



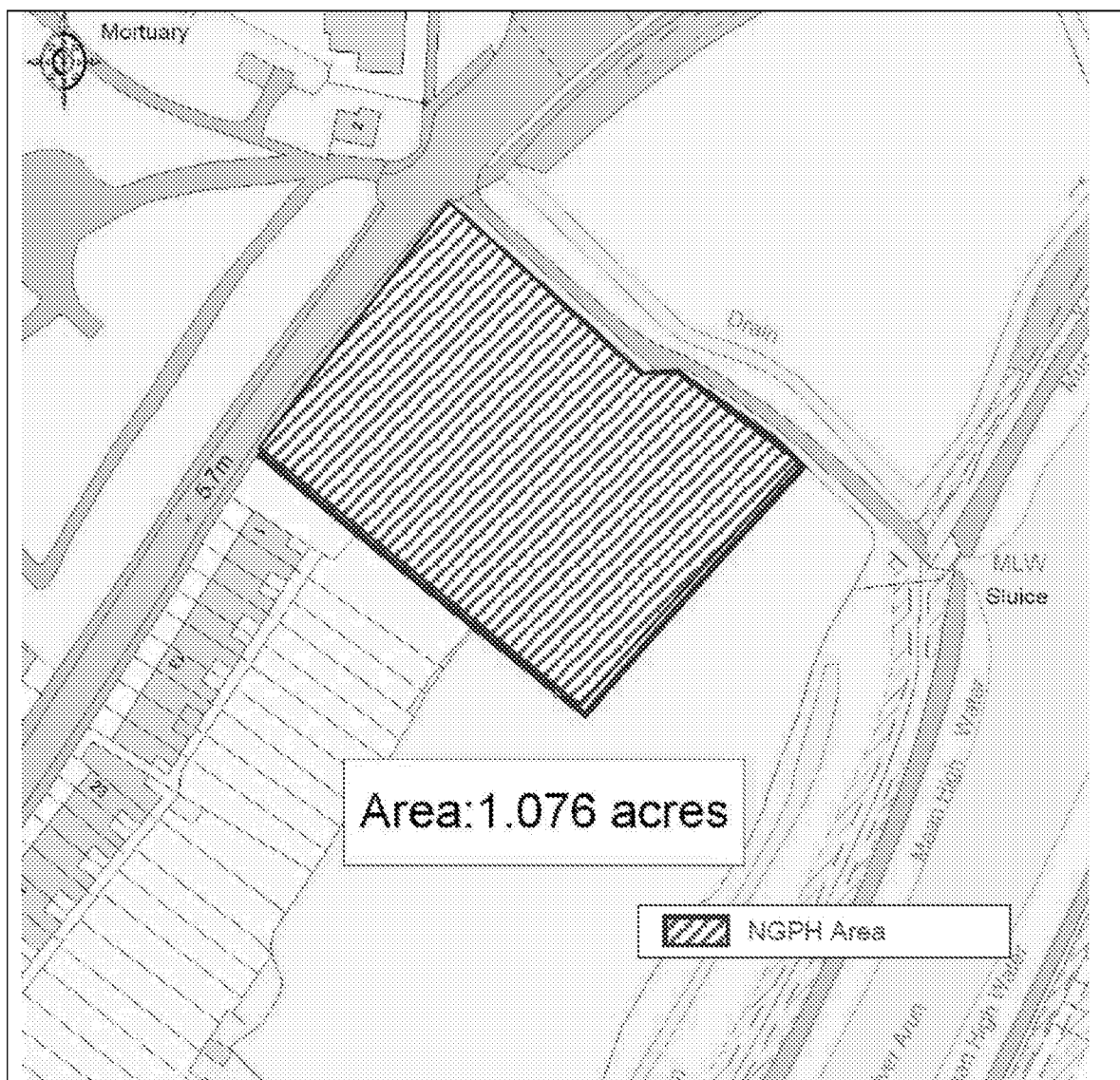
FORD ROAD, ARUNDEL
NATIONAL GRID PROPERTY
HOLDINGS

R1820/21/5089

CONSTRUCTION MANAGEMENT
PLAN

REV 0

JUNE 2021



Site Address:	Ford Road, Arundel, West Sussex BN18 9DX	NGP Document Tracking Code	
Report Title	Ford Road, Arundel – Construction Management Plan		
Report Type:	Contamination	Retention Period	
Site Code	2551	Author (Company)	Celtic Technologies
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Draft / Final	Final	H & S File?	Yes
Work Stage	Remediation		
Brief description of contents	Construction Management Plan for Remediation Works, including programme, public engagement, mitigation of nuisance emissions, site management		
Access Permitted	NGP Land Regeneration Team	NGP Contact	Gareth Taylor Samantha Rendell

Client:	National Grid Property Holdings	
Report Number:	R1820/21/5089	
Report Title:	Ford Road, Arundel Construction Management Plan	
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1.0 INTRODUCTION AND OBJECTIVES

Celtic EnGlobe (Celtic) has been commissioned by National Grid Property Holdings (NGPH) to design and implement ground remediation works at the former Gasworks Site, Ford Road, Arundel, West Sussex (the 'site'). The location of the site is shown on Drawing D1820/5045/A1, Appendix A.

The site has been subject to numerous investigations and assessments in line with current contamination land regulations, the waste hierarchy and sustainable management practices.

The remediation works are required to mitigate potential liabilities associated with ground conditions resulting from the site's historic use as a gasworks. An application for planning permission, reference AB/45/21/PL, has been submitted and this construction management plan is intended to inform the reader of the management plans, designed and put in place, for the planned remediation works as described within Celtic's Remediation Implementation and Verification Plan (RIP report), reference R1821/21/5045 (rev2), dated March 2021 .

Specific roles of the Remediation Project delivery are described as follows:

Client – NGPH

Principal Designer – Atkins Ltd

Principal Contractor – Celtic Technologies Ltd

CDM Advisor (CDM-A) – RSK Ltd

Public Engagement – Grayling Ltd

The works are being undertaken in line with the Construction (Design and Management) Regulations, 2015 (CDM 2015) and a construction phase health and safety plan (CPP) has been prepared for use on the project. An F10 HSE notification is not deemed necessary for this project as the works will not require more than 20 persons on site at one time, nor will they exceed 500 person days.

2.0 PROJECT PROGRAMME

Celtic's proposed programme of works is included in **Appendix A** of this report. This programme is subject to change with plant and machinery deployment subject to variation based on encountered ground conditions.

In summary, the mobilisation to site date is planned for the 7th June 2021 and this week will comprise establishing the site welfare compound, security and traffic management arrangements. Preparation of the soil and water processing areas, together with quarantine and waste storage areas will then follow, prior to the establishment and commissioning of the water treatment system. Excavation works will then be undertaken, with the careful segregation and management of impacted soils. Throughout these works, environmental control measures will be implemented, and monitoring undertaken to record potential nuisance emissions. Verification sampling of soil and groundwater will also be undertaken throughout the works, with appropriate assessment of the suitability of materials retained on-site. All waste materials will be appropriately disposed from site prior to the planned demobilisation date of the 6th August 2021.

Laboratory analysis will continue on samples retrieved to assess and verify the long-term strength and durability of the treated materials. A verification report is planned to be finalised following the site works and submitted to regulatory bodies with a subsequent addendum to include the long-term test results.

4.0 CONSTRUCTION MANAGEMENT

4.1 Preliminary Works

The following preliminary works have been undertaken as required:

- Discussion with utility providers to agree any protection/mitigation requirements to protect existing services and agree a suitable foul sewer trade effluent discharge consent;
- Submission of Planning Application for remediation works;
- Submission of a Section 61 consent for construction noise;
- EA Permit deployment to encompass remedial treatment activities; and
- Production of a materials management plan (MMP) in compliance with CL:aire Definition of Waste: Development Industry Code of Practice (DoWCoP).

4.2 Initial Site Set-up / Compound and Pedestrian Access Routes

In order to complete the works, Celtic will establish a welfare compound to include office, canteen, decontamination unit / changing room, toilets, stores and parking. In addition, storage areas will be prepared to accommodate plant, materials and equipment. CCTV security will be established supported by out of hours surveillance and call out response. It is not anticipated that floodlighting will be required, given the proposed summertime working hours; however, several motion sensor low power security lights will be established around the welfare compound to aid security. These lights will be angled away from adjacent receptors. The proposed layout is illustrated on Figure D1820/5045/A5.

The site compound will be situated on existing tarmac hardstand in the eastern corner of the site, with access via the existing gates off the access track which leads from Ford Road. Traffic management during the project will be controlled and the access gates will be kept closed when not in use. The proposed traffic management layout is included on drawing D1820/5045/A6.

Segregated pedestrian routes using 'crowd barrier' fencing and signage will be established to keep traffic and pedestrians separated.

The existing site boundary fencelines and gates are deemed to be suitable and sufficient for security purposes and prevention of unauthorised access and no additional site hoarding needs are expected. The suitability and integrity of the fencing will be continually monitored throughout the works.

4.3 Workforce and Visitors

Given the ongoing COVID-19 concerns, appropriate restrictions regarding site access, strict hygiene measures and workforce social distancing will be implemented. All workforce and visitors will be required to adhere to the latest Construction Leadership Council (CLC) guidance (currently version 7, dated 7th January 2021). A flowchart of the response to COVID-19 symptoms, notification of a positive test result and requirement to self-isolate is provided within **Appendix D**.

A site attendance register will record all site staff and visitors. An induction process is in place to inform workforce and visitors of the site works and procedures to comply with. Information regarding the site activities, health, safety and emergency procedures will be provided prior to the person engaging in site activities. All site staff and visitors will be required to wear appropriate personal protective equipment (PPE) when on-site.

Checks of competency will also be undertaken prior to any person working on-site

4.4 Remediation Works

A programme of site excavation and turnover is required to identify, segregate and treat contamination and minimise uncertainty of significant residual sources of pollution. Excavations will extend to the base of Made Ground where feasible to prove natural strata. Where Made Ground extends below the saturated zone (below high tide groundwater level), verification sampling and surveying will be required to record residual ground conditions.

In the event materials are excavated that may not be suitable for treatment, such as grossly contaminated infrastructure, fibrous asbestos or other high-risk substances, these shall be further segregated and stored so as to minimise nuisance emissions and potential risks to human health and the wider environment. Assessment of segregated materials, appropriate handling, storage, classification and disposal of off-site under appropriate duty of care documentation will be required. Records of these materials will be maintained on-site in the waste register and included within the verification report.

A 300 mm thick capping layer comprising suitable imported stone will be placed across site on top of an orange marker geotextile membrane.

4.5 Storage of Plant and Materials

A materials and plant storage area will be prepared to the east of the site adjacent to the welfare compound. Waste skips will be positioned within this area to contain segregated wastes and signs will be erected to display the waste types. Waste soils will be stored within a lined and bunded quarantine area in a central position of the site.

4.6 Loading and Unloading of Plant, Materials and Waste

In the first instance, the welfare cabins will be mobilised to site via the existing site access entrance gate. Hiab (crane mounted) lorries will be used to transport and unload the cabins with the use of an appropriate lift plan. An additional 6 m wide double leaf steel gate will be installed further along the access track to allow heavy goods vehicles (HGV) and delivery vehicles to access site and load/unload materials. Imported stone will be placed at the site entrance and along haul routes to maintain a suitable running surface for vehicles.

Loading and unloading of materials will take account of nearby remediation activities and exclusion zones will be established and communicated to the site operatives. Appropriate turning areas will be established, and a traffic marshal will control and supervise vehicle movements.

A jetwash will be established at the HGV site access to clean vehicle wheels prior to them leaving, in order to mitigate the risk of debris leaving site. Tipper wagons, used to remove waste materials, will ensure loads are sheeted prior to leaving site.

4.7 Vehicles used during the works

The anticipated number, frequency and types of vehicles to be used during the works is summarised within Table 1.

Table 1 – Summary of Vehicle Details

Vehicle / Activity	Number of movements	Frequency
Crane mounted hiab / Welfare	5	Start and end of project
Crane mounted hiab / Water treatment system	2	Start and end of project
Low loader / Plant	2	Start and end of project
Bulk wagons / Stabilisation additives	20	Staggered during treatment activities
Hook lift skip vehicle / waste skips	6	Staggered during works
8 wheel tipper wagon / import stone	150	Staggered during works
8 wheel tipper wagon / waste soils	5	Staggered during works

4.8 Identified Constraints

The site is known to have a number of constraints that are required to be considered to safely allow proposed remedial activities to be undertaken. Identified constraints are listed, followed by a discussion of mitigation works:

- Below ground remnant structures and services;
- Live electrical sub-station adjacent to the site entrance on the north eastern boundary and associated HV and LV cables, which run from this station along the access track to Ford Road;
- Surface water drain, which runs south west to north east, bisecting the southern half of the site; and
- The River Arun being a tidal waterway and located some 40 m to the south of the site boundary. Groundwater levels across the site are highly influenced by daily tidal variations.

Reviews of the site history and gas manufacturing processes have been undertaken, which have informed the site investigations and remediation design. Historical features and processes have been identified and included on site plans. Site investigation works have targeted identified features in order to assess the nature of ground conditions and potential obstructions. The removal of below ground structures will only be required to access soils and materials requiring remediation (i.e. contaminated materials). Where there is no significant contamination present, the remnant structure can be left in-situ unless it is deemed to act as a potential pathway for residual contaminants (e.g. a pipe). Topographic surveys will record the presence of obstructions and features left in-situ and included will be included within the final verification report.

Specialist utility surveyors have been employed to trace and map potential services using equipment such as ground penetrating radar (GPR) and cable avoidance tools. The location of potential services will be marked up on the ground and hand dug pits will be established to prove the location and depth of known services within remediation areas. Works will be undertaken in line with HSG47 Avoiding Danger from Underground Services.

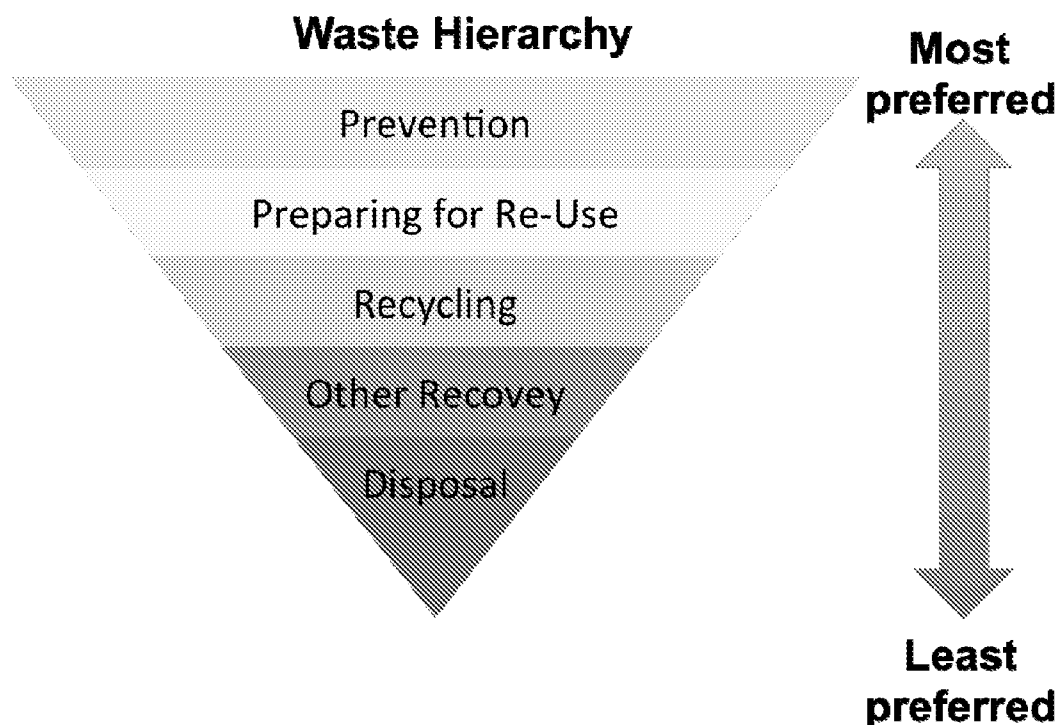
Positive engagement with SSE regarding the existing electrical substation and cables crossing below the access gates has been undertaken and it has been agreed that an additional access gate will be constructed further along the access track to allow heavier vehicular access to the site and mitigate risk of damage to existing electrical cables. There are no known other electrical or other live services on-site.

The 300 mm diameter surface water drain, which bisects the site is known to be approximately 1 – 1.2 m below ground level (to invert level) and is beneath an existing tarmac road with two access chambers on-site. There will be a 1 m easement either side of the drain during excavation works and an assessment of potential contamination made during works encroaching on this easement. To further protect the integrity of this drain, there will be a restriction of heavy goods vehicles crossing this drain and a designated crossing point, which will be strengthened with steel plates, will be constructed to minimise the risk of damage. Monitoring of the surface water flow and quality will be undertaken throughout the works.

The River Arun, located approximately 40m south east of the site is tidally influenced as is the groundwater beneath the site, which fluctuates daily according to the tide. The works are designed to target the unsaturated zone, above the high tide water level, and as such should not extend below the water table. Groundwater monitoring boreholes are present on-site, which has allowed a detailed assessment of tidal influence across site and an understanding of the predicted depths to groundwater.

4.9 Waste Management

The Waste Hierarchy, which forms part of the Waste Framework Directive, is a tool used in the evaluation processes that protect the environment alongside resource energy consumption from most favourable to least favourable actions. The hierarchy establishes priorities based on sustainability and an integrated approach is necessary to achieve sustainable waste management. A diagram showing the five stages of the Waste Hierarchy is shown within Graphic 1.



Graphic 1 – The 5 steps of the Waste Hierarchy

The works will be undertaken in line with the CL:aire Definition of Waste: Development Industry Code of Practice (DoWCoP) and associated Materials Management Plan (MMP). The appropriate use of the DoWCoP will allow the legitimate re-use of site originating materials so that they are not subject to waste regulations and therefore comply with the most preferred choice of 'prevention'.

A site waste management plan will be used to forecast potential waste streams and identify potential disposal facilities. Details of all on-site and off-site material movements will be recorded and completed in accordance with the Duty of Care regulations and MMP. Waste transfer/consignment notes and disposal certificates will be provided for each load of material removed from site so that an auditable trail of the dates, volumes and destination of material removed from site can be maintained.

4.10 Estimated Volumes of Materials

Based on the proposed remedial areas and anticipated depths of excavation, the volumes expected to be excavated, treated, re-used, imported and disposed off-site are presented within Table 2. These volumes will be subject to on-site survey and measurement during the remediation works and final volumes will be included within the verification report.

Table 2 – Estimated Volumes of Materials

Source	Estimated Volume (m ³)
Area 1 Excavation	1,000
Area 2 Excavation	200
Area 3 Excavation	1,300
Area 4 Excavation	2,400
Hardstand materials	250
S/S Treatment Volume	1,600
Re-use on site	4,700
Disposal off-site	200
Capping Layer	1,100

4.11 Unexpected Contamination

The potential to encounter unexpected contamination at the site exists on the basis of the site having an historic gasworks use. However, based on the completed investigation works the risks of encountering non gasworks related contamination is considered low. In the event unexpected contamination is encountered then Celtic would stop works and bring to the attention of the Client's project team. In addition, unexpected contamination would be notified to the EA and local authority contaminated land representatives with a strategy for investigation, characterisation and mitigation. It is considered that except for significant notifiable or other asbestos materials additional contamination could be incorporated and or treated using stabilisation as the primary proposed remedial technique.

4.12 Groundwater Betterment

The DQRA for controlled waters has concluded that groundwater remediation at the site is not a requirement per se to protect controlled waters. However, it is acknowledged that a groundwater treatment system will be required to facilitate remediation at the site, and it is therefore proposed that a groundwater treatment system is established to deal with NAPL, and incidental impacted perched water encountered during excavation works. Indeed, all encountered waters during excavation works will require removal and will be subject to passing through the on-site water

treatment system to facilitate its proper disposal in-line with a consent to discharge with the sewerage undertaker.

Free phase NAPL is expected to be encountered in and around the former gasworks structures within Area 4, as was evident during investigation works. Where NAPL is encountered, there is likely to be very high concentrations of dissolved phase hydrocarbons which have the potential to impact perched and tidal groundwaters within the vicinity.

Diesel and/or electrical driven pumps will divert encountered groundwater, via above ground pipework, to a water treatment system which has been designed and will be commissioned on-site by Celtic. Celtic have a proven track record of designing and delivering bespoke water treatment systems, which will comply with the site's mobile treatment license under the associated deployment of Celtic's Environmental Permit.

A discharge consent has been agreed with Southern Water and criteria established so that testing can be undertaken to demonstrate that it is achieved prior to disposal via the sewer consent.

4.13 Summary of Testing Schedules

Table 3 provides a summary of the testing schedules for verification purposes.

Table 3 – Summary of Testing Schedules

Testing Location	Testing Frequency	Testing Requirements
Excavation extent – where natural material encountered	Visual assessment with topographic and photographic evidence	none
Excavation extent – where Made Ground material remains (within saturated zone – below high tide level)	1 per 100m ²	Remedial Criteria (Table 6)
Excavation extent – where gross contamination encountered	1 per 20 m ²	Remedial Criteria (Table 6)
Face of excavations along boundary with residential property, boundary along Ford Road and north east boundary of Area 4.	1 per 10 linear metres of excavation	Remedial Criteria (Table 6)
Material Re-use	1 per 100 m ³	Remedial Criteria (Table 6)
S/S treated material	1 per 250 m ³	EA NEN 7371 test and leachate to achieve Remedial Criteria (Table 5)
Capping Layer	1 per 100 m ³	Minimum 3 samples per source for standard solid suite (Table 4)
Geotechnical Plate Bearing Test	1 per 400 m ²	>5% CBR value
Waste Materials	Dependant on receiving facility requirements, typically one representative sample per 100 m ³	Waste classification dependant on material type and substances present
Discharge water	To be agreed with Southern Water	As agreed with Southern Water

Tables 4 and 5 provide summaries of the soil and groundwater testing suites to be scheduled.

Table 4 – Testing Suites Solids

Grouping	Constituent COCs
Phenols	2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol; 2,4-Dichlorophenol; 2,4-Dimethylphenol; 2-Chlorophenol; 2-Methylphenol; 2-Nitrophenol; 4-Chloro-3-methylphenol; 4-Methylphenol; total phenols.
Metals	Arsenic, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc.
PAHs	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene.
BTEX	Benzene, Toluene, Ethylbenzene, p&m-xylene, o-xylene.
Cyanide	Free Cyanide, Complex Cyanide, Total Cyanide.
TPH	Speciated Aliphatic and Aromatic Hydrocarbons.
General inorganics	pH, Electrical Conductivity, Total Sulphate (as SO ₄), Sulphide, Total Chloride, Ammonium as NH ₄ , Total Organic Carbon.
Asbestos	Asbestos ID, Asbestos quantification (for positive ID).

Table 5 – Testing Suites Groundwater

Grouping	Constituent COCs
Phenols	Catechol, Resorcinol, Ethylphenol & dimethylphenol, Cresols, Naphthols, Isopropylphenol, Phenol, Trimethylphenols, Total Phenols.
Metals	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc.
PAHs	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene.
BTEX	Benzene, Toluene, Ethylbenzene, p&m-xylene, o-xylene.
Cyanide	Free cyanide, complex cyanide, total cyanide.
TPH	Speciated aliphatic and aromatic hydrocarbons.
General inorganics	pH, Electrical Conductivity, Sulphate (as SO ₄), Sulphide, Chloride, Ammonium as NH ₄ , Total Organic Carbon, Total Suspended Solids.

Site acceptability criteria (SAC) has been established for soils and leachate at the site, as presented within the RIP report and summarised in Tables 6 and 7. These SAC will be used to assess the suitability of materials at site.

Table 6 – Soil SAC in mg/kg

Substance	Site Wide Unsaturated Zone Soils	Boundary Strip (Area 2) Unsaturated Zone Soils
Sum Σ TPH	5,000	1,000
TPH Aliphatic C5-C6	Via Σ TPH	650
TPH Aliphatics C8-C10		440
TPH Aromatics C8-C10		500
Benzene	2,900	4
Sum Σ TEX	Via Σ TPH	500
Phenols	1,200	1,200
Sum Σ 16-PAH	5,000	1,000
Benzo[a]pyrene	92	92
Fluoranthene	400	400
Indeno[123-cd]pyrene	680	680
Naphthalene	4,600	260
Easily Liberatable Cyanide	250	250

Table 7 – Leachate SAC in mg/l

Substance	Site Wide Porewater Criteria
TPH Aliphatics C8-C10	2,500 ⁽¹⁾
TPH Aliphatics C10-C12	4,300 ⁽¹⁾
TPH Aromatic C8-C10	2,000 ⁽¹⁾
TPH Aromatic C10-C12	2,000 ⁽¹⁾
TPH Aromatic C12-C16	2,000 ⁽¹⁾
TPH Aromatic C16-C21	2,000 ⁽¹⁾
TPH Aromatic C21-C35	2,400 ⁽¹⁾
TPH Aromatic C35-C44	2,400 ⁽¹⁾
Benzene	2,000 ⁽¹⁾
Phenols	1,600
Benzo[b]fluoranthene	6.9 ⁽¹⁾
Benzo[k]fluoranthene	7.4 ⁽¹⁾
Benzo[ghi]perylene	0.74 ⁽¹⁾
Benzo[a]pyrene	0.041 ⁽¹⁾
Fluoranthene	1.3 ⁽¹⁾
Indeno[123-cd]pyrene	0.45 ⁽¹⁾
Naphthalene	400 ⁽¹⁾
Anthracene	21 ⁽¹⁾
Easily Liberatable Cyanide	200

(1) above theoretical saturation limits

4.14 Proposed Mitigation Measures

Based on the proposed works which include mechanical excavation, breakout of hard materials, transport of materials on and off site, processing of materials, stabilisation, site profiling and groundwater recovery and treatment, the potential for odour, dust, noise and vibration exist. These risks have been identified as part of pre-works planning and will be subject to on-going monitoring throughout the works.

In order to address and manage the identified risks, it is proposed that the following mitigation and monitoring measures are employed during the works. The proposed methods below also reflect the monitoring and mitigation measures that have been presented and agreed with the Environment Agency as part of Celtic's EA Permit deployment (Permit reference EA30379).

In compliance with Arun District Council's Construction Code of Practice, the proposed working hours will be restricted to Monday to Friday 08:00 – 18:00 hrs. No works will be undertaken on weekends or Public and Bank Holidays.

4.15 Environmental Monitoring and Mitigation Measures

4.15.1 Dust

Dust levels will be visually assessed on an ongoing daily basis by all Celtic staff who shall be encouraged to manage and mitigate dust levels during their daily works and communicate any issues to the site manager.

Dust monitoring will be carried out at the 4 proposed environmental monitoring points, located at each corner of the site together with any additional monitoring locations based on actual working areas, which will be agreed at the daily activity briefing based on proposed works areas and activities. The monitoring will be undertaken twice a day using a portable handheld calibrated Dustmate instrument. The monitoring results will be recorded and fed back to the site manager so that mitigation measures can be assessed and deployed as necessary.

The action level for dust on the site is for total respirable dust (PM10) set at 250 µg /m³ for a 15 minute mean due to the sensitivity of offsite receptors (adjacent residential properties and gardens).

Dust mitigation measures will be undertaken pro-actively as part of the normal site operations. Should there be visible dust, or exceedance of the action level value for dust, then works will be stopped and the dust management measures re-assessed, adapted or upgraded. Further follow up monitoring shall be undertaken to confirm that the corrective actions have successfully managed dust levels.

Remedial actions to manage dust impacts that shall be deployed on site to include:

- Traffic routes shall be sprayed with water to mitigate potential dust generation. There will be a limit to all unnecessary traffic across the site and all haul routes shall be subject to routine and regular inspection.
- The speed limit for the site shall be limited to 5 mph in order to minimise the potential generation of debris/dust.
- Dust netting and fencing shall be erected in advance of works across areas of site on a phased basis to mitigate the potential for cross boundary migration.
- During periods of high winds (in the direction of key receptors) the works and activities with the potential to generate dust shall be suspended or amended until wind speeds reduce to acceptable levels and / or alternative working and control methods can be deployed.

Celtic propose to use a combination of fixed dust suppression systems in high dust risk activities areas such as break out and stabilisation with additional mobile suppression via water bowsers for deployment and relocation based on works progress and observed site conditions.

4.15.2 Vapours and Gases

Based on the known site contaminants and potential receptors, works will be progressed in a manner where practicable to minimise open excavations for extended periods, minimise contaminated material stockpile volumes and remove, where encountered, non-aqueous phase liquid (NAPL) and perched water within excavations. Appropriate and controlled on-site storage will be implemented prior to off-site disposal. In addition, odour suppression equipment will be available on-site comprising mobile atomiser systems to allow deployment and movement based on encountered conditions and contamination.

Mobile treatment plant for soils and waters will be under the strict control of Celtic and are unlikely to create significant emissions of vapours and gases during normal operations.

Monitoring of volatile organic carbons (VOCs) will be undertaken regularly during working hours for the duration of site works. Monitoring will be undertaken from the first day of site works before excavation and S/S treatment commence, in order to determine background levels. A Photo Ionisation Detection meter (PID meter) will be kept on-site for this purpose.

The PID meter will be calibrated to respond to an appropriate organic contaminant (e.g. benzene), to assess vapours quantitatively. The 15-minute average for each location and maximum concentration will be recorded, together with the time that the monitoring was carried out.

Celtic will be responsible for daily calibration of any PID meter used on site. The site Engineer will record all monitoring information in electronic format (table format) on a weekly basis.

The threshold levels for vapour monitoring set out in EH40/2005 (Health and Safety Executive Workplace Exposure Limits) and subsequent amendments will be observed during the works. However, in practice, a maximum limit for the time weighted average concentration of 1 ppm will be set for vapours. If ambient levels on site approach or exceed this concentration, works on-site and contingency measures deployed will be reviewed with the aim of mitigating vapour levels to below the threshold levels.

Celtic will also monitor personnel most at risk from odours/ vapours and gases whilst on site and will provide sufficient personal monitoring instruments to do this. Typically, this will include excavation operators, banksmen and operatives carrying out hand excavation works. These procedures will be reviewed during the work and potentially revised for activities deemed to be higher risk. All monitoring data shall be recorded for inclusion within the verification report.

4.15.3 Odour

Odour monitoring (olfactory sniff test) will be undertaken daily at the edge of the works zone and at the most relevant site boundary to offsite receptors, dependent on work locations and weather conditions. The FIDOL factors will be recorded which are represented as follows:

F requency	How often an individual is exposed to odour
I ntensity	The individual's perception of the strength of the odour
D uration	The overall duration that individuals are exposed to an odour over time
O odour unpleasantness	Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone', and will be measured on a standard none-point scale
L ocation	The location of odour and nature of human activities on the vicinity of an odour source, including receptor characteristics

Odour intensity will be measured and recorded on a 1-5 scale where:

- 1 – No odour;
- 2 – Faint odour;
- 3 – Distinct odour;
- 4 – Strong odour;
- 5 – Extremely strong odour.

The trigger criteria are as follows:

- **Action Levels** shall be set at 3 or above for intensity at which point odour reduction measures should be put in place. This includes covering of stockpiles, limiting area of open excavations and deodorising sprays.
- **Stop Work Levels** shall be set at 4 or above for intensity at which point works will cease until the odour problem can be rectified.

Remedial actions and mitigation measures shall be documented, and odour monitoring undertaken again to ensure that the remedial measures have achieved the appropriate level of improvement.

If monitored odours are considered to exceed the action levels, records of sensitivity of the location will also be made as follow:

High Sensitivity Receptor	Surrounding land use where: • Users can reasonably expect enjoyment of a high level of amenity; and • People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land Examples may include residential dwellings, hospitals, schools/education and tourist/cultural
Medium Sensitivity Receptor	Surrounding land use where: • Users would expect a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land Examples may include places of work, commercial/retail premises and playing/recreational fields
Low Sensitivity Receptor	Surrounding land use where: • The enjoyment of amenity would not reasonably be expected; or • There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land Examples may include industrial use, farms, footpaths and roads

The suggested descriptor for magnitude of odour effects is illustrated within Table 8. Where the overall effect is greater than 'slight adverse', the effect is likely to be considered significant.

Table 8 – Suggested Descriptor for Magnitude of Odour Effects

Relative Odour Exposure (Impact)	Receptor Sensitivity		
	Low	Medium	High
Very large	Moderate adverse	Substantial adverse	Substantial adverse
Large	Slight adverse	Moderate adverse	Substantial adverse
Medium	Negligible	Slight adverse	Moderate adverse
Small	Negligible	Negligible	Slight adverse
Negligible	Negligible	Negligible	Negligible

Appropriate PPE and RPE will be made available for use by workers if odours exceed action levels. PPE and RPE shall be assessed and requirements presented within the Celtic health and safety plan.

4.15.4 Monitoring/ Control of Noise and Vibration

Best practicable means of noise control will be applied during the remediation works to minimise noise (including vibration) at neighbouring residential properties and other sensitive receptors arising from the remediation activities.

Celtic shall complete works in accordance with the agreed Section 61 consent and deploy mitigation measures as required. Mitigation and planning shall include the following:

- Restrict site working hours to 08:00 – 18:00 Monday to Friday and no working on weekends or public/bank holidays;
- Celtic shall position treatment activities as far away from sensitive receptors as reasonably practicable;
- Celtic shall restrict the movement of plant and position haul routes away from the sensitive north west and south west site boundaries and minimise the works required in these areas;
- Celtic shall select plant and machinery in good working order and less than 3 years old and, where available, use quiet and low vibration equipment;
- Vehicles and plant will be maintained in a good and effective working order and operated in a manner to minimise noise emissions;
- Equipment will be switched off when not in use;
- Where available quieter equipment will be selected and noise damping fitted where practicable; and
- Acoustic barriers will be available on-site and erected around activities to minimise noise emissions.

Celtic shall review phasing and operations to limit the overlap and duration of highest noise and vibration level activities.

Noise monitoring shall be carried out by Celtic daily at the designated environmental monitoring points as per the works progression and phasing. These points shall be confirmed during the daily site briefings and confirmation of works areas. Noise monitoring shall be carried out using a calibrated and certified Decibel Noise Meter.

In line with the Section 61 consent, the predicted time weighted noise level of 70 dB at the facade of the nearest sensitive receptor shall be adhered to. Where these levels are breached by 3dB or more works shall cease and further effective noise mitigation measures shall be installed.

If Celtic operations produce and record unacceptable noise and vibration levels then additional measures including further acoustic shielding/enclosures, works re-phasing and assessment of operational hours shall be completed.

All monitoring data shall be available and provided to the Client's team as part of both weekly and monthly reporting with additional information to support remedial measures in the event of a complaint or continued exceedance of threshold levels.

4.15.5 Asbestos Monitoring

Based upon the ground investigation and laboratory testing undertaken at the site Celtic do not anticipate widespread or significant asbestos containing soils at site.

Background, reassurance, asbestos air monitoring shall be undertaken on a weekly basis during excavation works and cover operational areas and key identified receptors. Asbestos assurance monitoring shall be completed by a specialist 3rd party sub-contractor with all results provided on day of testing to allow a proactive and immediate review and response based on any identified elevated concentrations.

The monitoring shall include occupational health monitoring of site staff, general works area monitoring and boundary monitoring targeting the most applicable potential receptors based on atmospheric conditions. Specific asbestos air monitoring shall be undertaken in works areas and the site boundary in the event previously unidentified or asbestos materials of a different nature are recorded. A watching brief for asbestos in soils shall be undertaken by environmental monitoring staff trained in asbestos awareness and Cat B non-licensable works.

Asbestos monitoring data shall be presented as part of both the weekly and monthly report submissions and immediately should levels dictate an immediate suspension or change to works, working methodologies, controls, PPE or RPE.

It is noted that the controls detailed for dust mitigation will also serve to mitigate any potential asbestos generation based on the current data and current low risk level.

4.16 Record Keeping

Throughout the works extensive records will be maintained including (but not limited to) the following:

- A full and detailed description of the works completed;
- Site diaries;
- All progress meeting minutes and key correspondence;
- Records of local community liaison / letter drops etc.;
- Environmental monitoring records (including noise, dust, odour and surface/ground water monitoring)
- Completed 'Soil Treatment' log sheets;
- Details of unforeseen contamination encountered during the works and subsequent remedial actions;

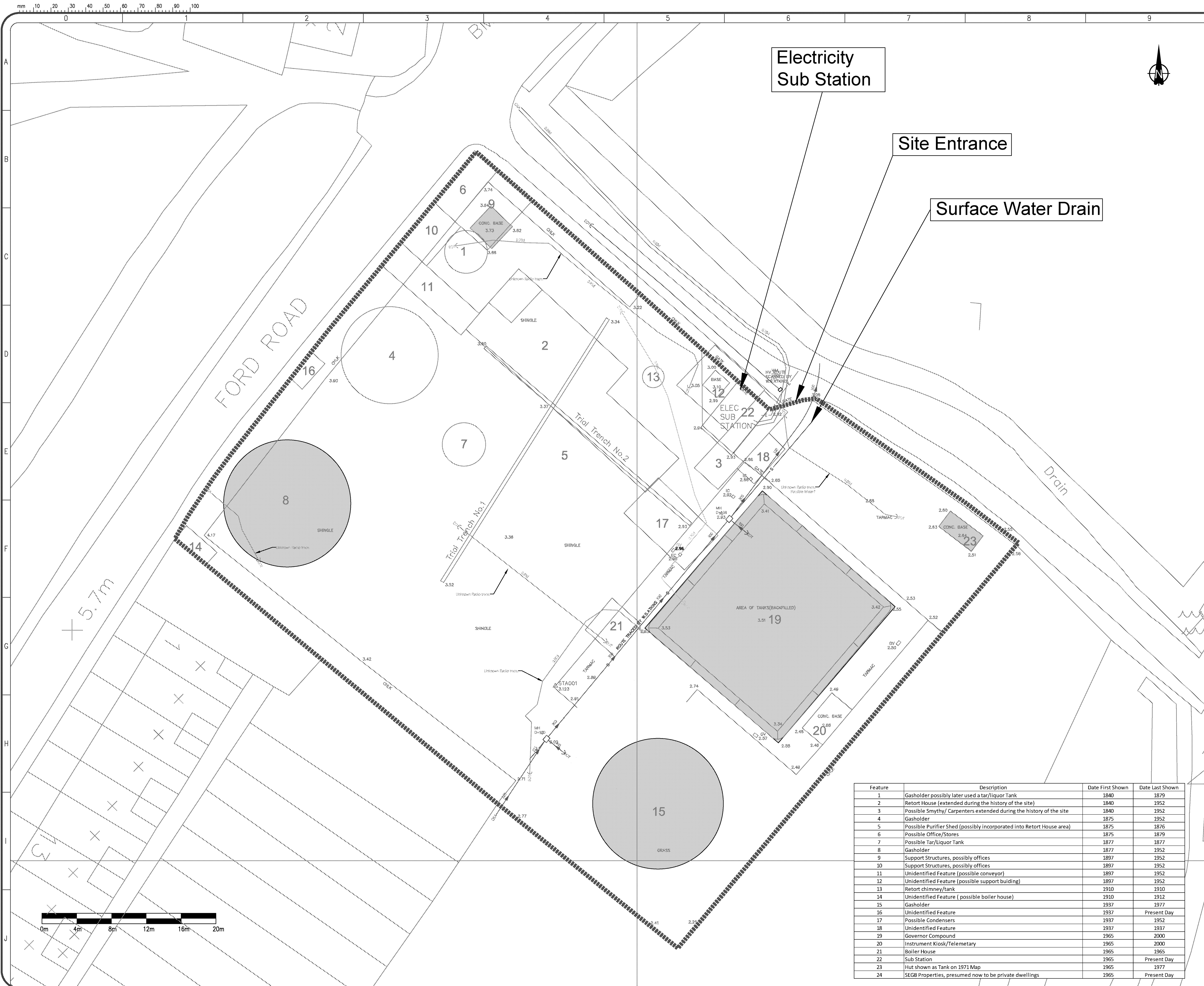
- Materials / Waste import / export records (including full Duty of Care documentation);
- Groundwater quality monitoring data and laboratory analytical certificates;
- Relevant approvals from Arun District Council, the Environment Agency and utilities companies
- Records of water treatment / disposal to sewer (including meter readings and laboratory analysis certificates);
- Laboratory certificates for soil analysis (for environmental and geotechnical testing purposes);
- The extent and location of all soil / groundwater remediation works, including 'As Built' engineering plans showing the location of remedial excavations, location of validation sampling, backfilled soils, obstructions etc.;
- Records of all soil treatment (including volumes and validation testing analytical results);
- Records of Groundwater and NAPL recovery including post betterment conditions and presence of remaining NAPL following demonstration of asymptotic conditions shall be provided. This shall include monitoring data at time of completion, thickness of remaining NAPL and a topographic record of well location to record distribution. This information shall be provided also on a monthly basis during NAPL betterment for Regulator review;
- A photographic record;
- A summary of environmental monitoring and complaints; and
- Full copies of key regulatory correspondence.

4.17 Verification Reporting

A verification report will be prepared on completion of the remediation works. The report will contain details of all excavation works carried out, materials management aspects including details of the volumes of material excavated, treatment activities, disposal activities and material re-use on-site. Photographs of the works, environmental monitoring data and certificates of the laboratory verification testing for chemical and geotechnical properties of all soil material will also be included.

The verification report shall be completed in accordance with current regulatory guidance and best practice.

FIGURES



Legend E501308, N106749

- National Grid Property Holdings Site Boundary
- ◇ Historical Features
- Proposed Celtic Compound

- LEGEND
- Foul Drainage
 - Surface Drainage
 - Combined Drainage
 - Electricity
 - Electricity High Voltage
 - Electricity Low Voltage
 - Gas
 - Ground Probing Radar
 - Water
 - Cable Television
 - Close Circuit Television
 - Communication
 - British Telecom
 - Compressed Air
 - Offset Fill-Line
 - Oil Pipe
 - Pipe
 - Ventilation
 - Fuel Line
 - Vapour Recovery
 - Gauge Line
 - Telemetry
 - Fibre Optics
 - Unknown
 - Fence
 - Edge of Canopy
 - Gully Run

0 First Issue 27/01/21
REV COMMENT DATE

Celtic enGlobe
Columbus House
Village Way
Cardiff
CF15 7NE
029 2036 8636
enquiries@celtic-ltd.com
www.celtic-ltd.com

Client
nationalgrid

Project
Arundel Gas Works
Ford Road, Arundel

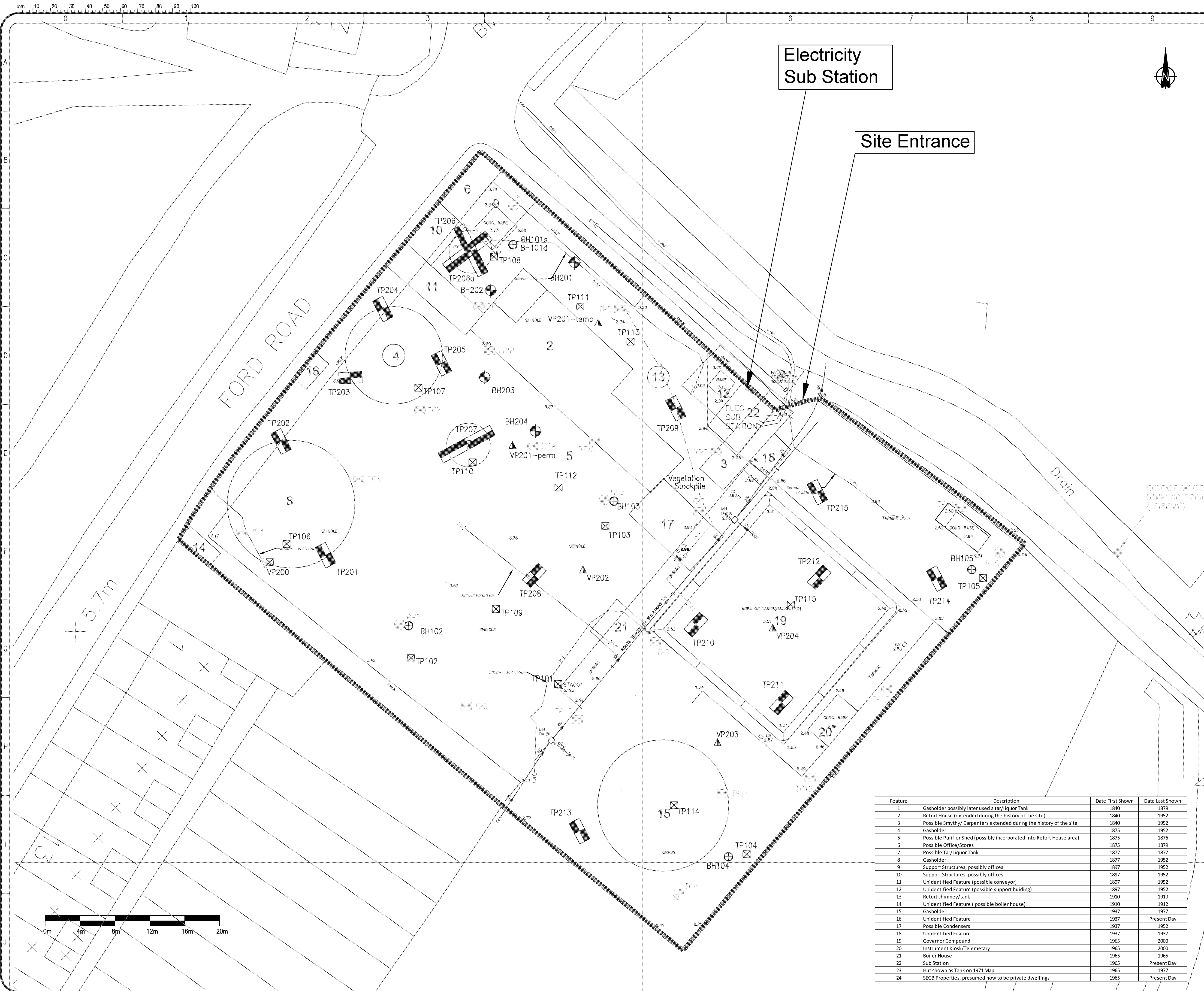
Title
Historical Features

Drawn by GEP Checked SG Date 27/01/21 Authorised MH Date 27/01/21

Original Scale 1:200 Date 27/01/21 Rev 0 Paper A1

Drawing Number
D1820/5045/A2

Feature	Description	Date First Shown	Date Last Shown
1	Gasholder possibly later used as a tar/liquor Tank	1840	1879
2	Retort House (extended during the history of the site)	1840	1952
3	Possible Smythy/ Carpenters extended during the history of the site	1840	1952
4	Gasholder	1875	1952
5	Possible Purifier Shed (possibly incorporated into Retort House area)	1875	1876
6	Possible Office/Stores	1875	1879
7	Possible Tar/Liquor Tank	1877	1877
8	Gasholder	1877	1952
9	Support Structures, possibly offices	1897	1952
10	Support Structures, possibly offices	1897	1952
11	Unidentified Feature (possible conveyor)	1897	1952
12	Unidentified Feature (possible support building)	1897	1952
13	Retort chimney/tank	1910	1910
14	Unidentified Feature (possible boiler house)	1910	1912
15	Gasholder	1937	1977
16	Unidentified Feature	1937	Present Day
17	Possible Condensers	1937	1952
18	Unidentified Feature	1937	1937
19	Governor Compound	1965	2000
20	Instrument Kiosk/Telemetry	1965	2000
21	Boiler House	1965	1965
22	Sub Station	1965	Present Day
23	Hut shown as Tank on 1971 Map	1965	1977
24	SEGB Properties, presumed now to be private dwellings	1965	Present Day



- Legend** E501308, N106749
- ***** National Grid Property Holdings Site Boundary
 - Celtic Trial Pits
 - Celtic Borehole Locations
 - 2000 Atkins Borehole Location
 - 2000 Atkins Trial Pit Location
 - 2000 Trial Trench Location
 - 2011 Atkins Borehole Location
 - 2011 Atkins Trial Pit Location
 - 2011 Vapour Well

- LEGEND**
- Foul Drainage
 - Surface Drainage
 - Combined Drainage
 - Electricity
 - Electricity High Voltage
 - Electricity Low Voltage
 - Gas
 - Ground Probing Radar
 - Water
 - Cable Television
 - Close Circuit Television
 - Communication
 - British Telecom
 - Compressed Air
 - Offset Fill-Line
 - Oil Pipe
 - Pipe
 - Ventilation
 - Fuel Line
 - Vapour Recovery
 - Gauge Line
 - Telemetry
 - Fibre Optics
 - Unknown
 - Fence
 - Edge of Canopy
 - Gully Run

0	First Issue	27/01/21
REV	COMMENT	DATE

Columbus House
Village Way
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www.celtic-td.com

Client
nationalgrid

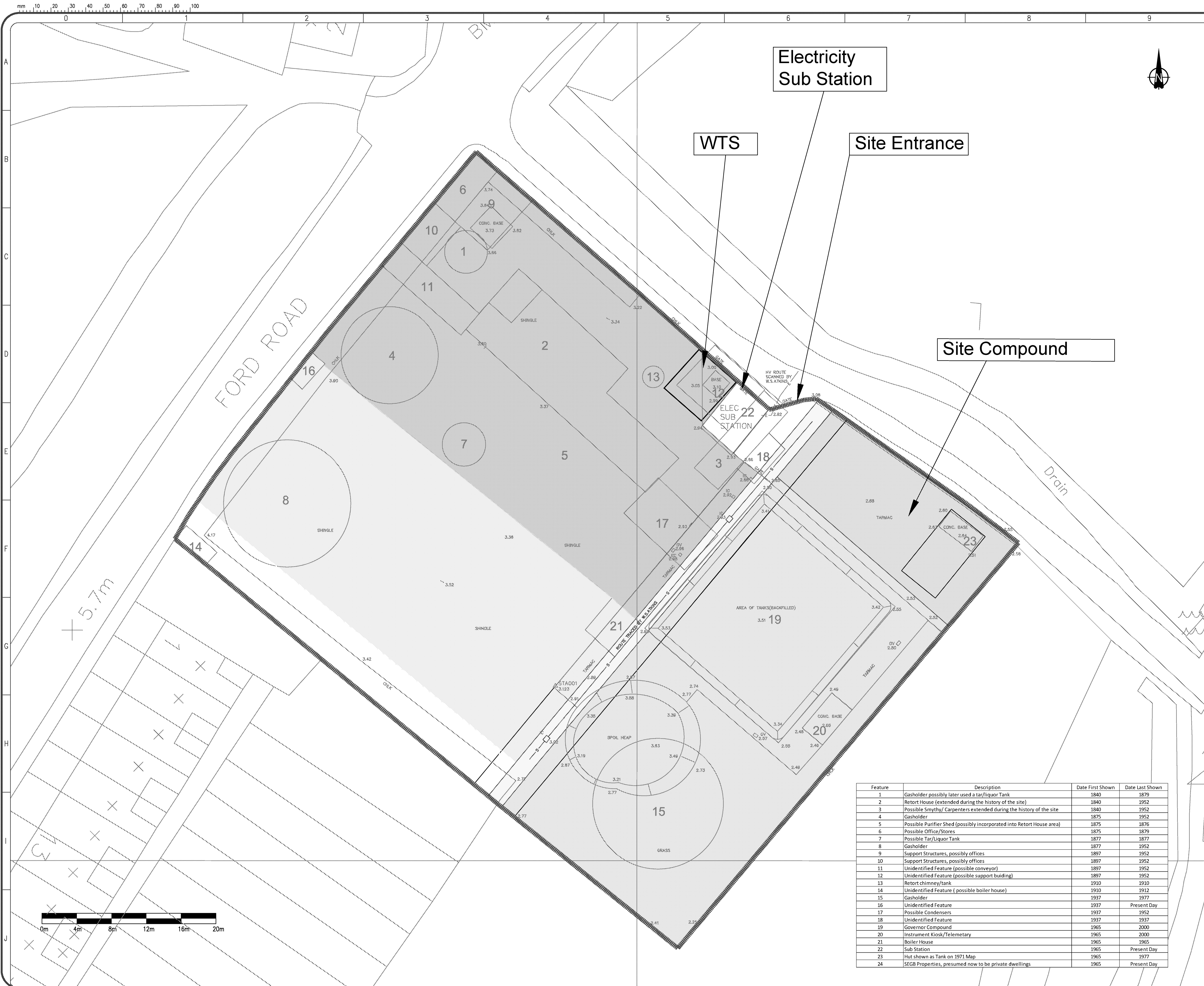
Project
Arundel Gas Works
Ford Road, Arundel

Title
Site Investigation Locations

Drawn by	Checked	Date	Authorised	Date
GEP	SG	27/01/21	MH	27/01/21
Original Scale	Date	Rev	Paper	
1:200	27/01/21	0	A1	

Drawing Number
D1820/5045/A3

Feature	Description	Date First Shown	Date Last Shown
1	Gasholder possibly later used as a tar/liquor Tank	1840	1879
2	Retort House (extended during the history of the site)	1840	1952
3	Possible Smyth/ Carpenters extended during the history of the site	1840	1952
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19	Governor Compound	1965	2000
20	Instrument Kiosk/Telemetry	1965	2000
21	Boiler House	1965	1965
22	Sub Station	1965	Present Day
23	Hut shown as Tank on 1971 Map	1965	1977
24	SEG8 Properties, presumed now to be private dwellings	1965	Present Day



Legend

- National Grid Property Holdings Site Boundary
- Site Compound
- Water Treatment System
- Area 1
- Area 2
- Area 3
- Area 4
- Surface Water Easement
- Historical Locations

1	Surface Water Easement Amended	08/03/21
0	First Issue	27/01/21
REV	COMMENT	DATE

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Client
nationalgrid

Project
Arundel Gas Works
Ford Road, Arundel

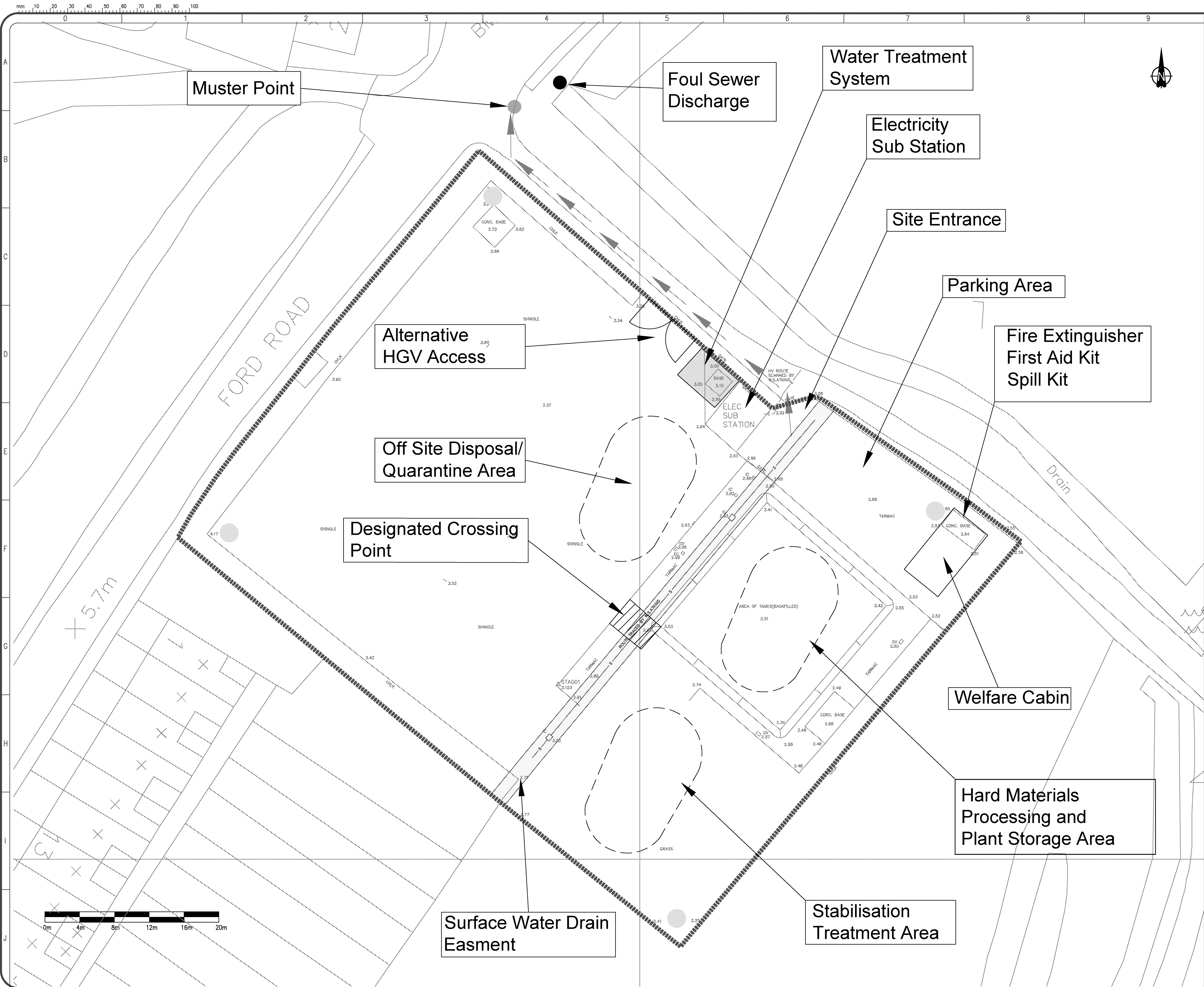
Title
Proposed Remediation
Areas

Drawn by	Checked	Date	Authorised	Date
GEP	SG	27/01/21	MH	27/01/21

Original Scale	Date	Rev	Paper
1:200	27/01/21	1	A1

Drawing Number
D1820/5045/A4

Feature	Description	Date First Shown	Date Last Shown
1	Gasholder possibly later used as a tar/liquor Tank	1840	1879
2	Retort House (extended during the history of the site)	1840	1952
3	Possible Smyth/ Carpenters extended during the history of the site	1840	1952
4	Gasholder	1875	1952
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19	Governor Compound	1965	2000
20	Instrument Kiosk/Telemetry	1965	2000
21	Boiler House	1965	1965
22	Sub Station	1965	Present Day
23	Hut shown as Tank on 1971 Map	1965	1977
24	SEGB Properties, presumed now to be private dwellings	1965	Present Day



- Legend**
- ***** National Grid Property Holdings Site Boundary
 - Celltic Site Compound
 - Muster Point
 - Egress Route
 - Environmental Monitoring Point
 - Surface Water Easment

1	Surface Water Easment Amended	08/03/21
0	First Issue	27/01/21
REV	COMMENT	DATE

Celtic enGlobe

Columbus House
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CF15 7NE
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enquiries@celtic-ltd.com
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Client

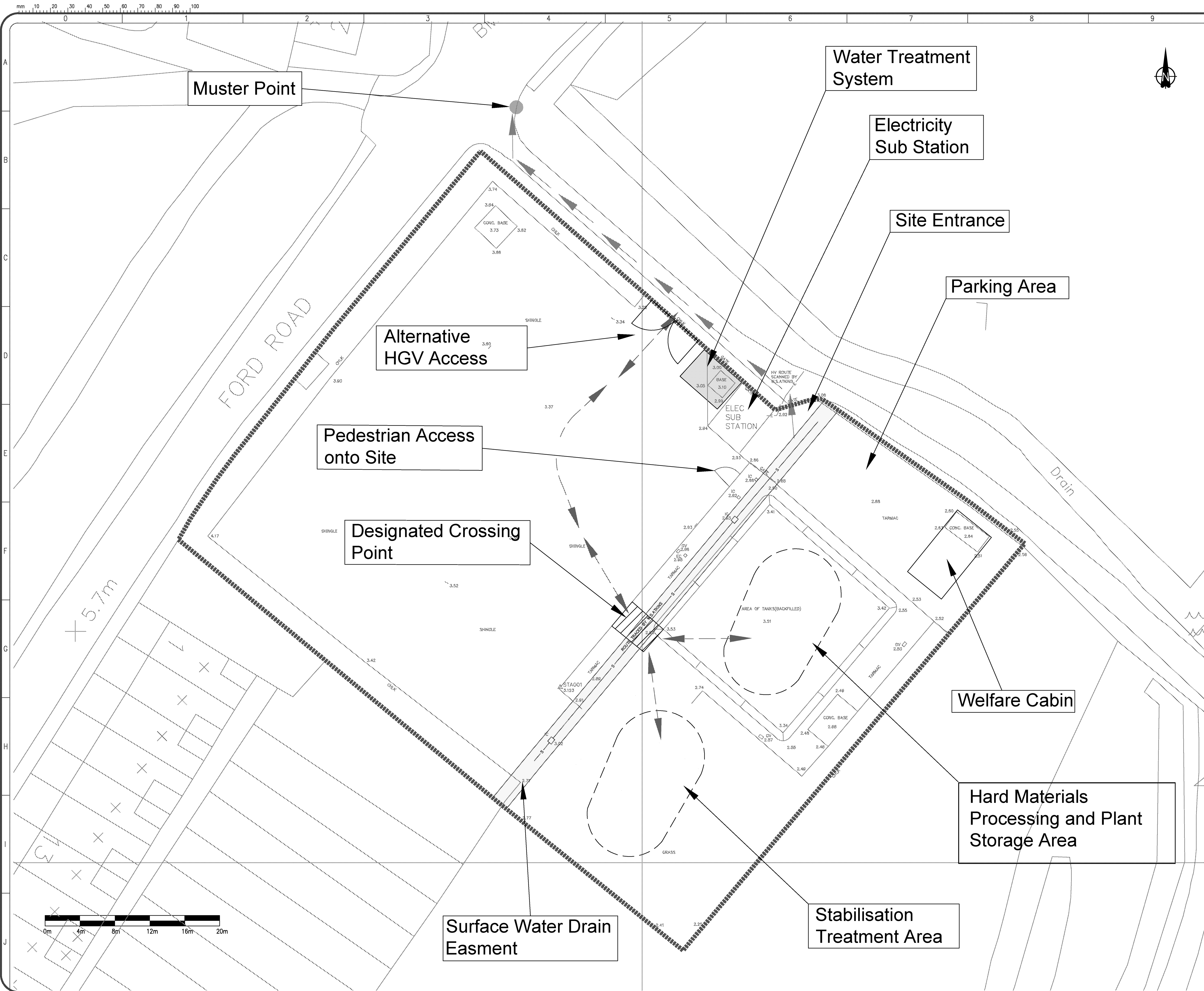
nationalgrid

Project
Arundel Gas Works
Ford Road, Arundel

Title
Proposed Remedial
Layout

Drawn by CEP	Checked SG	Date 27/01/21	Authorised MH	Date 27/01/21
Original Scale 1:200	Date 27/01/21	Rev 1	Paper A1	

Drawing Number
D1820/5045/A5



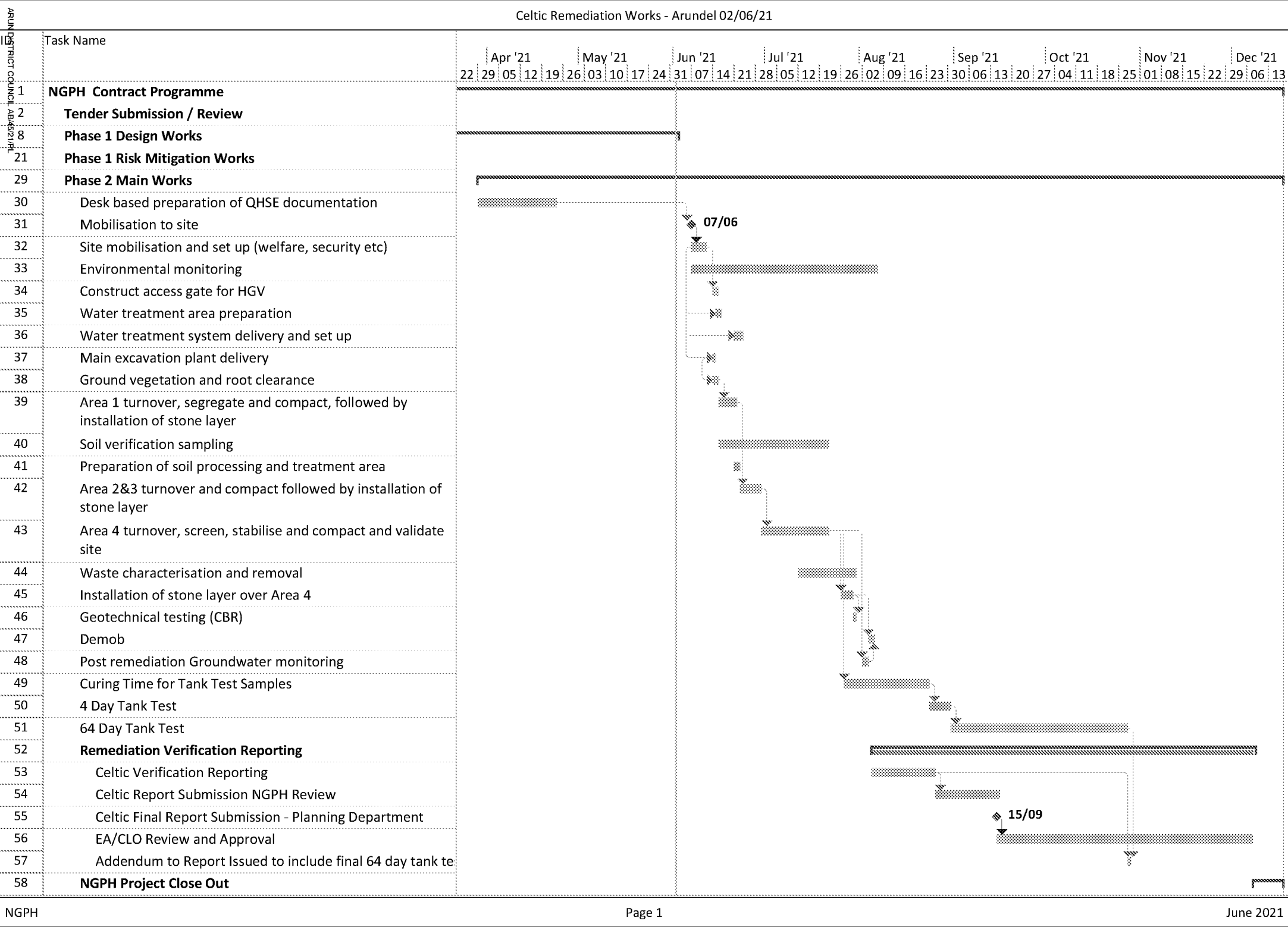
- Legend
- ***** National Grid Property Holdings Site Boundary
 - Celtic Site Compound
 - Muster Point
 - Egress Route
 - HGV Route
 - Surface Water Easement

1	Surface Water Easement Amended	08/03/21
0	First Issue	27/01/21
REV	COMMENT	DATE
Celtic enGlobe Columbus House Village Way Cardiff CF15 7NE 029 2036 8636 enquiries@celtic-ltd.com www.celtic-ltd.com		
Client nationalgrid		
Project Arundel Gas Works Ford Road, Arundel		
Title Proposed Traffic Management Plan		
Drawn by CEP	Checked SG	Date 27/01/21
Original Scale 1:200	Date 27/01/21	Rev 1
Drawing Number D1820/5045/A6		Paper A1
Authorised MH		Date 27/01/21

APPENDICIES

APPENDIX A	PROGRAMME OF WORKS
APPENDIX B	PUBLIC ENGAGEMENT LETTER
APPENDIX C	PUBLIC ENGAGEMENT POSTER
APPENDIX D	COVID RESPONSE FLOWCHART

APPENDIX A PROGRAMME OF WORKS



NGPH

Page 1

June 2021

APPENDIX B PUBLIC ENGAGEMENT LETTER

ADDRESS
ADDRESS
ADDRESS
ADDRESS

21 May 2021

Dear Neighbour

Keeping you informed – Work at Ford Road, Arundel, West Sussex

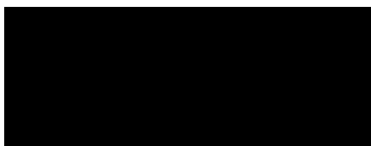
As you may be aware, National Grid, with our specialist contractor, Celtic, have been carrying out site investigation works at Ford Road, Arundel, West Sussex. These works are vital to clear the old gas valve compound on site. Following the site investigation works last year, we are now in a position to start the next phase of the project and wanted to provide you with an update on upcoming remediation works.

Our specialist contractor, Celtic, will start to mobilise the site from w/c 7 June 2021. This site set-up will involve taking plant deliveries and erecting welfare cabins for our staff. Following this, remediation works will then take place, which will involve the excavation and on-site treatment of soils. These treatment works are regulated by the Environment Agency and strict controls will be in place to minimise emissions such as dust, odours, noise and vibration. We anticipate completing our works by the end of August.

During this time, you may notice an increase in lorries to the site, which will be needed to remove unsuitable materials. We anticipate that there will be at most three lorry movements per day during this work. In order to minimise disruption, we will be liaising with all contractors to ensure that larger vehicles will travel to and from site outside of rush hour, where possible. As they have done previously, our workers will access the site via the access track off Ford Road, and all vehicles will be parked within our site boundary. The working hours for the remediation works will take place between 8am – 6pm, Monday – Friday. No work will take place on a Saturday or Sunday. We will continue to write in advance of any additional works taking place on the site.

Please be assured that we will do all we can to minimise any disruption associated with our works. If you have any queries, please call our community relations team on  or email us on . They're available daily from 8am until 6pm.

Yours faithfully



Samantha Rendell
Land Regeneration Manager
National Grid Property Holdings Ltd.

APPENDIX C PUBLIC ENGAGEMENT POSTER

Ford Road, Arundel

Environmental improvement works

What are we doing?

As part of our programme of environmental improvement work, we're starting work on this site from 7th June 2021.

Our work will take place from 8am to 6pm Monday to Friday. No work will take place on Saturdays and Sundays, bank or public holidays.

We anticipate completing our work by the end of August 2021.

What will the work involve?

Our work will involve the excavation and processing of soils and groundwater, with some on-site treatment and subsequent removal of unsuitable materials. These treatment works are regulated by the Environment Agency and strict controls will be in place to minimise nuisance emissions.

Given the ongoing restrictions associated with COVID, should you have any questions, please refrain from approaching our contractors, contact details are provided below.

What to expect from our work

You may notice some activity on and around the site during this period, but we'll make every effort to minimise disruption to all our neighbours.

We are committed to reducing the impact of construction activity on the local community. You will see an increase of vehicles coming to and from the site removing unsuitable materials and importing clean stone. There may be some odorous materials encountered and there will be some noise from the vehicles, plant and machinery we will be using but we endeavour to keep these to a minimum. Strict controls will be implemented to mitigate and minimise risks to our workforce and neighbouring community. Environmental monitoring will be undertaken throughout the works to assess our impact and provide reassurance that control measures are suitable.

Will there be a lot of disruption from the site?

We will do everything we can to ensure disruption is kept to a minimum. We'll closely monitor noise, dust and other nuisance emissions and take appropriate action to reduce the impact of this on the community.

Contact

Please get in touch if you'd like further information about our work. Our community relations team will be happy to answer any questions you may have about the project. You can reach them on:



Freephone: [REDACTED] (9am – 6pm)



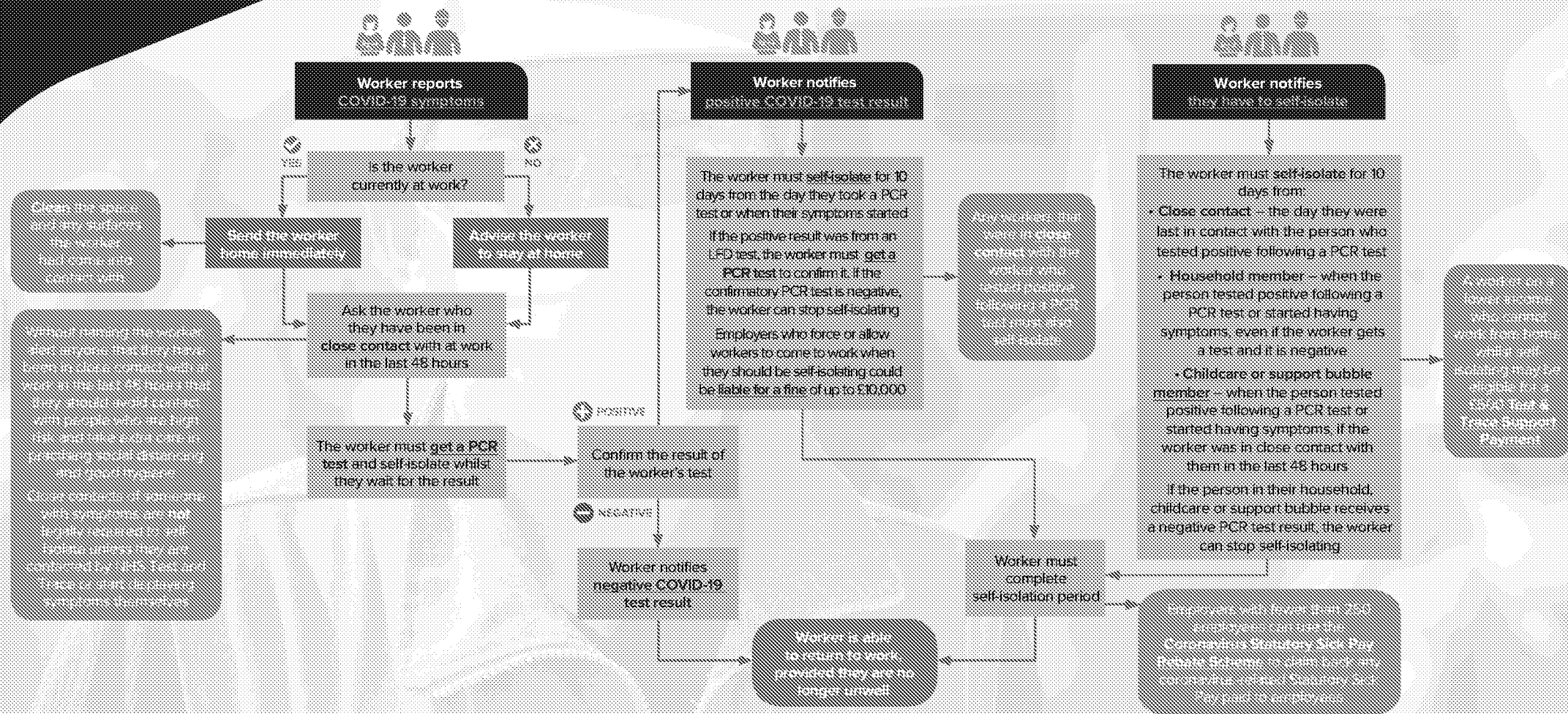
Email: [REDACTED]

APPENDIX D COVID RESPONSE FLOWCHART

WHAT TO DO IF A WORKER HAS COVID-19 OR HAS TO SELF-ISOLATE

14 April 2021

This information applies in England; other information may apply in Scotland, Wales and Northern Ireland



This flowchart is regularly reviewed
Click here for the latest version

Find the latest coronavirus information
www.BuildUK.org/coronavirus