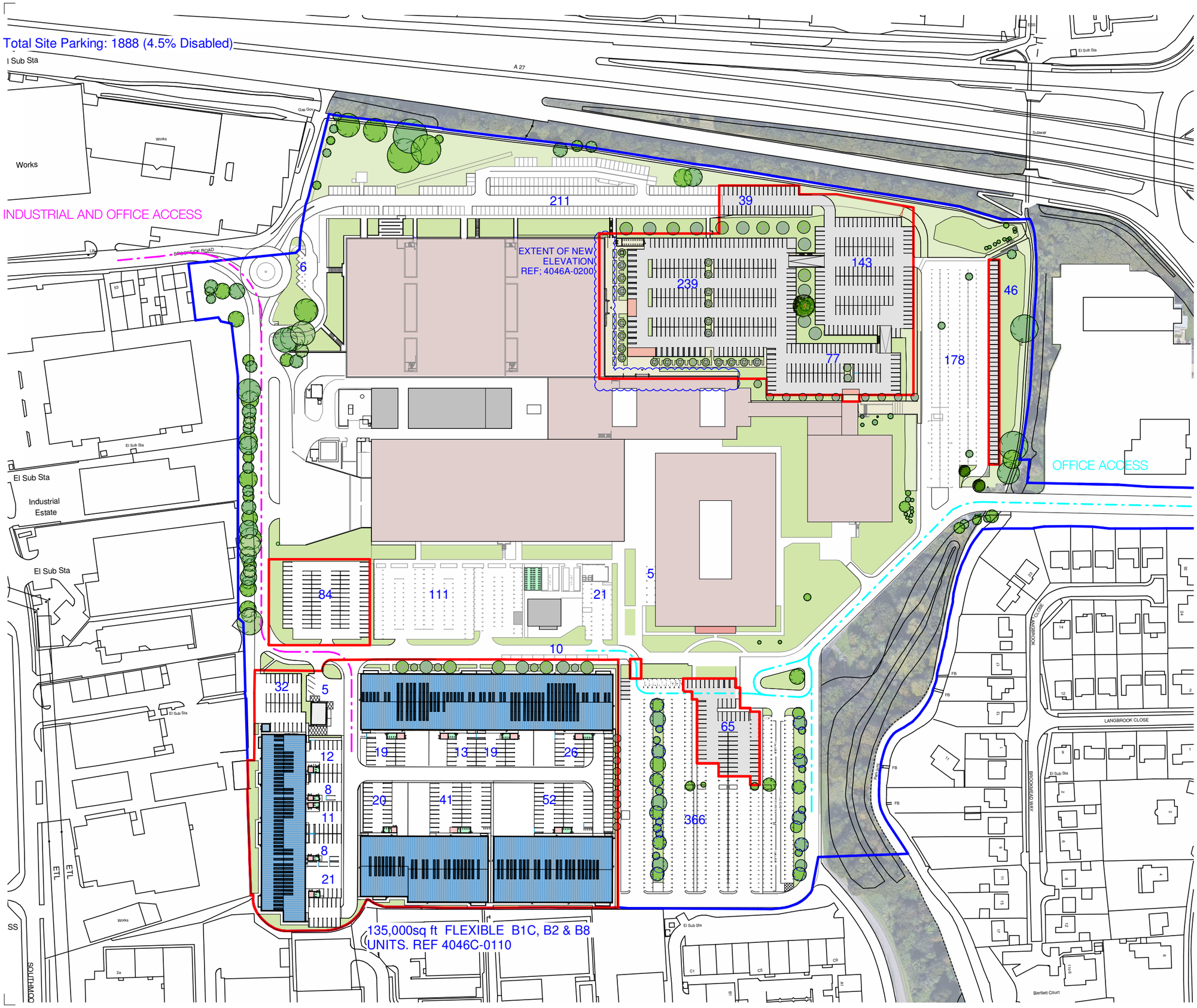

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Rev	Date	Init	Notes	Chkd
G	26.06.19	CJ	Industrial area and landscape coordinated.	

North

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SCALE 1:2000 m

Client

Drawing Originator

inspired environments

London - 106 Weston Street London SE1 3QB 020 7160 6000
Bristol - Rivergate House, Bristol, BS1 6LS 0117 923 2535
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Langstone Technology Park

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Proposed Layout Plan Opt 02

Scale	Sheet	Drawn	Checked	Date
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Drawing Reference	Drawing No.	Revision
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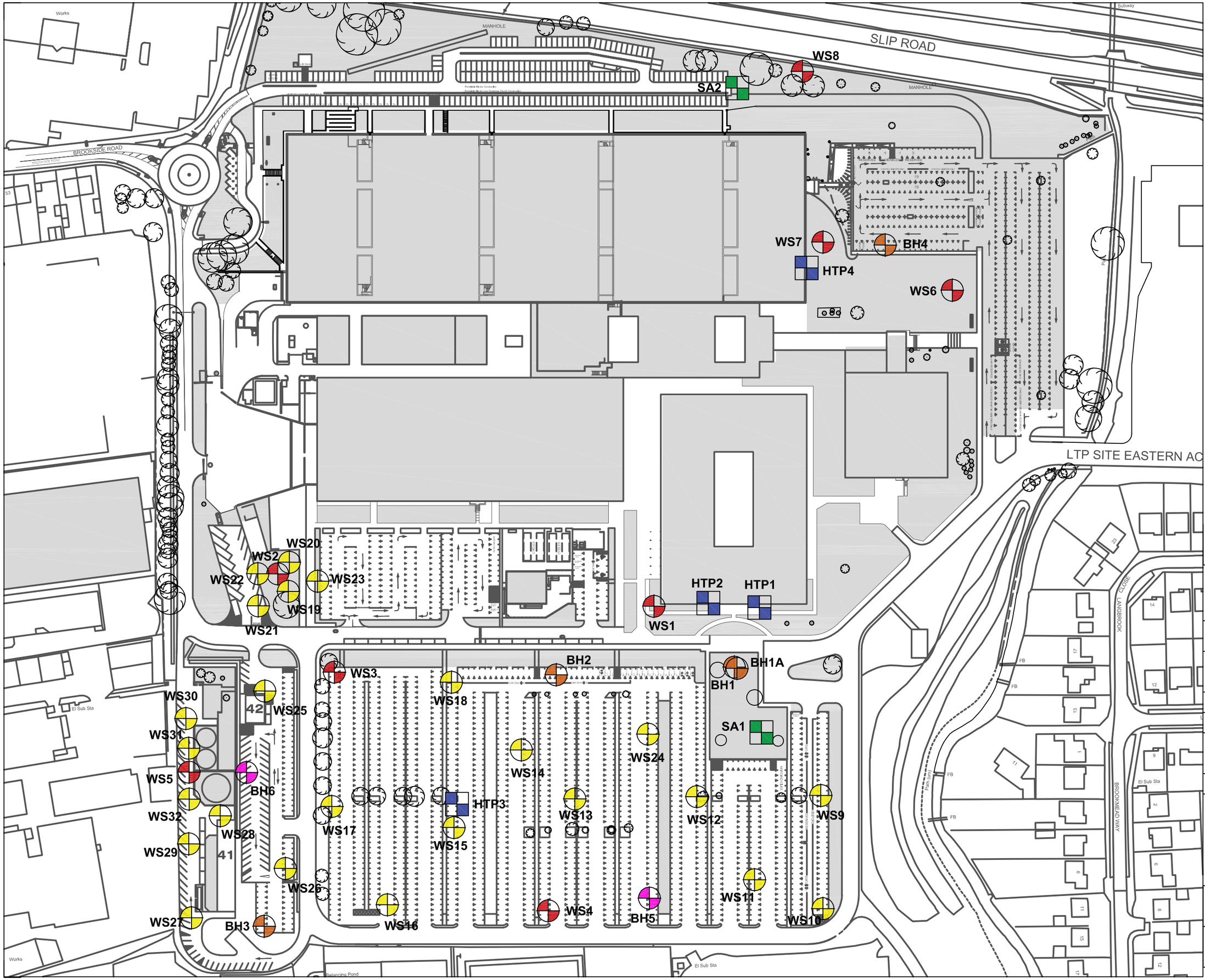

Key

- Cable Percussive Borehole (Aug 2019)
- Window Sample Borehole (Aug 2019)
- Hand Excavated Trial Pit (Aug 2019)
- Soakaway Test Trial Pit (Aug 2019)
- Window Sample Borehole (July 2020)
- Cable Percussive Borehole (July 2020)

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A	Aug 2020	Exploratory Hole Location Plan	DH	SHP	NR

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Client: AG Langstone B.V.

Project: Langstone Technology Park Havant

Office: Altrincham

Discipline: Geo-Environmental

Title: Exploratory Hole Location Plan

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Originator	Job Number	Discipline	Building/Zone
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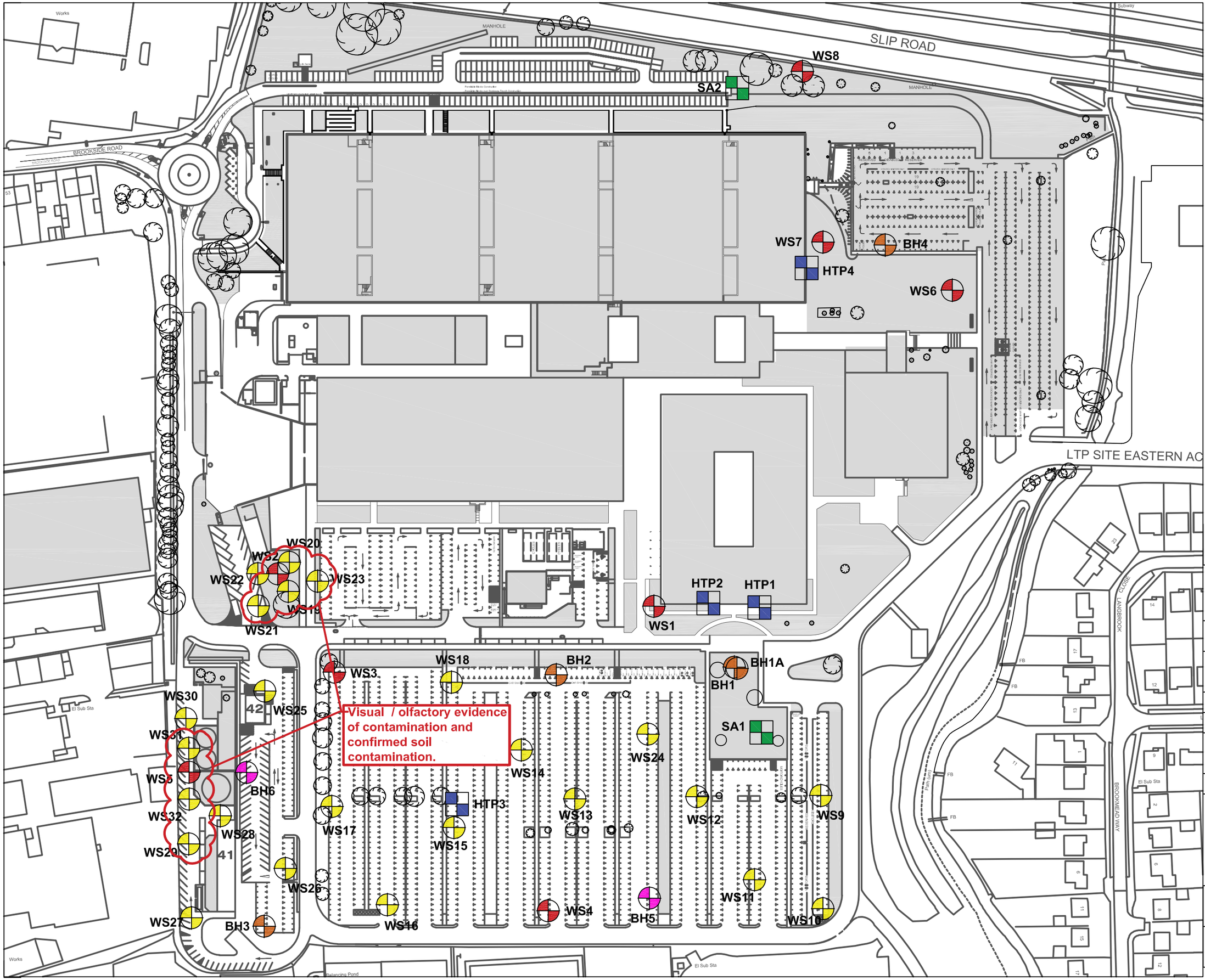

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- Cable Percussive Borehole (July 2020)

Rev	Date	Description	By	Check	App.
A	Sep 2020	Exploratory Hole Location Plan	SHP	NR	NR

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Client: Malcolm Hollis

Project: Langstone Technology Park, Havant

Office: Altrincham

Discipline: Geo-environmental

Title: Contamination Hotspot Location Plan

Scale @ A3: NTS

Status:

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Originator	Job Number	Discipline	Building/Zone
SHP	10/1425	GEO	-
Type	**Level**	**Drawing No.**	**Revision**
GA	00	014	A

Birmingham 0121 200 7500 , Glasgow 0141 222 7125 , Liverpool 0151 227 5300 , London 020 3477 0970 , Manchester 0161 613 6000 , Newcastle 0191 221 0702 , Norwich 01603 305190 , Prestwick 01292 475375 , Reading 0118 947 7688

APPENDIX II

S4UL ASSESSMENT CRITERIA PROTECTIVE OF COMMERCIAL SITE WORKERS

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All mg/kg	S4UL Criteria for Commercial End Use		
Metals			
Arsenic	640		
Beryllium	12		
Boron	240000		
Cadmium	190		
Chromium VI	33		
Copper	68000		
Lead (C4SL 3.5 µg dL-1)	2300		
Inorganic Mercury	1100		
Nickel	980		
Selenium	12000		
Vanadium	9000		
Zinc	730000		
	1% SOM	**2.5% SOM**	**6% SOM**
Petroleum Hydrocarbons			
Aliphatic EC 5-6	3200 (304)^{sol}	5900 (558)^{sol}	12000 (1150)^{sol}
Aliphatic EC >6-8	7800 (144)^{sol}	17000 (322)^{sol}	40000 (736)^{sol}
Aliphatic EC >8-10	2000 (78)^{sol}	4800 (190)^{vap}	11000 (451)^{vap}
Aliphatic EC >10-12	9700 (48)^{sol}	23000 (118)^{vap}	47000 (283)^{vap}
Aliphatic EC >12-C16	59000 (24)^{sol}	82000 (59)^{sol}	90000 (142)^{sol}
Aliphatic EC >16-35	1600000	1700000	1800000
Aliphatic EC >35-44	1600000	1700000	1800000
Aromatic EC5-7 (benzene)	26000 (1220)^{sol}	46000 (2260)^{sol}	86000 (4710)^{sol}
Aromatic EC >7-8 (toluene)	56000(869)^{vap}	110000 (1920)^{sol}	180000 (4360)^{vap}
Aromatic EC >8-10	3500 (613)^{vap}	8100 (1500)^{vap}	17000 (3580)^{vap}
Aromatic EC >10-12	16000 (364)^{sol}	28000 (899)^{sol}	34000 (2150)^{sol}
Aromatic EC >12-16	36000 (169)^{sol}	37000	38000
Aromatic EC >16-21	28000	28000	28000
Aromatic EC >21-35	28000	28000	28000
Aromatic EC >35-44	28000	28000	28000
Aliphatic + Aromatic EC >44-70	28000	28000	28000
TPH Ali/Aro			
Benzene	27	47	90
Toluene	56000^{vap} (869)	110000^{vap} (1920)	180000^{vap} (4360)
Ethylbenzene	5700^{vap} (518)	13000^{vap} (1220)	27000^{vap} (2840)
o-xylene	6600^{sol} (478)	15000^{sol} (1120)	33000^{sol} (2620)
m-xylene	6200^{vap} (625)	14000^{vap} (1470)	31000^{vap} (3460)
p-xylene	5900^{sol} (576)	14000^{sol} (1350)	30000^{sol} (3170)
MTBE			
PAHs			
Acenaphthene	84000 (57.0) sol	97000 (141)sol	100000
Acenaphthylene	83000 (86.1) sol	97000 (212) sol	100000
Anthracene	520000	540000	540000
Benzo(a)anthracene	170	170	180
Benzo(a)pyrene	35	35	36
Benzo(b)fluoranthene	44	44	45
Benzo(g,h,i)perylene	3900	4000	4000
Benzo(k)fluoranthene	1200	1200	1200
Chrysene	350	350	350
Dibenzo(a,h)anthracene	3.5	3.6	3.6
Fluoranthene	23000	23000	23000
Fluorene	63000 (30.9) sol	68000	71000
Indeno(1,2,3-c,d)pyrene	500	510	510
Naphthalene	190 (76.4) sol	460 (183) sol	1100 (432) sol
Phenanthrene	22000	22000	23000
Pyrene	54000	54000	54000
PAH			