Lanarkshire Steelworks

Soil and Groundwater Contamination Liability Assessment

The Scottish Government

22 April 2016

Notice

This document and its contents have been prepared and are intended solely for The Scottish Government's information and use in relation to the preliminary assessment of soil and groundwater contamination liabilities at the existing TATA facilities at Clydebridge and Dalzell Steelworks.

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Document history

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Executive summary

Atkins has been requested by the Scottish Government to undertake a preliminary assessment of plausible soil and groundwater contamination liabilities at two TATA steel plants in Lanarkshire. The Clydebridge and Dalzell steelworks are located in South Lanarkshire and North Lanarkshire respectively.

The objective of the assessment is to provide an initial financial estimate of potential soil and groundwater contamination remediation liabilities at Clydebridge and Dalzell. Specifically this relates to the plausible remediation activities arising out of historical soil and groundwater contamination and in relation to the following potential future land-use scenarios:

- closed site/no on-going use;
- light/heavy industrial redevelopment; and
- residential redevelopment.

The works considered existing statutory liabilities under environmental protection legislation, PPC permits, Waste Management Licences and the plausible impacts of over one hundred years of industrial landuse.

The assessment approach is consistent with that set out in 'The Model Procedures for the Management of Land Contamination' (CLR11) which promotes a risk based approach to the management of contamination. In undertaking the assessments, Atkins has drawn upon its professional experience of similar sites, the typical requirements of the environmental regulators and the particular environmental settings.

A summary of the costs of what are considered 'Lower Mid Level' and 'Upper Mid Level' remediation costs is presented for each scenario below. An estimate of joint reclamation and remediation costs is also provided for both industrial and residential landuse. The joint costs include sums for partial removal of in-ground structures and general turnover and for the provision of localised clean cover and gas and vapour membranes within newly built structures. Whilst clean cover and gas barriers are important risk management measures these costs as well as general reclamation requirements are excluded from the isolated remediation costs.

		Clydebridge		Dalzell	
		Lower Mid Range	***Upper Mid Range***	***Lower Mid Range***	***Upper Mid Range***
Closed/No Landuse		[redacted]	[redacted]	[redacted]	[redacted]
Redevelopment – Light/Heavy Industrial	Joint Remediation and Reclamation	[redacted]	[redacted]	[redacted]	[redacted]
	Remediation	[redacted]	[redacted]	[redacted]	[redacted]
Redevelopment – Residential	Joint Reclamation and Remediation	[redacted]	[redacted]	[redacted]	[redacted]
	Remediation	[redacted]	[redacted]	[redacted]	[redacted]

1. Introduction

Atkins has been requested by the Scottish Government to undertake a preliminary assessment of plausible soil and groundwater contamination liabilities at two TATA steel plants in Lanarkshire. The Clydebridge and Dalzell steelworks are located in South Lanarkshire and North Lanarkshire respectively. Atkins' understanding of the site boundaries is shown on drawings 5139156-ATK-CLB-DR-0001 and 5139156-ATK-DLZ-DR-0001 for Clydebridge and Dalzell respectively and are included with this report.

The work has been undertaken under the Transport for Scotland Framework and the scope defined within a Service Brief titled, '*Acquisition and Sale of Lanarkshire Steelworks – Environmental Liabilities'*. The offer in relation to this brief is contained within Atkins letter, reference *GBMC/WGE/Cities/20160829- Doc 01 Rev 1 APP*, dated 7th April 2016.

The objective of the assessment is to provide an initial financial estimate of potential soil and groundwater contamination remediation liabilities at Clydebridge and Dalzell. Specifically this relates to the plausible remediation activities arising out of historical soil and groundwater contamination and in relation to the following potential future land-use scenarios:

- closed site/no on-going use;
- light/heavy industrial redevelopment; and
- residential redevelopment.

1.1. Approach to Assessment, Assumptions and Limitations

The assessment relates solely to below ground contamination in soil and groundwater. For each site reference has been made to a range of contamination liabilities related to:

- Existing or pending statutory actions under contaminated land or water protection legislation, for example, Part IIA of the Environmental Protection Act or Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Pollution Prevention and Control (PPC) Permits;
- Waste Management Licences; and
- Future duty of care considerations and remediation requirements for remediation under the planning process.

From the data made available (see Section 1.2) an assessment has been made of the plausibility of below ground contamination being present as a result of historic and current landuses. The setting of each site has also been assessed in outline to evaluate the broad environmental sensitivity of the site, the site geology and its ground and surface water environments.

Although this report is not intended as a detailed assessment of contamination risk, the approach adopted is broadly consistent with that set out in '*The Model Procedures for the Management of Land Contamination'* (CLR11) which promotes a risk based approach to the management of contamination. Accordingly, Atkins' proposals for further assessment and remediation and the associated cost estimates assume that risk assessment principles will be applied and that any future remediation should generally be proportionate and have reference to the environmental setting of the site and the surrounding areas.

All cost estimates assume the sites are demolished to ground level (excluding the Listed structures) and all above ground hazardous waste and materials are removed or excluded from liability transfer.

An inherent uncertainty within the assessment is the very limited level of investigation data that has been made available. Consequently in undertaking the assessments, Atkins has drawn upon its professional experience

of similar sites, the typical requirements of the environmental regulators and the particular environmental settings.

Statutory Liabilities

For existing statutory liabilities, related to compliance with environmental legislation, Atkins has requested confirmation of the current regulatory status of both sites from both the Local Authorities and SEPA. Where there are no regulatory actions pending or underway, a zero cost liability rating has been assumed but with an allowance for possible future inspection and related follow up activities commensurate with the sites' environmental setting and historical usage.

PPC

Two PPC permits are currently held by Longs Steel UK Ltd relating to the Dalzell and Clydebridge sites. It is assumed that these will transfer to a new operator in totality along with the obligations to maintain the operation in accordance with the permit. The soil and groundwater environmental baseline condition of both areas relating to the permits have not been defined in detail at the commencement of the permits hence it is not possible to establish with any reasonable degree of confidence the impacts from non-compliance. Accordingly, within this assessment, it is assumed that all on-going operational compliance issues associated with the PPC permits remain with the future operator and any remediation of ground impacts relating to past non-compliance are absorbed into the contingency sums for general development remediation. This includes management and mitigation of pre-transfer issues, for example, any deficiencies in containment or drainage infrastructure and addressing any current concerns of the regulators with respect to compliance monitoring and failures.

Waste Management Licence (Landfill)

The historic landfill at Clydebridge retains a Waste Management Licence. Atkins understands that the licence will be transferred to the new site owner (Liberty). Therefore, although on-going management of the landfill attracts financial liability, Atkins costs estimate excludes any sums related to licence surrender and, maintenance works or any works to the landfill which is required to manage or mitigate it's environmental impacts on the site or the wider area.

Non Development (Mothballed) Status

For this scenario the estimated costs associated with existing known statutory issues, permit and licence obligations remain applicable. An allowance has also been included in relation to the anticipated duty of care of the site owner/manager relating to possible implications of sub-surface contamination.

Redevelopment Scenarios

For the redevelopment scenarios it has been assumed that remediation will be undertaken in parallel with the general reclamation of the sites. To varying degrees this would include removal of below ground structures, turnover of surface/shallow soils and the preparation of the development platform. An indicative preparation cost has been estimated associated with a particular end use. This includes an element of 'reclamation' and from which the estimated 'remediation' cost has been isolated. The remediation estimates presented therefore exclude various reclamation related activities such as general soils turnover, structures removal and plot preparation, but which are still important to the overall redevelopment of the site.

Similarly in the absence of any plot layouts, the isolated remediation cost estimates exclude costings for vapour and gas membranes and clean-cover/barrier layers in landscaped areas and gardens. The use of these risk management strategies clearly reduces the need for wider remediation but are also very specific to the layout and for this reason are excluded from the isolated remediation cost estimates. Notwithstanding, to provide context, an overall reclamation and remediation estimate is provided as a headline figure which is based on preliminary land-use and reclamation assumptions but which should be considered indicative only,

Other

All area calculations provided in this report are approximations based on Atkins best estimate from the plans supplied as part of this project.

All costs provided should be considered approximate and are based on the assumptions set out within this report. Greater accuracy on the quantum of soil and groundwater contamination liabilities can only be provided by undertaking physical investigations including an assessment of the groundwater environment.

1.2. Information Sources

The list of contacts and references used in the collation of this report are provided within Appendix B. The data sources were also supplemented with a site visit by Atkins to both Dalzell and Clydebridge on 6th April 2016 and which included meeting TATA staff, obtaining site plans and gaining an understanding of current site processes. Witness photographs from the visit are provided in Appendix C.

As part of this study Atkins are unable to take any responsibility for inaccuracies and omissions of any third party data supplied to it.

2. The Sites

A walkover of both of the sites was undertaken on 6th April 2016 by two experienced Atkins environmental consultants who were chaperoned by a TATA employee at all times. The walkover included obtaining photographs (Appendix C) of key observations as shown on drawings 5139156-ATK-CLB-DR-0002 and 5139156-ATK-DLZ-DR-0002. The information in the following sections are taken from sources discussed in section 1.2 of this report.

2.1. Clydebridge Steelworks

The site is located in the Cambuslang/Rutherglen area of Glasgow at National Grid Reference 263290, 662030. The site is accessed via Bogleshole Road off the Cambuslang Road. The location of the site and our understanding of the site red line boundary is shown on 5139156-CLB-DR-001.

The site is divided in to the following three areas:

- Northern Section – 10.8 ha;
- Main Section – 32.7 ha; and
- Southern Section – 0.53 ha.

Hertz Rental business is located in the southern section and separated from the main section by the Argyll railway line. The main section is predominantly occupied by a large rectangular building (heat treatment bays), constructed alongside a number of smaller facilities, quench pond and associated pump house and main TATA offices. The northern section of the site is dominated by a closed landfill and bound to the north by the River Clyde and to the south by the M74 motorway which dissects the site.

2.1.1. History

Clydebridge works was opened in 1888 by the Clydebridge Steel Company in what was a semi-rural setting surrounded by a combination of open fields, small factories and coal pits. A coal pit is shown to be located within the site in 1860 but is not shown on later historical maps.

The extent and operations of the steelworks changed substantially over time. Initially the steelworks undertook numerous operations, with the main raw material, iron, produced just across the River Clyde at the Clydebridge Iron Works. The operations included large scale furnaces, ingots, cogging and plate mills and involved numerous tanks and cooling towers. Historical mapping shows tipping had commenced on the northern part of the site by 1934 and continued until sometime after 1954.

Following the closure of nearby Clyde Iron works, the melting shop and slabbing mill were closed in 1978 then demolished. The plate mill was kept open until 1982 and was subsequently demolished. All the buildings in the south-eastern area of the site, except the cold plate finishing and despatch bay were closed and demolished in the mid to late 1980s. The despatch bay was later demolished in the early 1990s along with the removal of all the railway lines servicing the various production units.

It is understood that between 1967 and 1987 three boreholes were used for the disposal of spent pickling acid. The boreholes were drilled into the coal measures and historic workings. Disposal was consented under the Clyde River Purification Board Act (consent No PL3 – SEPA Ref No. WPC/W/8016). Although this was a consented activity it is understood there have been impacted in the wider area from disposal of liquid waste into boreholes and shafts.

Key historical features for the site are outlined on drawing 5139156-ATK-CLB-DR-0003 which is collated in the back of this report. There is some uncertainty over the exact location of the acid disposal boreholes. For purposes of this assessment an allowance has been made for the treatment of these as potential contamination pathways.

2.1.2. Environmental Setting

The BGS solid map of the areas (NS66SW Rutherglen, 1:10,000, 2007) has identified that the site and wider surrounds are underlain by the Carboniferous Scottish Middle Coal Measures Formation (SMCM) comprising a cyclical sequence of sandstone, siltstone, mudstone and coal. Borehole logs from the surrounding area indicate that the depth to bedrock varies across the site and is in the region of 23m to 32m below ground level (m bgl.)

The site is located within an area of known mining in more than one seam, including mining in the Glasgow Upper Coal, within 30m of rock head. Information from the Coal Authority confirms that the site is within the likely zone of influence from workings in six coal seams (40m to 160m bgl), which were last worked in 1916. The Coal Authority states that any ground movements associated with these workings are likely to have ceased. According to the Coal Authority database there is one potential shaft or adit in the south west of the site; BGS records show a number of abandoned shafts in the wider area to the north.

Made Ground has been encountered within investigations undertaken as part of the PPC licence application and recently by TATA in 2016. These investigations revealed a wide variety of fill on the site comprising a mix of soils (including ash and slag), waste and structural remnants. Exploratory hole records examined did not appear to have encountered significant groundwater in the Made Ground, however, the presence of sand directly underlying much the Made Ground is considered likely to act as a conduit for groundwater and potential contamination migration. Bands of firm to stiff clay or silt appear to be present beneath the sand and gravel which, may retard vertical movement and cause adherence of some contaminants. Groundwater flow in these shallow deposits is considered likely to be towards the north-west, towards the River Clyde.

The Clydebridge landfill occupies a meander of the River Clyde and has an existing Waste Management License attached to it. The landfill status is ‘closed’. This area of the site including land beyond the current extent of the Waste Management Licence has a history of unrecorded infilling which only latterly was undertaken under licence to TATA for inert industrial wastes.

Using the Water Framework Directive (WFD) guidance, SEPA has classified the bedrock underlying the Clydebridge site area as being part of the Glasgow and Motherwell body, which has a Poor status. The superficial Sand and Gravel depositis of the Carmyle and Tollcorss, which also underly the site have been classified as having a Good status.The nearet surface water course is the River Clyde which bounds the northern region of the site and flows towards the west. Using WFD guidance SEPA has classified this as a heavily modified river with bad Ecological Potential and a chemical staus of Fail. The river is considered likely to be in natural hydraulic continuty with groundwater within the shallow deposits underlying the site.

2.2. Dalzell Steelworks

The site is located in the Motherwell area of North Lanarkshire at National Grid Reference 75895 56639. The site is accessed via Park Street and Crosshill Street off the A721. The location of the site and our understanding of the site red line boundary is shown on 5139156-ATK-DLZ-DR-0001.

The site, which covers an area of approximately 28 ha, is adjacent to the site of the former Ravenscraig steelworks which lies to the east. The surrounding area is largely residential to the south, west and north. The current site comprises a plate rolling mill and associated activities for the hot rolling of steel plate with the scale and swarf produced as part of the process, sent for recycling. All the furnaces, used for reheating the steel are fired using natural gas.

2.2.1. History

Dalzell works was opened in 1873 and was originally operated by Colvilles. The site was in a largely rural setting, however, there were numerous active and disused coal pits in the area which continued to mine coal into the first half of the 20th century. Two disused coal pits are also marked within the areas of the current site, however these are not shown on mapping after 1861.

When the works first opened, ironmaking was carried out on site using ‘puddling’ furnaces until in the early 1900’s, a melting shop for the production of steel was developed. The iron used for this steel production was supplied from the Clyde Ironworks at Cambuslang. Gas production also took place on site as shown by the presence of a gas holder on the 1898 map.

Between 1920 and 1980 the development of the works continued around the existing buildings with a variety of enhancements. Originally the soaking pits for reheating the steel were fired with gas generated on site, however, in the 1950’s new oil-fired furnaces were installed. In the late 1970’s and early 1980’s much of the site was closed and demolished to leave the current site operations.

Key historical features for the site are outlined on drawing 5139156-ATK-DZL-DR-0003 which is collated in the back of this report.

2.2.2. Environmental Setting

The British Geological Survey (BGS) online mapping and borehole records for the Dalzell area show that the site is underlain by superficial deposits of Devensian Till comprising sandy gravelly clays to varying depths of between 0m and 40.8m below ground level (bgl).

The bedrock geology of the site predominately comprises the SMCM formation with the Scottish Upper Coal Measures formation (SUCM) shown to encroach the north eastern corner of the site on BGS online mapping. The SMCM and SUCM generally comprise interbedded sandstone, siltstone and mudstone with seams of coal reported to be present in six of the seven BGS boreholes. The coal seams range in thickness between 0.1m and 3.1m with a maximum combined thickness of 3.6m from three seams in borehole NS75NE190/3. The Coal Authority records suggest that there are four shafts present within the site boundary.

Locally, site investigation records have identified Made Ground down to a maximum of 9.5m below ground level on the site. The Made Ground is reported to comprise grey and brown sandy clays and gravels containing varying quantities of ash, slag, refractory, scale and clinker. There is also localised evidence of contamination impact.

Using the Water Framework Directive (WFD) guidance, SEPA has classified the bedrock underlying the Dalzell site area as being part of the Glasgow and Motherwell body, which has a Poor status. There are known impacts from contaminantion derived from the former Ravenscriag Steelworks which lay adjacent the Dalzell site.

The Scottish Coal Measures Group is classified as a moderately productive aquifer and is described by the BGS as a cyclic multi-layered aquifer with low yields from sandstones. It is noted that higher yields are found where mined but it is generally poor quality water which has high iron and fluoride.

The nearest water bodies are two ponds located off site immediately adjacent to the eastern boundary and the South Calder (330m) Todhole Burn (550m) located north of the site.

3. Remediation Assessment

Soil and groundwater contamination remediation cost summaries for each site have been provided under the following headings:

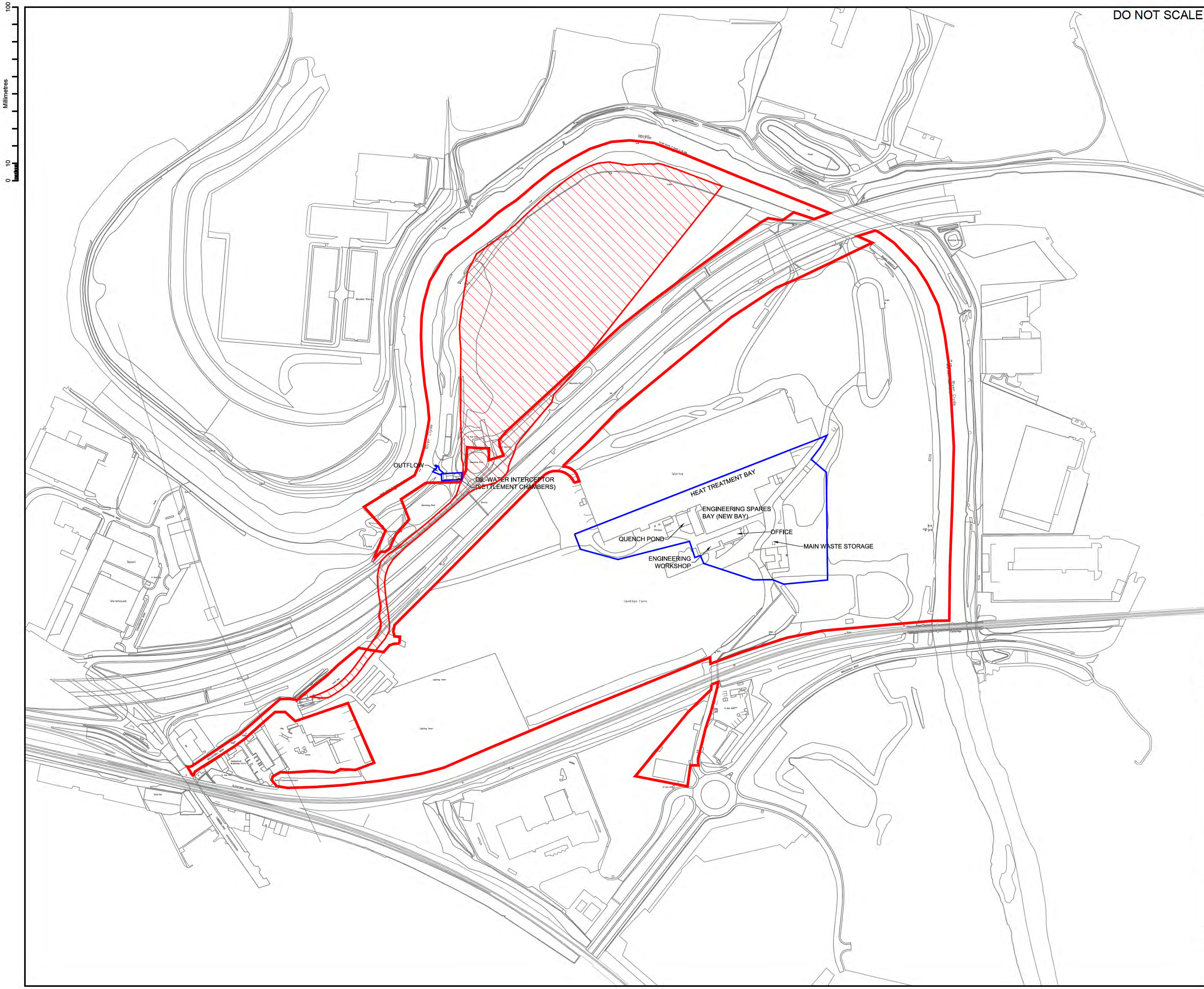
- Statutory Actions and License Obligations
- Closed site/No land-use
- Redevelopment site – Light Heavy Industry
- Redevelopment Site - Residential

Cost build up sheets for each scenario are provided in Appendix A and summarised in the tables below.

Clydebridge Steelworks	**Lower Mid Range**	**Upper Mid Range**
Statutory and Licences		
Regulatory Action Risk Contingency	[redacted]	[redacted]
Total	[redacted]	[redacted]
Closed No Landuse		
Statutory	[redacted]	[redacted]
Post operational duty of care investigations	[redacted]	[redacted]
Post operational contamination mitigation	[redacted]	[redacted]
Total	[redacted]	[redacted]
Redevelopment – Light Heavy Industry		
Joint Reclamation and Remediation Estimate	[redacted]	[redacted]
Site Investigation and Assessment	[redacted]	[redacted]
Remediation	[redacted]	[redacted]
Total	[redacted]	[redacted]
Redevelopment –Residential		
Joint Reclamation and Remediation Estimate	[redacted]	[redacted]
Site Investigation and Assessment	[redacted]	[redacted]
Remediation	[redacted]	[redacted]
Total	[redacted]	[redacted]

Dalzell Steelworks	Lower Mid Range	Upper Mid Range
Statutory and Licences		
Regulatory Action Risk Contingency	[redacted]	[redacted]
Total	[redacted]	[redacted]
Closed No Landuse		
Statutory	[redacted]	[redacted]
Post operational duty of care investigations	[redacted]	[redacted]
Post operational contamination mitigation	[redacted]	[redacted]
Total	[redacted]	[redacted]
Redevelopment – Light Heavy Industry		
Joint Reclamation and Remediation Estimate	[redacted]	[redacted]
Site Investigation and Assessment	[redacted]	[redacted]
Remediation	[redacted]	[redacted]
Total	[redacted]	[redacted]
Redevelopment –Residential		
Joint Reclamation and Remediation Estimate	[redacted]	[redacted]
Site Investigation and Assessment	[redacted]	[redacted]
Remediation	[redacted]	[redacted]
Total	[redacted]	[redacted]

Figures



KEY:

SITE BOUNDARY

PPC BOUNDARY

HISTORICAL LAND FILL BOUNDARY (APPROXIMATED FROM ENVIROCHECK REPORT)

NOTES:

1. Boundaries and features detailed on this drawing have been approximated from information provided as detailed in Appendix B of Report SCS-RPT-OUT-5139156-001. Atkins has not assessed the validity or accuracy of this third party information.

Rev.	Date	Description	By	Chk'd	App'd
P01	13/04/2016	DRAFT FOR COMMENT	RJ	DH	MP

Drawing Status: WORK IN PROGRESS

Suitability: S0

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Project Title: CLYDEBRIDGE

Drawing Title: SITE BOUNDARY

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Drawing Number: 5139156-ATK-CLB-ZZ-DR-C-0001

Revision: P01

DO NOT SCALE

Millimetres 0 10 100

KEY:

SITE BOUNDARY

LOCATION OF PHOTOGRAPH TAKEN

NOTES:

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2. Numbers next to photograph locations relate to photographs in Appendix C.

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Project Title: CLYDEBRIDGE

Drawing Title: LOCATION OF PHOTOGRAPH TAKEN

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Revision: P01

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KEY:

- SITE BOUNDARY
- PPC BOUNDARY
- INDICATIVE AREAS OF PREVIOUS INDUSTRIAL INTENSE DEVELOPMENT
- INFILLED PONDS
- COAL PITS

NOTES:

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Project Title: CLYDEBRIDGE

Drawing Title: HISTORICAL FEATURES SUMMARY

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Revision: P01

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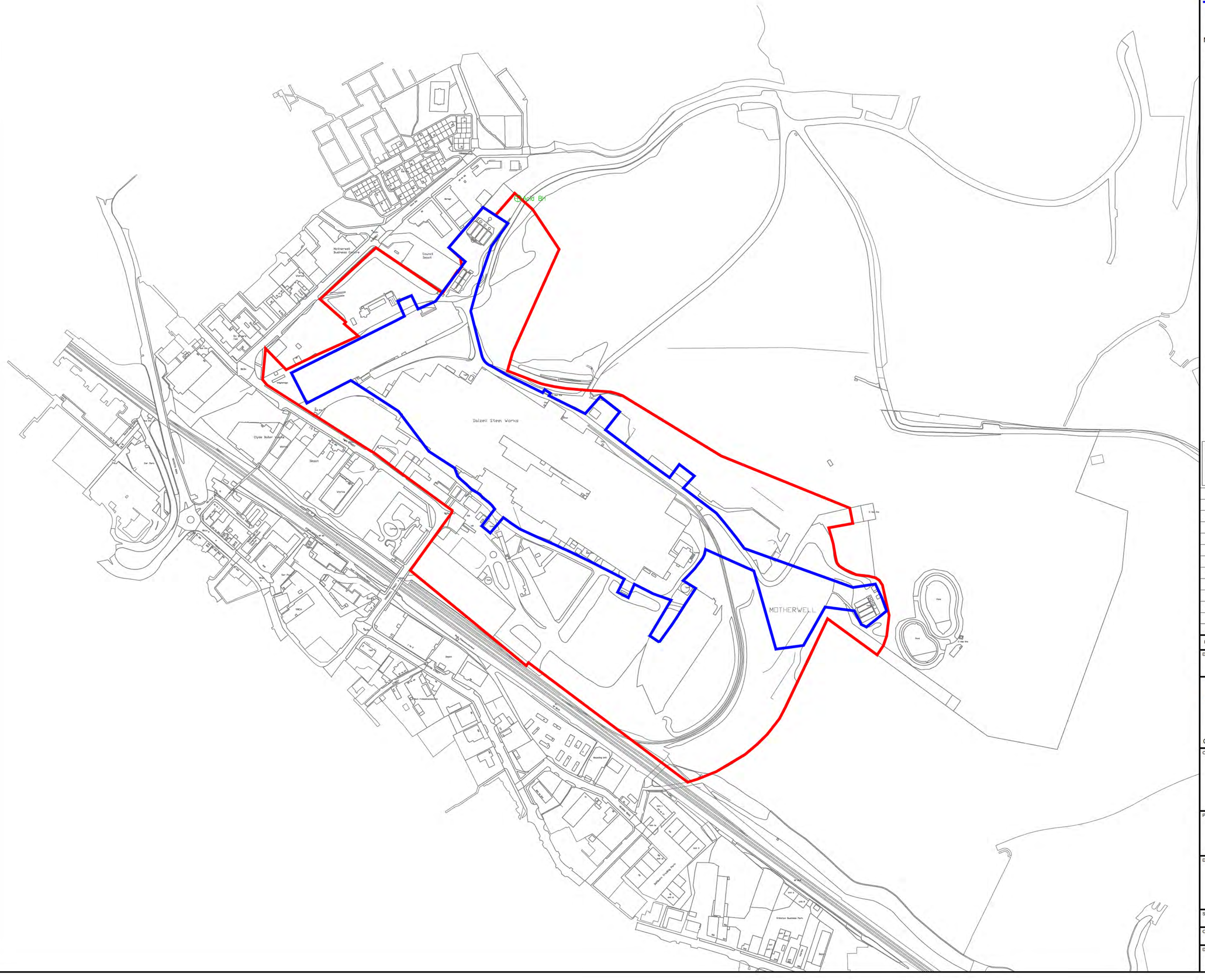

KEY:

- SITE BOUNDARY
- PPC BOUNDARY
- ⊕ ACID BOREHOLE LOCATION

NOTES:

1. Boundaries and features detailed on this drawing have been approximated from information provided as detailed in Appendix B of Report SCS-RPT-OUT-5139156-001. Atkins has not assessed the validity or accuracy of this third party information.

NOTES:

1. The blue PPC boundary has been approximated from Appendix 1 of the Consolidated Permit (PPC-W-0020029-CP01) Dated 9th April 2013.

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Project Title: DALZELL

Drawing Title: SITE BOUNDARY

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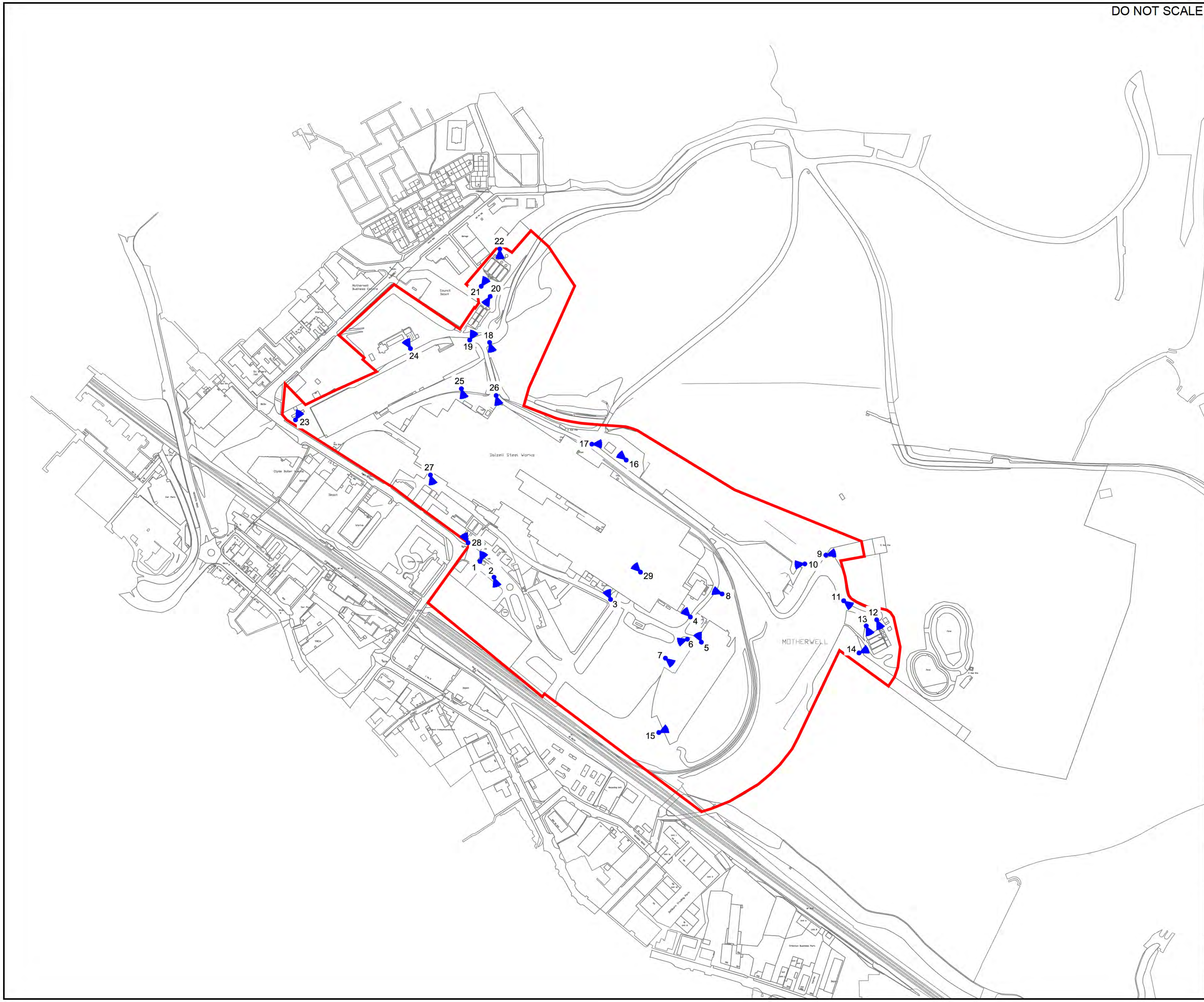
Drawing Number: 5139156-ATK-DZL-ZZ-DR-C-0001

Revision: P01



KEY:

SITE BOUNDARY

LOCATION OF PHOTOGRAPH TAKEN

NOTES:

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Project Title: DALZELL

Drawing Title: LOCATION OF PHOTOGRAPHS TAKEN

Scale	Designed	Drawn	Checked	Authorised
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Drawing Number	Revision
5139156-ATK-DZL-ZZ-DR-C-0002	P01

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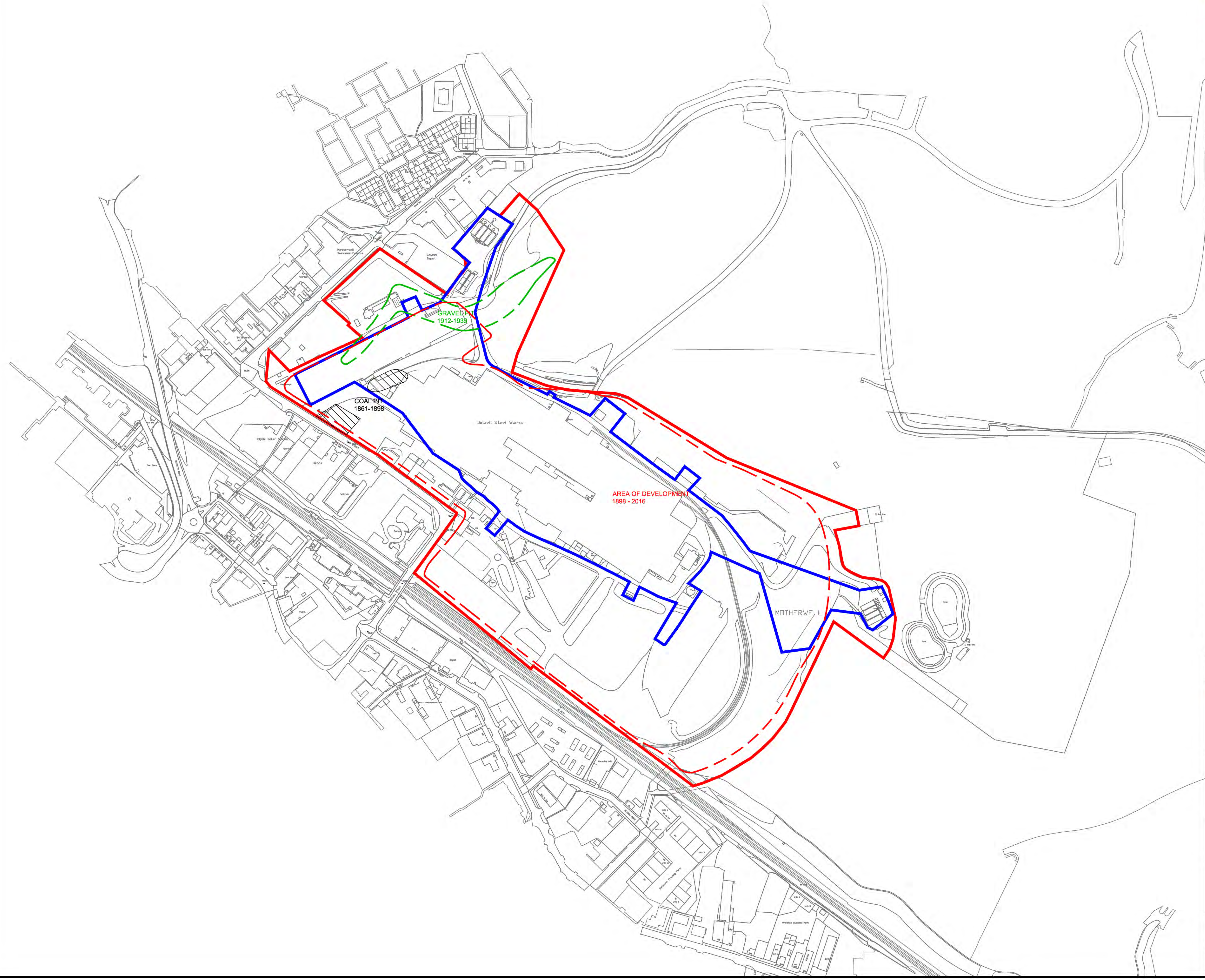

KEY:

- SITE BOUNDARY
- PPC BOUNDARY
- INDICATIVE AREAS OF PREVIOUS INTENSE INDUSTRIAL DEVELOPMENT
- COAL PITS

NOTES:

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Drawing Number: 5139156-ATK-DZL-ZZ-DR-C-0003 | Revision: P01

Millimetres 0 10 100

Appendices

Appendix A. Cost Appraisal

Clydebridge Remediation - Preliminary Cost Model Statutory Actions and License Obligations

Date:	11 April 2016	Version: Rev 1
Assessment by:	[redacted]	
Checked by:	[redacted]	
Site area north of M74 (including landfill)		108,000 m^2
Site Area South of M74		327,400 m^2
Total Site Area		435,400 m^2

Statutory Actions	***Cost Basis***	
There is no current or pending statutory actions by SEPA or the Local Authority related to Part IIa or ground and surface water protection legislation (Note 1)		[redacted]
PPC		
Remediation obligations related to non compliance with the PCC licenses are assumed to remain with the license holder. (Note 2)		[redacted]
Waste Management License		
Costs associated with aftercare and management of the closed landfill and activities leading to license surrender. (Note 3)		
Aftercare and management documentation [redacted]		
Geotechnical stability assessment including ground investigation. [redacted]		
Gas and Groundwater Monitoring well installation [redacted]		
Gas and groundwater monitoring: 5 years quarterly 5 years bi-annually and reporting. [redacted]		
Surrender Application [redacted]	Sum	[redacted]
Capital Sum cost range for landfill repair and management before surrender (for example, local repair requirements including at the interface with the River Clyde)		[redacted]
Total Statutory and Licenses		[redacted]
Risk Contingency Items		
Requirement by regulators to formally undertake an inspection of the site and monitoring as part of the Part IIa inspection regime. (Note 4)	[redacted]/ha	[redacted]
Capital sum cost range arising out of requirement to mitigate issues identified during regulatory required inspection.(Note 5)	sum	[redacted]
Total		[redacted]

Notes:

Note 1 - Assessment is based on written confirmation from SEPA and South Lanarkshire Local Authority

Note 2 - Permit dates from August 2012 based on an Application Site Report dated 2011 providing brief summary of likely ground conditions. Permit transferred to Longsteel in August 2015. Absence of a defined environmental baseline makes assessment of existing impacts from the operation difficult to quantify. As part of this assessment it is assumed that responsibility for on-going and future operational compliance issues associated with the PPC permits remain with the future operator. This includes management and mitigation of pre-transfer issues, for example, any deficiencies in containment or drainage infrastructure and addressing any current concerns of the regulators with respect to compliance monitoring and failures.

Note 3 - On-going management of the landfill attracts financial liability. Atkins costs estimate excludes any sums related to licence surrender and costs, maintenance works or any works to the landfill which are required to manage or mitigate landill impacts on the site or the wider area.

Note 4 - Although no intention to inspect has been indicated by the regulators the site has a history of over 100 years of industrial usage. Based on a cost of £2000/ha for a preliminary geoenvironmental investigation and assessment. This applies ONLY to the industrial area assessment, costs for the the imacts of the landfill are assumed to be covered under the obligatins under the Waste Management License. **No subsequent significant remediation costs are included within this sum. For the purpose of the costing estimate contingency sums for remediation are provide under the separate development scenarios.**

Note 5 - Sum provided to undertake localised contamination source reduction in soil or groundwater as a result of specific regulatory concerns outside of a formal planning context. In the absence of targeted site investigation data a range of indicative costs are provided. More widespread remediation requirements, although possible, are considered within development phase remediation.

Clydebridge Remediation - Preliminary Cost Model Non Development Scenario (Mothballed)

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Site area north of M74 (including landfill)		108000 m^2
Site Area South of M74		327400 m^2
Total Site Area		435400 m^2

Landuse Assumptions	***Cost Basis***	
Site fully decommissioned and demolished to slab level. Operational sumps and drainage runs decommissioned or sealed. License Obligations fulfilled and surrendered. Estate management function remains in place. No landform alteration. Landfill assessment, surrender costs and works covered under Waste Management License obligations.		
Site Investigation Duty of care requirement to undertake post decommissioning contamination hazard audit, assess surface condition and asses residual risks. (Note 1)	Sum	[redacted]
Site Security Estate management requirement to ensure access remains controlled and unauthorised access discouraged (Note 2)	Sum	[redacted]
Risk Contingency Items Sum for localised mitigation to manage localised surface exposure of hazardous materials or actions arising out of post decommissioning hazard audit. (Note 3)	Sum	[redacted]
Statutory costs brought forward (Note 4)		[redacted]
Total		[redacted]

Notes:

Note 1 - Requirement based on history of potentially contaminative landuses and actuate exposure risks to those that have future access, including unauthorised users.

Note 2 - Adequate security and discouraging unauthorised access to potentially contaminated sites is important in managing residual risks in the absence of a full site characterisation. However costs for this element are assumed to be part of the general estate management function for the site. Lower levels of security or allowing any unchecked public access is likely to require higher levels of post decommissioning assessment.

Note 3 - General sum to allow for localised hazardous materials disposal or capping. The requirement for this sum is largely dependant on the state of the site following decomissioning by the site operator.

Note 4 - Unassessed and unremediated the risk of inspection from the environmental regulators remains. The principal risks in a properly decommissioned but managed site is considered to relate to groundwater.

Clydebridge Remediation - Preliminary Cost Model Redevelopment Scenario (Light/Heavy Industry Industrial)

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Site area north of M74 (including landfill)		108000 m^2
Site Area South of M74		327400 m^2
Total Site Area		435400 m^2

Landuse Redevelopment Ranges

	Lower Mid Range	*Upper Mid Range*
Estimated joint reclamation and remediation estimate for a site of this nature	[redacted]	[redacted]

Costs assume circa 91.5% (30ha) development of the site south of the M74, including partial site turnover, partial removal of remnant structures, remediation and provision of clean cover capping and gas vapour barriers.

Extracted costs estimates associated with contamination and remediation (see general notes below).		[redacted]	[redacted]

Remediation Cost Estimates Build Up

	Cost Basis	*Lower Mid Range*	*Upper Mid Range*
Site Investigation and Assessment			
Whole site geoenvironmental investigation and assessment (Note 1)	[redacted] Ha	[redacted]	[redacted]
Secondary assessment, remediation strategies and procurement.(Note 2)	Sum	[redacted]	[redacted]
Remediation (Note 3)			
1 -2 In situ groundwater remediation treatments (typically a ChemOx based source treatment followed by 5 years post treatment monitoring) (Note 4)	Sum	[redacted]	[redacted]
1No. Mine shaft treatment (grouting and capping of actual or potential contamination conduit)	[redacted] /treatment	[redacted]	[redacted]
Ex situ soil treatment to reduce gross contamination principally to reduce soil leachable content for protection of groundwater resources. Mixture of petroleum hydrocarbon impacts soils, gasworks waste and leachable metals. Assume between 5% (12,000m3) and 10% (24,000m3) of reclamamtion volume requires treatment			
Assume 70% ex situ bio-remediation	[redacted] m^3	[redacted]	[redacted]
Assume 30% ex situ soil stabilisation	[redacted] m^3	[redacted]	[redacted]
Programme of oily non aqueous phase removal and disposal from the shallow (perched) groundwater environment from sumps, trenches and open excavations (possibly combined with exsitu excavations of grossly impacted soil)	Sum	[redacted]	[redacted]
General Remediation Contractor Prelims during main phase of remediation works - assume some reliance on main contractor mobilisation as part of the general reclamation of the site. Assume 25 - 30 weeks (50% of whole site reclamation rate)	[redacted] pw	[redacted]	[redacted]
Contingency sum allowance for non treatable waste disposal (asbestos, tar etc)	Sum	[redacted]	[redacted]
Total		[redacted]	[redacted]

Notes:

Note 1 - Investigation costs include allowance for Preliminary Geoenvironmental assessment, site wide physical investigation assessment of soil and groundwater, preliminary monitoring, interpretative reports and preliminary detailed quantitative risk assessment.

Note 2 - Allowance for additional contamination delineation, monitoring, risk assessment and remediation strategy.

Note 3 - In the absence of detailed investigation and assessments a remediation allowance is calculated based on likelihood of impacts from historic contamination and the general environmental setting together with Atkins experience on similar sites. Indicative remediation rates obtained from specialist contractors.

Note 4 - Sum for groundwater treatment based on typical programme costs for an in situ treatment using chemical oxidation. This assumes a generally moderate to high sensitivity environmental setting which includes a shallow aquifer underlying the site with connectivity to the River Clyde.

General Notes:

An estimate for the costs for the importation of clean cover layers in landscaped areas and installation of gas and vapour management is included in the general redevelopment costs but excluded from isolated remediation costs. It is assumed that hardstanding and floor slabs will provide sufficient protection against direct contact with residual contamination and landscape areas will be provided with a clean landscaping cover as part of the general development costings.

Typical planning requirements for site redevelopments will apply including the need to discharge a range of contamination and remediation related issues and seek regulator approvals.

Clydebridge Remediation - Preliminary Cost Model Redevelopment Scenario (Residential)

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Site area north of M74 (including landfill)		108000 m^2
Site Area South of M74		327400 m^2
Total Site Area		435400 m^2

Landuse Redevelopment Ranges

	Lower Mid Range	*Upper Mid Range*
Estimated joint reclamation and remediation estimate for a site of this nature Costs assume circa 85.5% (28ha) of the site south of the M74 is redeveloped and include for circa 60% partial site turnover, removal of remnant structures, remediation and provision of clean cover capping and gas and vapour barriers.	[redacted]	[redacted]
Extracted costs estimates associated with contamination and remediation (see general notes below).	[redacted]	[redacted]

Remediation Cost Estimates Build Up

	Cost Basis	*Lower Mid Range*	*Upper Mid Range*
Site Investigation and Assessment			
Whole site geoenvironmental investigation and assessment (Note 1)	[redacted]	[redacted]	[redacted]
Secondary assessment, remediation strategies and procurement.(Note 2)	Sum	[redacted]	[redacted]
Remediation (Note 3)			
1 -2 In situ groundwater remediation treatments (typically a ChemOx based source treatment followed by 5 years post treatment monitoring) (Note 4)	Sum	[redacted]	[redacted]
1 No. Mine shaft treatment (grouting and capping of actual or potential contamination conduit)	[redacted] /treatment	[redacted]	[redacted]
Ex stu soil treatment to reduce gross contamination principally to reduce soil leachable content for protection of ground water resources. Mixture of petroleum hydrocarbon impacted soils, gasworks waste and leachable metals. Assume between 10% (33,600m3) and 20% (67,200m3) of reclamation volume requires treatment			
Assume 70% exsitu bio-remediation	[redacted] m^3	[redacted]	[redacted]
Assume 30% exsitu soil stabilisation	[redacted] m^3	[redacted]	[redacted]
Programme of oily non aqueous phase removal and disposal from the shallow (perched) groundwater environment from sumps, trenches and open excavations (possibly combined with exsitu excavations of grossly impacted soil)	Sum	[redacted]	[redacted]
General Remediation Contractor Prelims during main phase of remediation works - assume some reliance on main contractor mobilisation as part of the general reclamation of the site. Assume 35 - 40 weeks (50% of whole site reclamation rate)	[redacted] pw	[redacted]	[redacted]
Contingency sum allowance for non treatable waste disposal (asbestos, tar etc)	Sum	[redacted]	[redacted]
Total		[redacted]	[redacted]

Notes:

Note 1 - Investigation costs include allowance for Preliminary Geoenvironmental assessment, site wide physical investigation assessment of soil and groundwater, preliminary monitoring, interpretative reports and preliminary detailed quantitative risk assessment.

Note 2 - Allowance for additional contamination delineation, monitoring, risk assement and remediation strategy.

Note 3 - In the absence of detailed investigation and assessments a remediation allowance is calculated based on likelihood of impacts from historic contamination and general the environmental setting together with Atkins experience on similar sites. Indicative remediation rates obtained from specialist contractors.

Note 4 - Sum for groundwater treatment based on typical programme costs for an insitu treatment using chemical oxidation. This assumes a generally moderate to high sensitivity environmental seating which includes a shallow aquifer with connectivity to the River Clyde.

General Notes:

No costed allowance for the importation of clean cover layers. For residential properties with gardens the placement of sufficient clean cover and, where required, no-dig and marker layer is likely to be a key risk management requirement if remediation volumes are to be minimised. Typical clean cover depths range between 0.6 and 1.0m. However, the likely absence of sufficient sub-soil and topsoil acting and a suitable landscaping layer indicates the requirement for substantial soil import regardless of specific contamination concerns. For this reason costs for clean cover capping and gas and vapour barriers are excluded from the isolated remediation costings.

Typical planning requirements for site redevelopments will apply including the need to discharge a range of contamination and remediation related issues and seek regulator approvals.

Dalzell Remediation - Preliminary Cost Model Statutory Actions and License Obligations

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Approximate Site Area:		**270000** m^2

	Cost Basis	
Statutory Actions There is no current or pending statutory actions by SEPA or the Local Authority related to Part IIa or groundwater and surface water protection legislation. (Note 1)		[redacted]
IPPC Remediation obligations related to non compliance with the PCC licenses are assumed to remain with the license holder. (Note 2)		[redacted]
Total Statutory and Licenses		[redacted]
Risk Contingency Items Requirement by regulators to formally undertake an inspection of the site and monitoring as part of the Part IIa inspection regime. (Note 3)	[redacted]	[redacted]
Capital sum cost range arising out of requirement to mitigate issues identified during regulatory required inspection.(Note 4)	sum	[redacted]
Total		[redacted]

Notes:

Note 1 - Assessment is based on written confirmation from SEPA and North Lanarkshire Local Authority.

Note 2 - Permit dates from 2005 based on an Application Site Report providing brief summary of likely ground conditions. Consolidated Permit issued 2013 and transferred to Longsteel in August 2015. Absence of a defined environmental baseline makes assessment of existing impacts from the operation difficult to quantify. As part of this assessment it is assumed that responsibility for on-going and future operational compliance issues associated with the PPC permits remain with the future operator. This includes management and mitigation of pre-transfer issues, for example, any deficiencies in containment or drainage infrastructure and addressing and current concerns of the regulators with respect to compliance monitoring and failures.

Note 3 - Although no intention to inspect has been indicated by the regulators the site has a history of over 100 years of industrial usage. Costs are estimated at £2000/ha for a preliminary geoenvironmental investigation and assessment. **No subsequent remediation costs are included within this sum. For the purpose of the costing estimate contingency sums for remediation are provided under the separate development scenarios.**

Note 4 - Sum provided to undertake localised contamination source reduction in soil or groundwater as a result of specific regulatory concerns outside of a formal planning context. In the absence of targeted site investigation data, a range of indicative costs are provided. More widespread remediation requirements, although possible, are considered within development phase remediation.

Dalzell Remediation - Preliminary Cost Model Non Development Scenario (Mothballed)

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Approximate Site Area:		270000 m^2

Land use Assumptions

Site fully decommissioned and demolished to slab level.

Operational sumps and drainage runs decommissioned or sealed.

Estate management function remains in place.

No landform alteration.

Operational license obligations managed and surrendered by operator.

Site Investigation

Duty of care requirement to undertake post decommissioning contamination hazard audit, assess surface condition and assess residual risks. (Note 1)	Sum	[redacted]

Site Security

Estate management requirement to ensure access remains controlled and unauthorised access discouraged (Note 2)	Sum	[redacted]

Risk Contingency Items

Sum for localised mitigation to manage localised surface exposure of hazardous materials or actions arising out of post decommissioning hazard audit. (Note 3)	Sum	[redacted]
Statutory costings brought forward (Note 4)		[redacted]

Total

[redacted]

Notes:

Note 1 - Requirement based on history of potentially contaminative land uses and acute exposure risks to those have future access, including unauthorised users.

Note 2 - Adequate security and discouraging unauthorised access to potentially contaminated sites is important to in managing residual risks in the absence of a full site characterisation. However costs for this element are assumed to be part of the general estate management function for the site. Lower levels of security or allowing any unchecked public access will require higher levels of post decommissioning assessment.

Note 3 - General sum to allow for localised hazardous materials disposal or capping. The requirement for this sum is largely dependant on the state of the site following decomissioning by the operator.

Note 4 - Unassessed and unremediated the risk of inspection from the environmental regulators remains. The principal risks in a properly decommissioned but managed site is considered to relate to groundwater.

Dalzell Remediation - Preliminary Cost Model Redevelopment Scenario (Light/Heavy Industry Industrial)

Date:	22 April 2016	Version: Rev 2	
Assessment by:	[redacted]		
Checked by:	[redacted]		
Approximate Site Area:		270000 m^2	

Land use Redevelopment Ranges

	Lower Mid Range	*Upper Mid Range*
Estimated joint reclamation and remediation estimate for a site of this nature	[redacted]	[redacted]
Costs assume 100% area development, partial site turnover, removal of remnant structures, remediation and provision of clean cover capping and gas/vapour management.		
Extracted costs estimates associated with contamination and remediation (see general notes below).	[redacted]	[redacted]

Remediation Cost Estimates Build Up

	Cost Basis	*Lower Mid Range*	*Upper Mid Range*
Site Investigation and Assessment			
Whole site geoenvironmental investigation and assessment. (Note 1)	[redacted]/Ha	[redacted]	[redacted]
Secondary assessment, remediation strategies and procurement. (Note 2)	Sum	[redacted]	[redacted]
Remediation (Note 3)			
1 -2 In situ groundwater remediation treatments (typically a ChemOx based source treatment followed by 5 years post treatment monitoring) (Note 4)	Sum	[redacted]	[redacted]
2 No. Mine Shaft Treatment (grouting and capping of actual or potential contamination conduit)	[redacted]/treatment	[redacted]	[redacted]
3 No Acid borehole investigation and treatments	[redacted]treatment	[redacted]	[redacted]
Ex situ soil treatment to reduce gross contamination principally to reduce soil leachable content for protection of ground water resources. Mixture of petroleum hydrocarbon impacts soils, gasworks waste and leachable metals. Assume between 5% (10,800m3) and 10% (21,600m3) of reclamation volume requires treatment			
Assume 70% ex situ bio-remediation	[redacted] m^3	[redacted]	[redacted]
Assume 30% ex situ soil stabilisation	[redacted] m^3	[redacted]	[redacted]
Programme of oily non-aqueous phase removal and disposal from the shallow (perched) groundwater environment from sumps, trenches and open excavations (possibly combined with ex situ excavations of grossly impacted soil)	Sum	[redacted]	[redacted]
General remediation contractor prelims during main phase of remediation works - assume some reliance on main contractor mobilisation as part of the general reclamation of the site. Assume 20 - 30 weeks (50% of whole site reclamation rate)	[redacted]pw	[redacted]	[redacted]
Contingency sum allowance for non treatable waste disposal (asbestos, tar etc.)	Sum	[redacted]	[redacted]
Total		[redacted]	[redacted]

Notes:

Note 1 - Investigation costs include allowance for preliminary geoenvironmental assessment, site wide physical investigation assessment of soil and groundwater, preliminary monitoring, interpretative reports and preliminary detailed quantitative risk assessment.
Note 2 - Allowance for additional contamination delineation, monitoring, risk assessment and remediation strategy.

Note 3 - In the absence of detailed investigation and assessments a remediation allowance is calculated based on likelihood of impacts from historic contamination and general the environmental setting together with Atkins experience on similar sites. Indicative remediation rates obtained from specialist contractors.

Note 4 - Sum for groundwater treatment based on typical programme costs for an in situ treatment using chemical oxidation. This assumes a generally moderate sensitivity environmental setting which includes substantial deposits of low permeability Glacial Till.

General Notes:

An estimate for the costs for the importation of clean cover layers in landscaped area and gas barriers is included in the general redevelopment costs but excluded from extracted remediation costs. It is assumed that hardstanding and floor slabs will provide sufficient protection against direct contact with residual contamination and landscape areas will be provided with a clean landscaping cover as part of the general development costings.

Typical planning requirements for site redevelopments will apply including the need to discharge a range of contamination and remediation related issues and seek regulator approvals.

Dalzell Remediation - Preliminary Cost Model Redevelopment Scenario (Residential)

Date:	22 April 2016	Version: Rev 2
Assessment by:	[redacted]	
Checked by:	[redacted]	
Approximate Site Area:		270000 m^2

Land use Redevelopment Ranges

	Lower Mid Range	*Upper Mid Range*
Estimated joint reclamation and remediation estimate for a site of this nature removal of remnant structures, remediation and provision of clean cover capping and gas management.	[redacted]	[redacted]
Extracted costs estimates associated with contamination and remediation (see general notes below).	[redacted]	[redacted]

Remediation Cost Estimates Build Up	*Cost Basis*	*Lower Mid Range*	*Upper Mid Range*
Site Investigation and Assessment			
Whole site geoenvironmental investigation and assessment (Note 1)	[redacted] Ha	[redacted]	[redacted]
Secondary assessment, remediation strategies and procurement. (Note 2)	Sum	[redacted]	[redacted]
Remediation (Note 3)			
1-2 In situ groundwater remediation treatments (typically a ChemOx based source treatment followed by 5 years post treatment monitoring) (Note 4)	Sum	[redacted]	[redacted]
2 No. Mine Shaft Treatment (grouting and capping of actual or potential contamination conduit)	[redacted] /treatment	[redacted]	[redacted]
3 No Acid borehole investigation and treatments	[redacted] treatment	[redacted]	[redacted]
Ex situ soil treatment to reduce gross contamination principally to reduce soil leachable content for protection of groundwater resources. Mixture of petroleum hydrocarbon impacts soils, gasworks waste and leachable metals. Assume between 10% (32,400m3) and 20% (64,800m3) of reclamation volume requires treatment			
Assume 70% exsitu bio-remediation	[redacted] m^3	[redacted]	[redacted]
Assume 30% exsitu soil stabilisation	[redacted] /m^3	[redacted]	[redacted]
Programme of oily non-aqueous phase removal and disposal from the shallow (perched) groundwater environment from sumps, trenches and open excavations (possibly combined with ex situ excavations of grossly impacted soil)	Sum	[redacted]	[redacted]
General remediation contractor prelims during main phase of remediation works - assume some reliance on main contractor mobilisation as part of the general reclamation of the site. Assume 30 - 40 weeks (50% of whole site reclamation rate)	[redacted] /pw	[redacted]	[redacted]
Contingency sum allowance for non treatable waste disposal (asbestos, tar etc.)	Sum	[redacted]	[redacted]
Total		[redacted]	[redacted]

Notes:

Note 1 - Investigation costs include allowance for preliminary geoenvironmental assessment, site wide physical investigation assessment of soil and groundwater, preliminary monitoring, interpretative reports and preliminary detailed quantitative risk assessment.

Note 2 - Allowance for additional contamination delineation, monitoring, risk assessment and remediation strategy.

Note 3 - In the absence of detailed investigation and assessments a remediation allowance is calculated based on likelihood of impacts from historic contamination and general the environmental setting together with Atkins experience on similar sites. Indicative remediation rates obtained from specialist contractors.

Note 4 - Sum for groundwater treatment based on typical programme costs for an in situ treatment using chemical oxidation. This assumes a generally moderate sensitivity environmental setting which includes substantial deposits of low permeability Glacial Till.

General Notes:

No costed allowance for the importation of clean cover layers. For residential properties with gardens the placement of sufficient clean cover and, where required, no-dig and marker layer is likely to be a key risk management requirement if remediation volumes are to be minimised. Typical clean cover depths range between 0.6 and 1.0m. However, the likely absence of sufficient sub-soil and topsoil acting and a suitable landscaping layer indicates the requirement for substantial soil import regardless of specific contamination concerns. For this reason cost for clean cover capping and gas and vapour barriers are excluded from the isolated remediation costings.

Typical planning requirements for site redevelopments will apply including the need to discharge a range of contamination and remediation related issues and seek regulator approvals.

Appendix B. Reviewed Document List

Clydebridge and Dalzell Steelworks Appraisal
Summary of Information Utilised.

The following information was utilised by Atkins as part of the assessment:

Meetings and Teleconferences	Received from:	Notes:
Site Visit 6th April 2016	N/A	Atkins staff attended both sites under supervision from staff from Tata Steel ([redacted]/[redacted]/[redacted]). The purpose of the site walkovers was to review any information held on site as well as to gain a better understanding of current processes/activities. Selected photographs from both sites, taken during the site walkover are appended to the assessment.
Teleconference with SEPA 6th April 2016	N/A	Introductory teleconference between Atkins and [redacted] and [redacted] in order to introduce relevant parties, outline the scope and objectives of Atkins' commission and to obtain preliminary guidance on the volume/type of information likely to be available.
Teleconference with SEPA 11th April 2016	N/A	Supplementary teleconference with [redacted] and [redacted] in order to discuss Atkins conclusions based on the information available and Atkins request for a more formal confirmation of known outstanding issues

Documents	Received from:	Notes:
Landmark Envirocheck Reports 83857868_1_1	Landmark Group	A collation of available geological and environmental data relating to both sites
PPC Permit PPC/A/1099381 and Transfer	SEPA	PPC Permit for activities at Clydebridge including transfer to Longs Steel UK Ltd in August 2015. The Permit relates to the 'operation of four separate heat treatment furnaces…treated as a single combustion appliance (combustion activity)' plus directly associated activities, including water quenching and the handling and storage of wastes.
PPC Permit PPC/A/1099381 Request for Further Information	SEPA	SEPA request for further information relating to site drainage, hardstanding upgrade, chemical composition/leachate and justification of the open air storage of waste including mill scale and shot blast. A response from Tata Steel is also provided in an email dated 6/6/2012.
WML-W-0000107	SEPA	Waste Disposal Licence GDC49 (British Steel PLC) for a landfill site at Clydebridge Steelworks Tip (1991, revised conditions in 1994 and transfer to Longs Steel UK Limited in July 2015). The types of waste authorised for disposal are 'inert, solid, non-toxic, non-putrescible and non ferrous only'.
Environ Report UK12-17207, December 2011	SEPA	This report, titled 'Application for a Permit: Chapter 1 Section 1.1 (A)(a) of the PPC (Scotland) Regulations 2000' was prepared to support a PPC Application by Tata Steel UK Limited for 'Clydebridge Heat Treatment'. The report provides an overview of the historical development and environmental setting relating to the Clydebridge site and detailed information relating to the processes associated with the activities proposed under the PPC.
PPC/W/0020029 including Consolidated Permit CP01	SEPA	PPC Permit for activities at Dalzell including transfer to Longs Steel UK Ltd in August 2015. The Permit relates to the burning of fuel in combustion appliances and ferrous metal activity, including a number of directly associate activities.
Corus UK Limited, Non Technical Summary, Site Maps and Site Condition Report, July 2003	SEPA	This report was prepared to support an IPPC Application to 'operate an existing facility for the hot rolling of steel plate and associated activities' at Dalzell Steelworks. The report includes information on the historical development of the site, discussion of site operations and some limited intrusive investigation.
Email correspondence dated 11/4/16	SEPA	Email correspondence confirming ongoing and pending regulatory involvement. Email includes 'End of Year Summaries' for Dalzell (2009-2015) and Clydebridge (2012-2015)
Tata Steel 'Phase 1A Intrusive Investigation at Dalzell and Clydebridge Works', March 2016.	Tata Steel	This report includes a discussion of the historical development of each site, a discussion of existing available information and the findings of a targeted trial pitting investigation.
Article on 'Motorways and the Mineralogy of Chromium Contaminated Land', Stephen Hillier, Macaulay Institute	Tata Steel	Discussion of the assessment of mineralogy of Chromate Ore Processing Residue (COPR).
Borehole Logs _Norwest Holst	Tata Steel	Copies of various borehole logs associated with the M74 (Clydebridge Steelworks)
Email correspondence March 2015	Tata Steel	Copies of email correspondence between SEPA and Tata Steel confirming that no waste reporting conditions apply to the landfill at Clydebridge Steelworks.
Email from P Knight 12_4_16	Tata Steel	Details of ground conditions based on trial pitting investigation at both sites
Email correspondence from South Lanarkshire Council dated 8/4/2016	South Lanarkshire Council_Environmental Services	SR329688 BGS borehole plan, site notes and aerial photography/historical map.
Email correspondence from South Lanarkshire Council dated 11/4/2016	South Lanarkshire Council_Environmental Services	Email from [redacted] confirming current and pending regulatory involvement.
Email correspondence from South Lanarkshire Council dated 18/4/16	South Lanarkshire Council_Environmental Services	Email from [redacted] confirming that the Environmental Services Manager's responsibilities include contaminated land therefore the response from South Lanarkshire Council covers both environmental health and contaminated land.
Email correspondence from North Lanarkshire Council dated 5/4/16	North Lanarkshire Council	Email from [redacted] confirming that NLC Protective Services do not hold any site investigation information relating to Dalzell site
Email correspondence from North Lanarkshire Council dated 7/4/16	North Lanarkshire Council	Email from [redacted] confirming that NLC employ Jacobs to act as consultants for the Ravenscraig site
Email correspondence from North Lanarkshire Council dated 12/4/16	North Lanarkshire Council	Email from [redacted] confirming current and pending regulatory involvement.
Email correspondence from North Lanarkshire Council dated 18/4/16	North Lanarkshire Council	Email from [redacted] confirming response on current and pending regulatory involvement made by consultants used by NLC

Appendix C. Site Walkover Photographs

C.1. Clydebridge Photographs

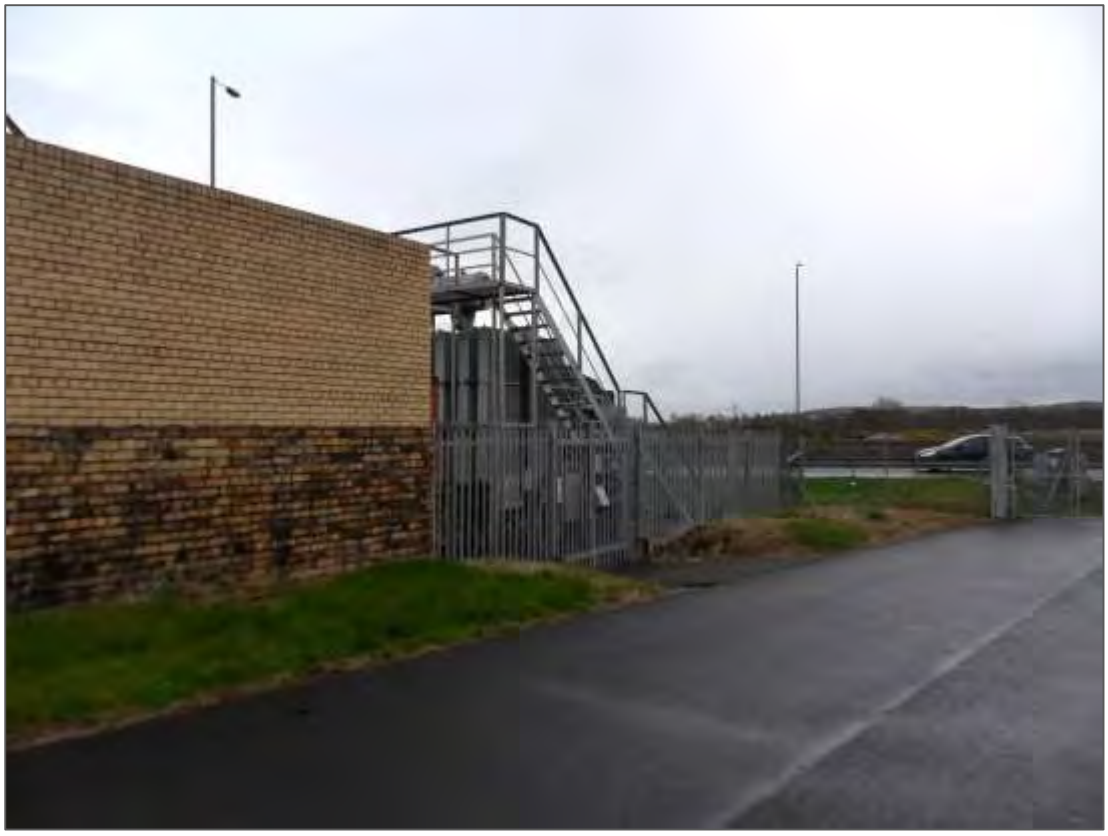
Photograph 1: View north east of the outfall of Eastfield Burn in to the River Clyde which originates to the south of the site and thought to be culverted under the site and M74.

Photograph 2: View north east of the PPC regulated outfall and substation in the background. Note the relative instability of the river bank highlighted by slip scars.

Photograph 3: Discharge of water believed to be the regulated outfall of the PPC permit.

Photograph 4: View east of the water treatment system included as part of the PPC permit.

Photograph 5: View south east of the Made Ground which the substation is built on. Made Ground comprises predominantly slag, refractory and ash.



Photograph 6: View eastwards of the smaller substation immediately adjacent to the M4.

Photograph 7: View south west of the larger substation immediately adjacent to the M4.

Photograph 8: View north from the base of the former landfilled area. Suspected Giant Hogweed.

Photograph 9: View eastwards from the top of the landfill. Note the topographical height difference from the M74.

Photograph 10: View northwards from the top of the landfill. Note the topographical height difference from the River Clyde which is situated in the wooded area at the base.

Photograph 11: View south west towards the landfill (right) and M74 embankment (left).

Photograph 12: View south east of the River Clyde along the north eastern boundary of the site and the bridge abutment of the M74.

Photograph 13: View north east of the location of the former cold plate finishing and despatch bay works.

Photograph 14: View northwards of a fenced compound, including a liquid oxygen tank, and the various access areas to the main works buildings.

Photograph 15: View north of the cooling tower complex immediately south of the quench ponds.

Photograph 16: Currently inactive quench ponds with some scale evident in the primary compartment on the left.

Photograph 17: Bunded drainage area where the dredged scale from the quench ponds is left to drain prior to recycling.

Photograph 18: View south of the area formerly the location of the furnacing and casting bay. Currently used as open land with potential Giant Hogweed present in places.

Photograph 19: South eastern façade of the works building where incoming steel is unloaded.

Photograph 20: View westwards within the main works building.

C.2. Dalzell Photographs

Photograph 1: View eastwards of the 'High Tank' and the main works building in the background

Photograph 2: View southwards of the staff carpark and fire fighting water tank

Photograph 3: View to the north west of the fenced substation and works access areas

Photograph 4: View to the north west of a liquid oxygen tank manifold structures.

Photograph 5: 'Former fuel oil' tank which TATA informed was emptied as part of the decommissioning of fuel oil pipelines.

Photograph 6: View south west of the area formerly used for railway sidings. Currently used as a trailer park.

Photograph 7: Empty barrel and recovered oil storage area awaiting removal from site. Note the flooded and inadequate bunding

Photograph 8: View westwards of the compressor tanks and cooling tower system.

Photograph 9: View north east of the high voltage power lines which provide power to the steelworks

Photograph 10: View west of the retaining structures accommodating topographical change across the site.

Photograph 11: View south east towards the 'Meadows Pumping Station' and oil separators.

Photograph 12: View south east of the Meadows water treatment facility with active oil recovery systems (belt skimmers) in action during walkover.

Photograph 13: View south of the Meadows water treatment facility with active oil recovery systems (belt skimmers) in action during walkover.

Photograph 14: View north east of the number 3 compartment of the Meadows water treatment facility which has been drained to recover the reddish brown sludge.

Photograph 15: View north east of the historical stockpile of scale which TATA informed Atkins during the walkover, had 'some oil in'. Stockpile estimated at approximately 750m^3.

Photograph 16: View north west of the 'High Tank Sump' and cooling tower.

Photograph 17: View east of the 'High Tank Sump', cooling tower and oil recovery IBCs.

Photograph 18: View south east of the area formerly used for railway sidings. Currently used as a turning area for vehicles.

Photograph 19: Overview of the 'Creamery' water treatment area. Viewing to the north.

Photograph 20: View south west of the primary separator facility at the 'Creamery'.

Photograph 21: View north east of bays 3 and 4 of the water treatment facility with active oil recovery systems (belt skimmers) in action during walkover.

Photograph 22: The 'v' notch water sampling point of which the creamery effluent is sampled prior to discharge to the Calder to the north.

Photograph 23: View north east of the end of the loading bay and Newtown Skip Hire business which is immediately adjacent to the site boundary.

Photograph 24: View north west showing the overgrown derelict footings of a former substation.

Photograph 25: View south of a recently installed gas tank which is said to feed the furnaces in the works.

Photograph 26: View south east of the retaining structures accommodating topographical change across the site.

Photograph 27: View south of the engineering buildings and offices of the steelworks.

Photograph 28: View north west along Park Street of the offices frontage on to the public highway.

Photograph 29: View north west within the steelworks main building.

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