




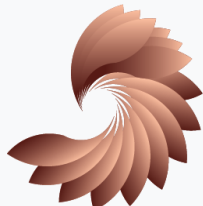

Blue Phoenix
Building a sustainable future

Regulatory Frameworks in UK and The Netherlands

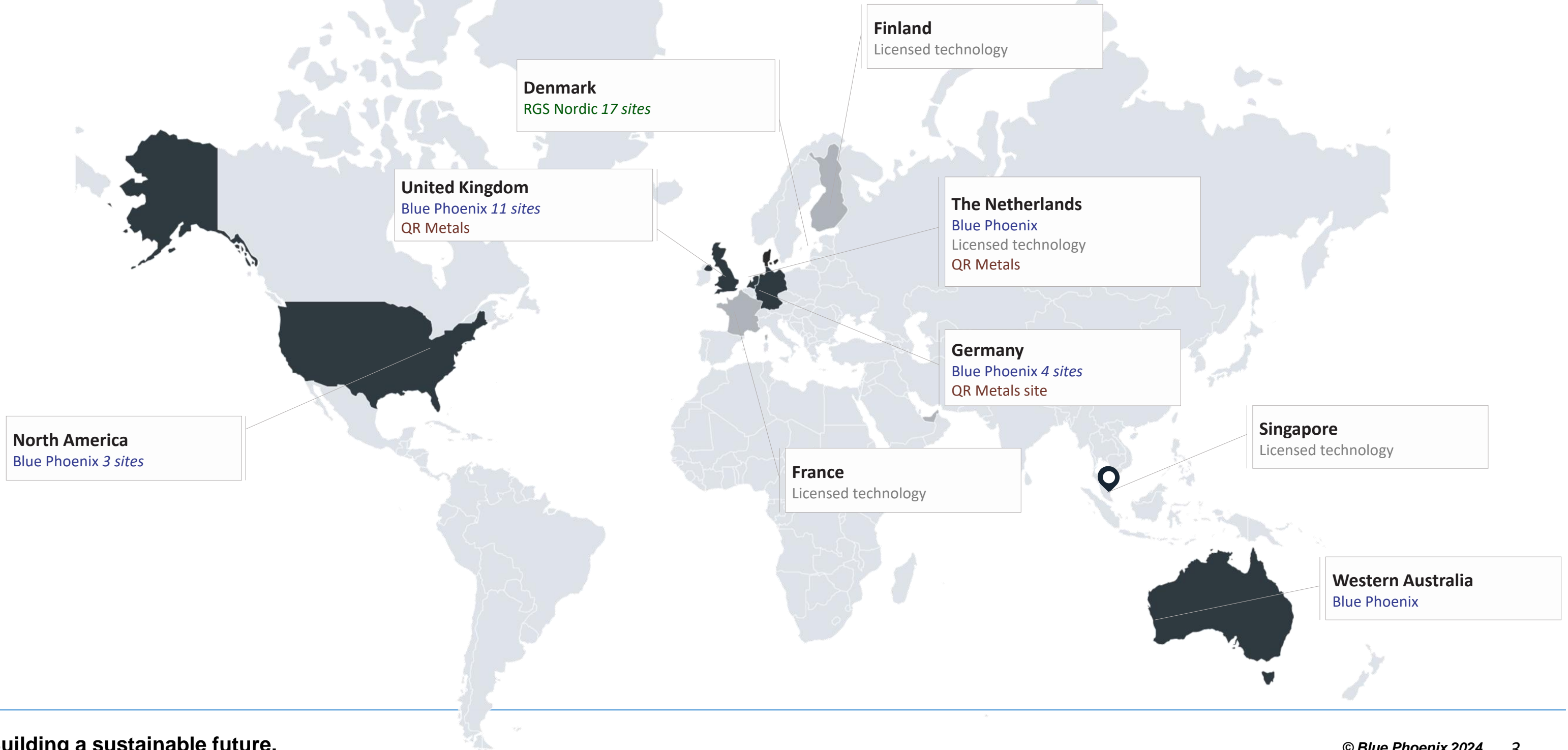
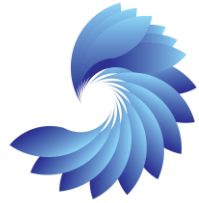
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 <p>Blue Phoenix Building a sustainable future</p>	 <p>QR Metals Building a sustainable future</p>	 <p>RGSNORDIC</p>
<p>IBA Processing and Aggregates CEMPR Urbyon® Cement Filler</p>	<p>Ferrous and Non-ferrous Metals Recycling</p>	<p>C&D Waste and Soil Remediation</p>
<p>Bluephoenix-group.com</p>	<p>Qr-metals.com</p>	<p>Rgsnordic.com</p>
<p>EU, UK, USA, AU, UAE</p>	<p>EU, UK</p>	<p>DK</p>

BPG builds, owns and operates waste recycling installations globally, helping industries to divert materials from ending up at landfills and circling secondary resources back into the economy. BPG's mission in building a sustainable future has led to growing the business into a multidisciplinary waste management group. The Group consists of several subsidiary divisions from which Blue Phoenix operates in the domain of recovering materials from incinerator bottom ash (IBA) with operations in the UK, USA, EU, Asia, and Australia. The metal refinery division, QR Metals, operates out of Europe and further upgrades recovered non-ferrous metals to smelter qualities. BPG entered into the construction and demolition waste recycling market in 2024 with the acquisition of RGS Nordic in Denmark.





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Compliance with the UK Regulatory Framework (RPS 247) for the use of IBAA

Neil Nolan

Technical Director - Blue Phoenix UK

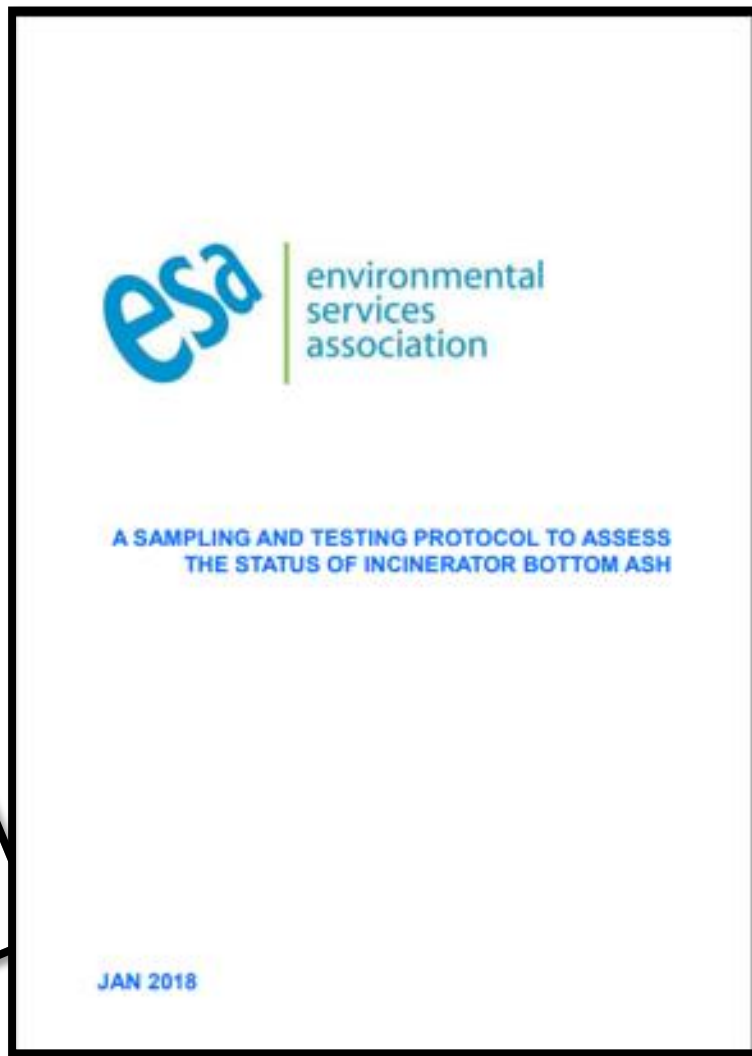
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Current UK Regulatory Framework for IBAA



What is the ESA Protocol?

- It is a voluntary protocol produced by Environmental Services Association (ESA) and its members.
- It is supported by the Environment Agency.
- Its main goal is to:
 - provide a reliable method for the classification and assessment of IBA from a municipal waste incinerator.
 - help ensure that IBA is managed in a manner that does not pose risk or harm to human health or pollution of the environment.

Sampling Frequency (EfW operators)

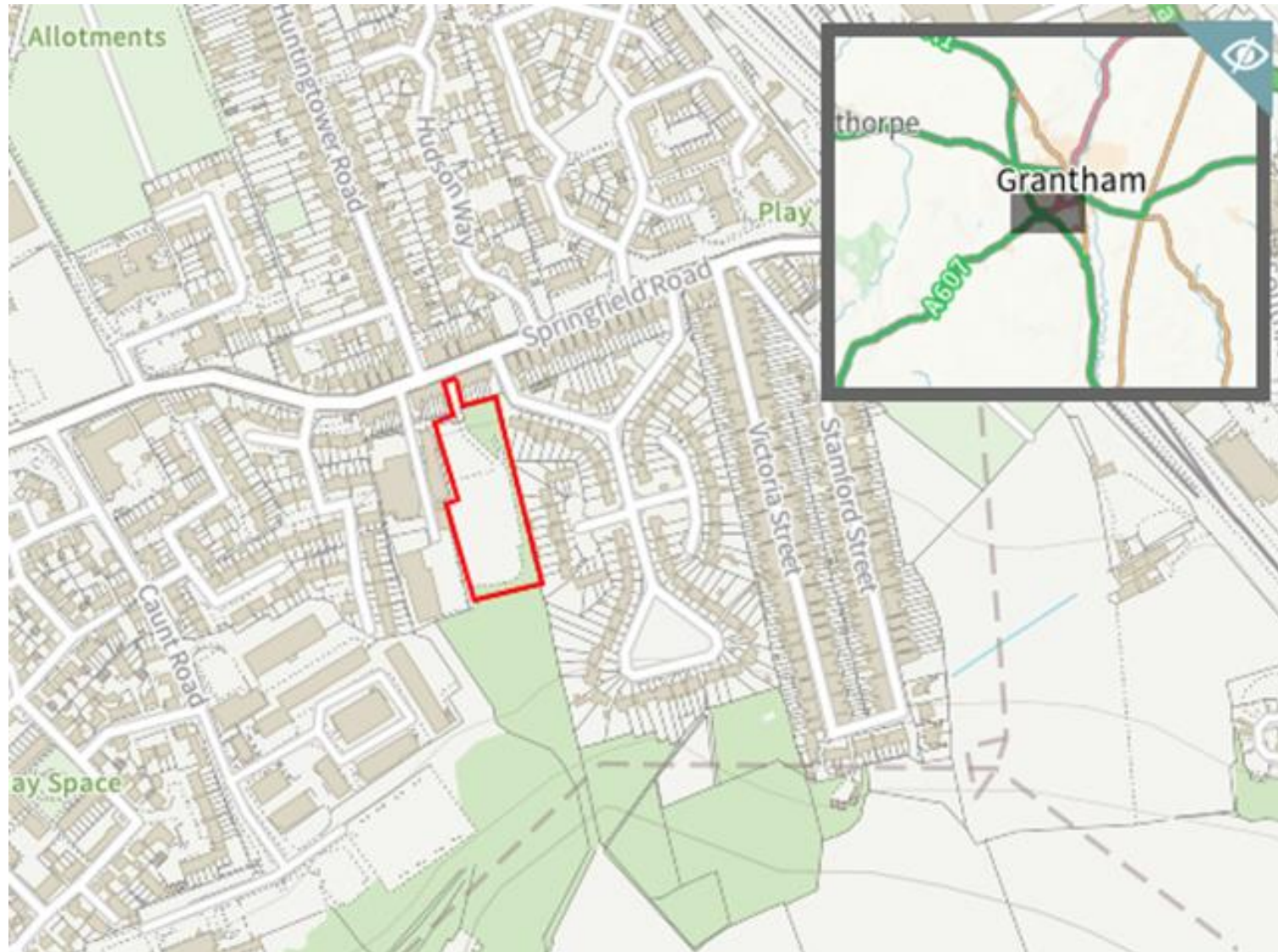


Results should be sent to the EfW facility within 20 working days of sampling, quicker where possible.

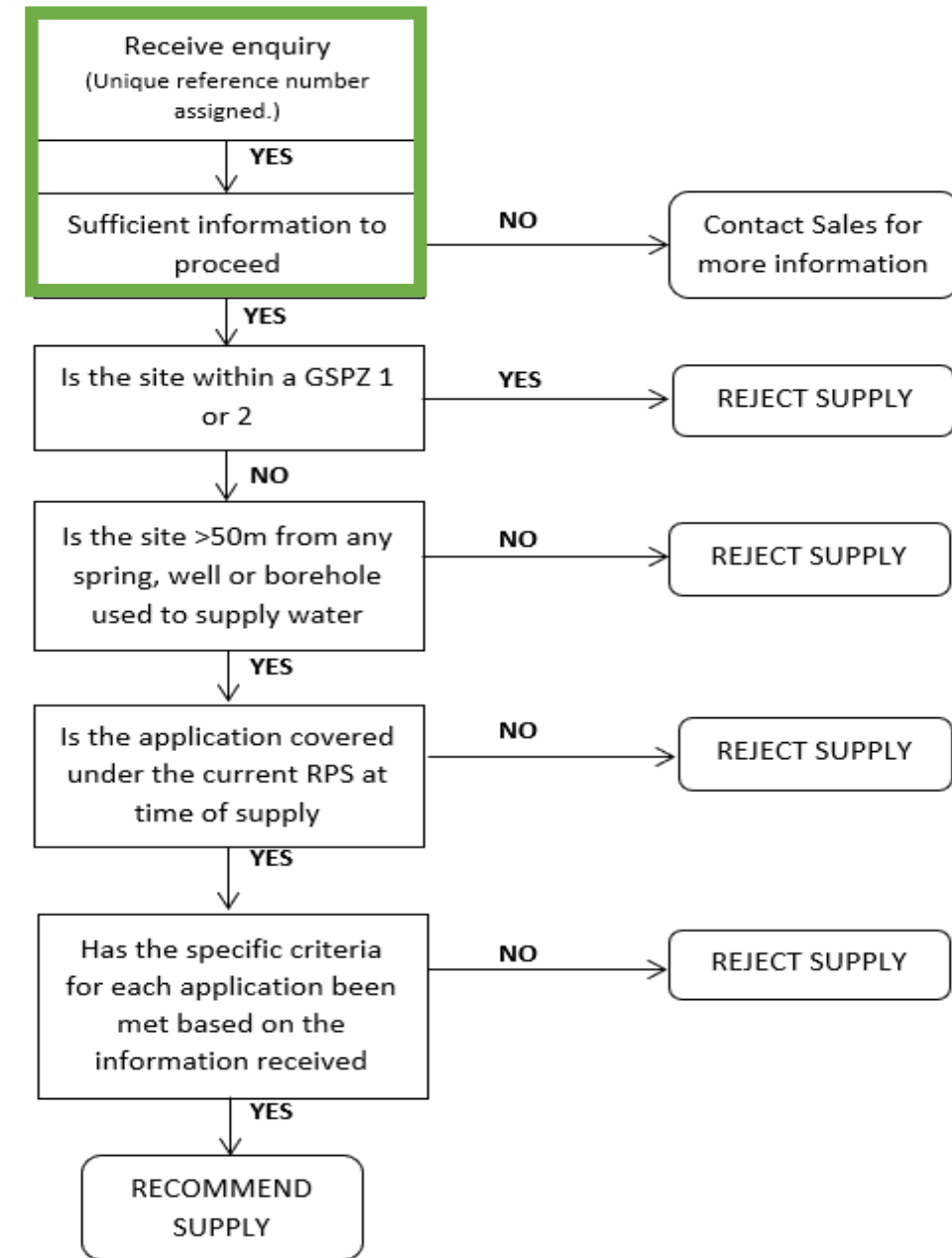
- IBA is delivered to Blue Phoenix sites from the EfWs and is “*presumed*” non-hazardous, but no testing has been carried out.
- IBA cannot be processed until we have received confirmation of a Non-Hazardous WM3 result.
- It should be stored separately from the date the sample was taken up to the sampling date of the next batch.
- A new, separate pile is to be started when the next sample is taken.
- Each stockpile (batch) must be clearly labelled/identified.
- It can only be processed once a result relating to each specific batch is received stating the material is non-hazardous.

- RPS 247 (Regulatory Position Statement) defines the permitted uses for IBAA:
 - IBAA products supplied must comply with EN 13242 Aggregates unbound and hydraulically bound uses and meet the required specification for the application it is being used for.
 - Unbound IBAA cannot be stored or used within a groundwater source protection zone 1 or 2.
 - Unbound IBAA cannot be used within 50m of any spring, well or borehole used to supply water.
 - IBAA cannot be used under any residential properties or gardens.
 - IBAA cannot be stored for more than 6 months before use.
 - The supply of IBAA must not cause any adverse effects to human health or the environment.

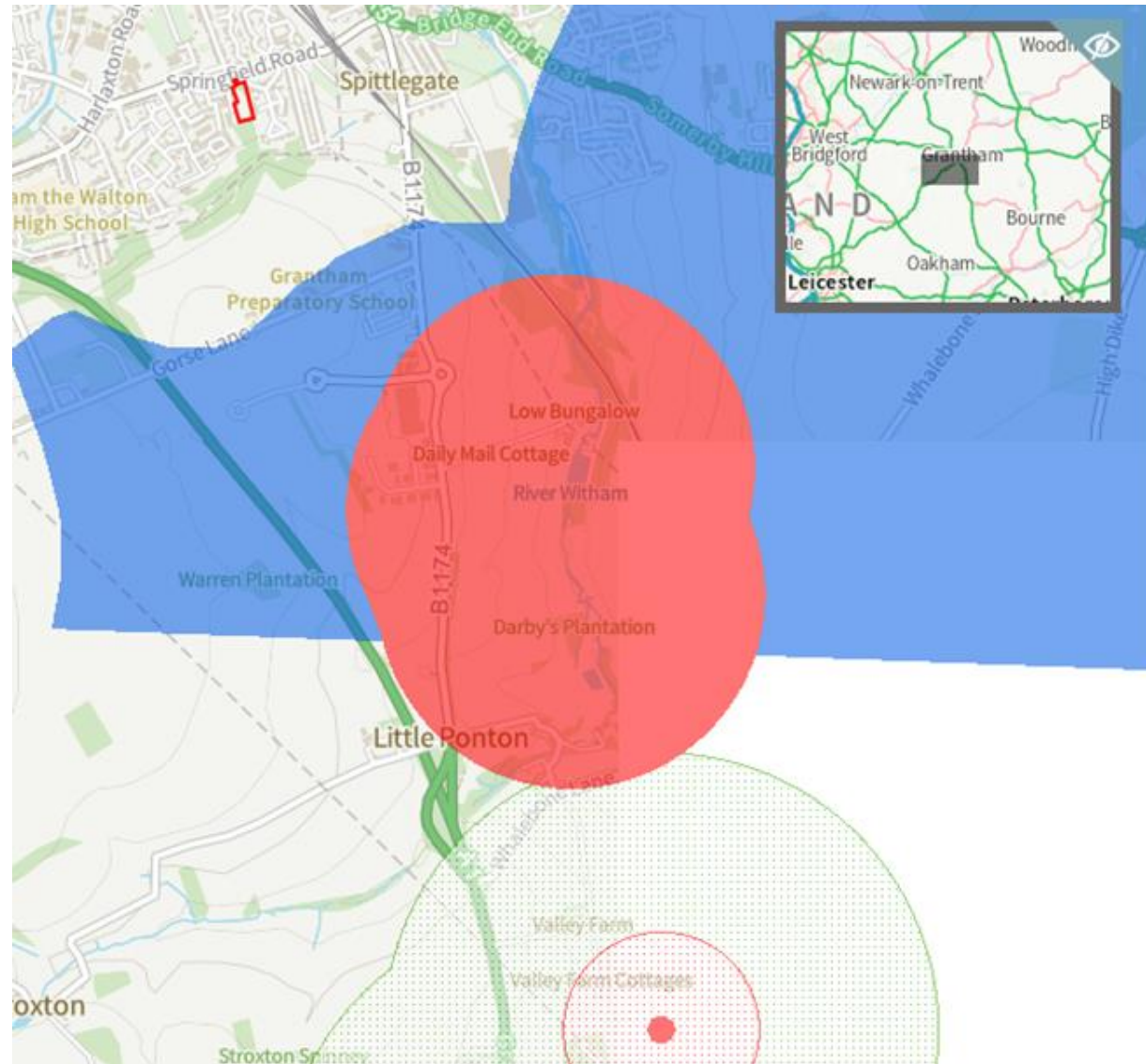
Example Assessment: Site Location



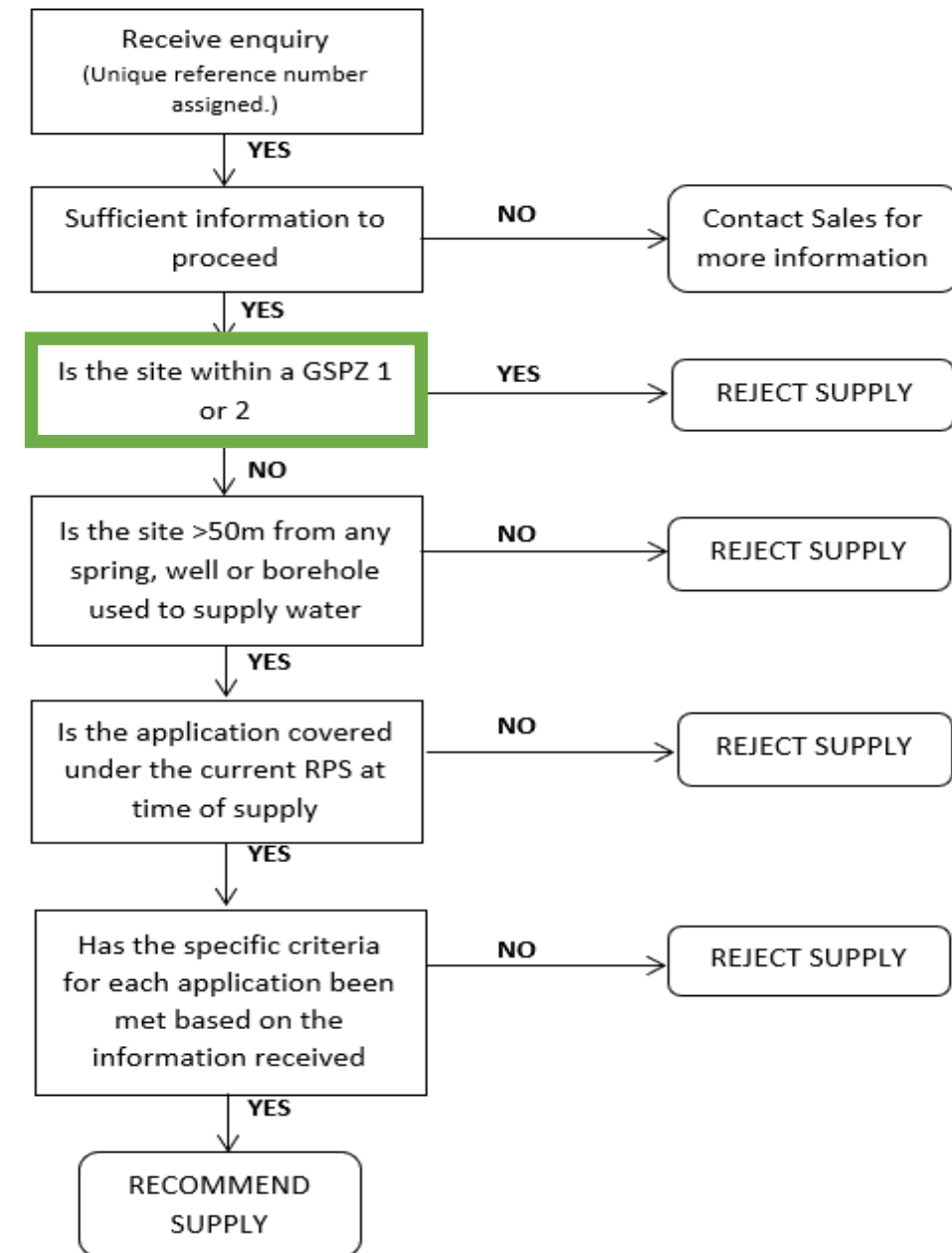
Site address: Land opposite the Springfield Arms, Springfield Road, Grantham, Lincs, NG31 7BG



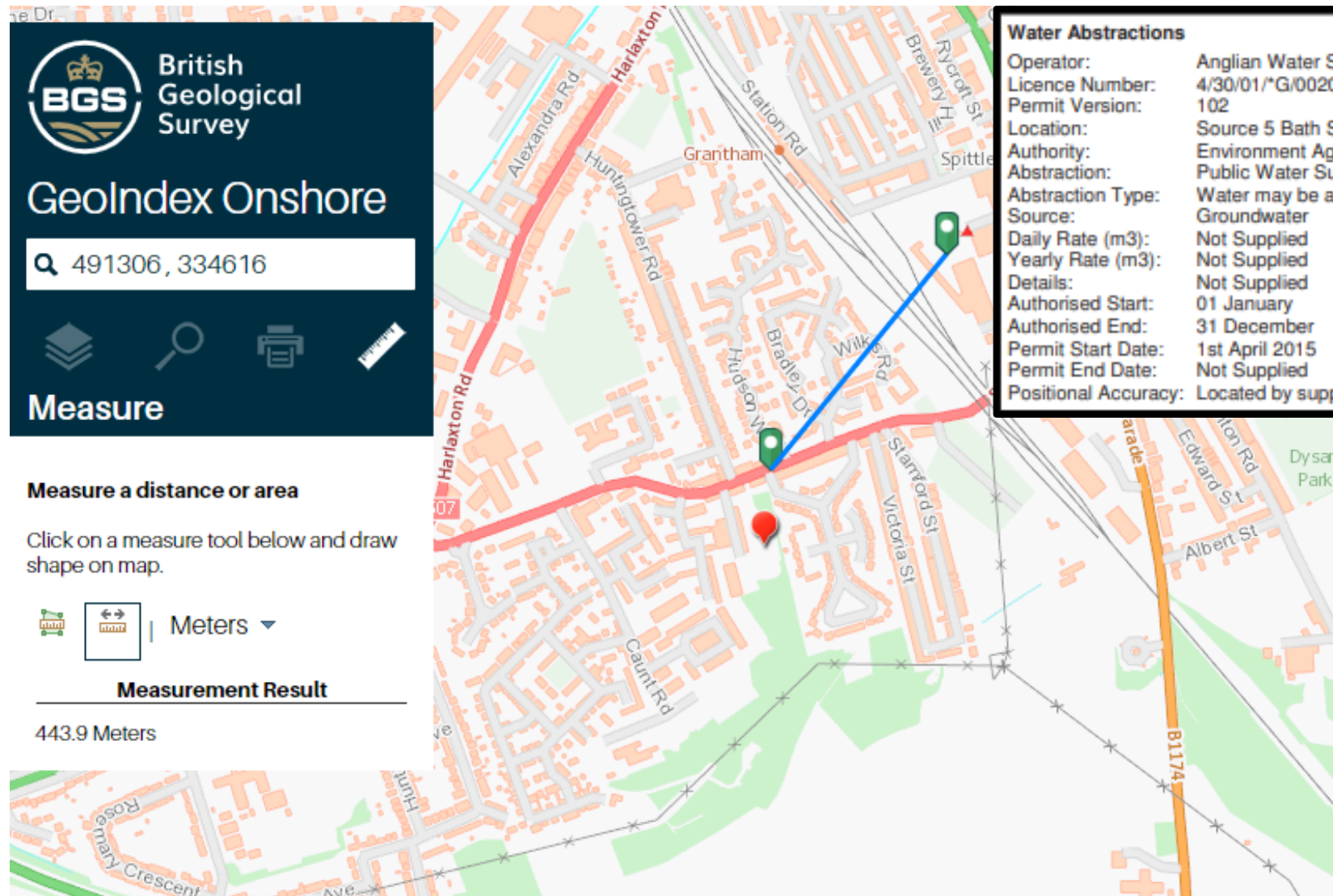
Example Assessment: Groundwater Source Protection Zones



Site is located outside groundwater source protection zones 1 or 2.

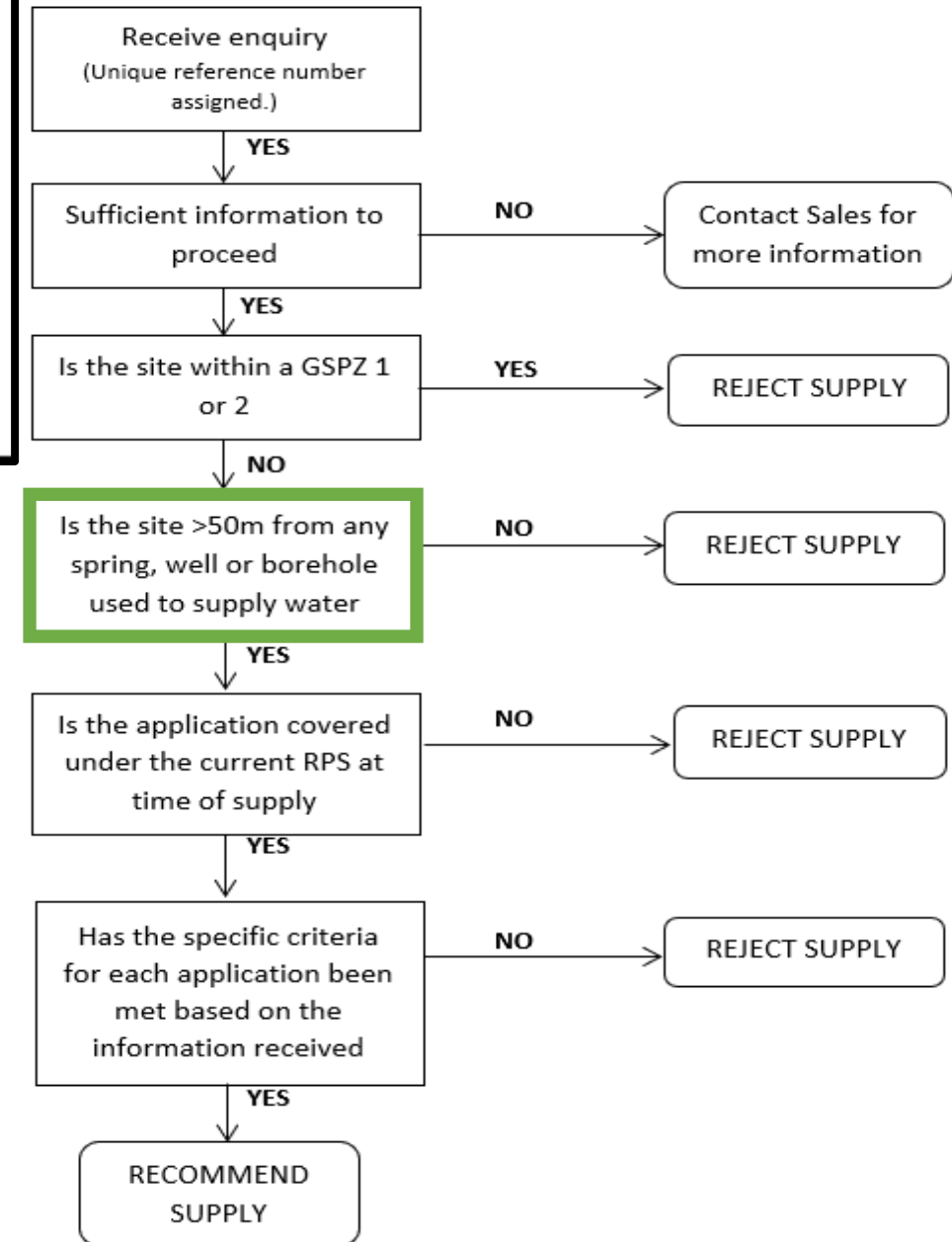


Example Assessment: Wells, Springs or Boreholes used to Supply Water



Water Abstractions

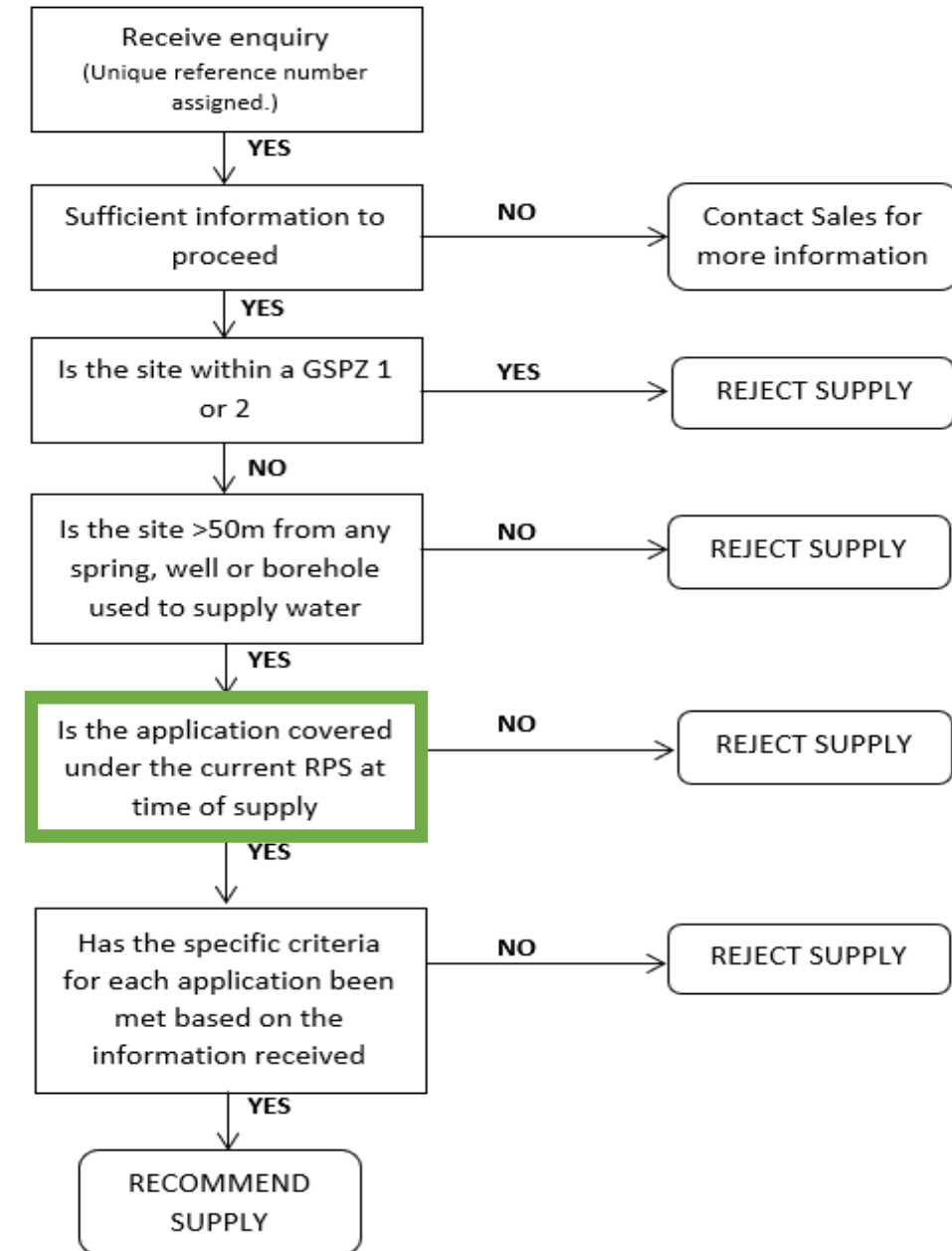
Operator:	Anglian Water Services Limited
Licence Number:	4/30/01/*G/0020
Permit Version:	102
Location:	Source 5 Bath Springs
Authority:	Environment Agency, Anglian Region
Abstraction:	Public Water Supply: Potable Water Supply - Direct
Abstraction Type:	Water may be abstracted from a single point
Source:	Groundwater
Daily Rate (m3):	Not Supplied
Yearly Rate (m3):	Not Supplied
Details:	Not Supplied
Authorised Start:	01 January
Authorised End:	31 December
Permit Start Date:	1st April 2015
Permit End Date:	Not Supplied
Positional Accuracy:	Located by supplier to within 10m



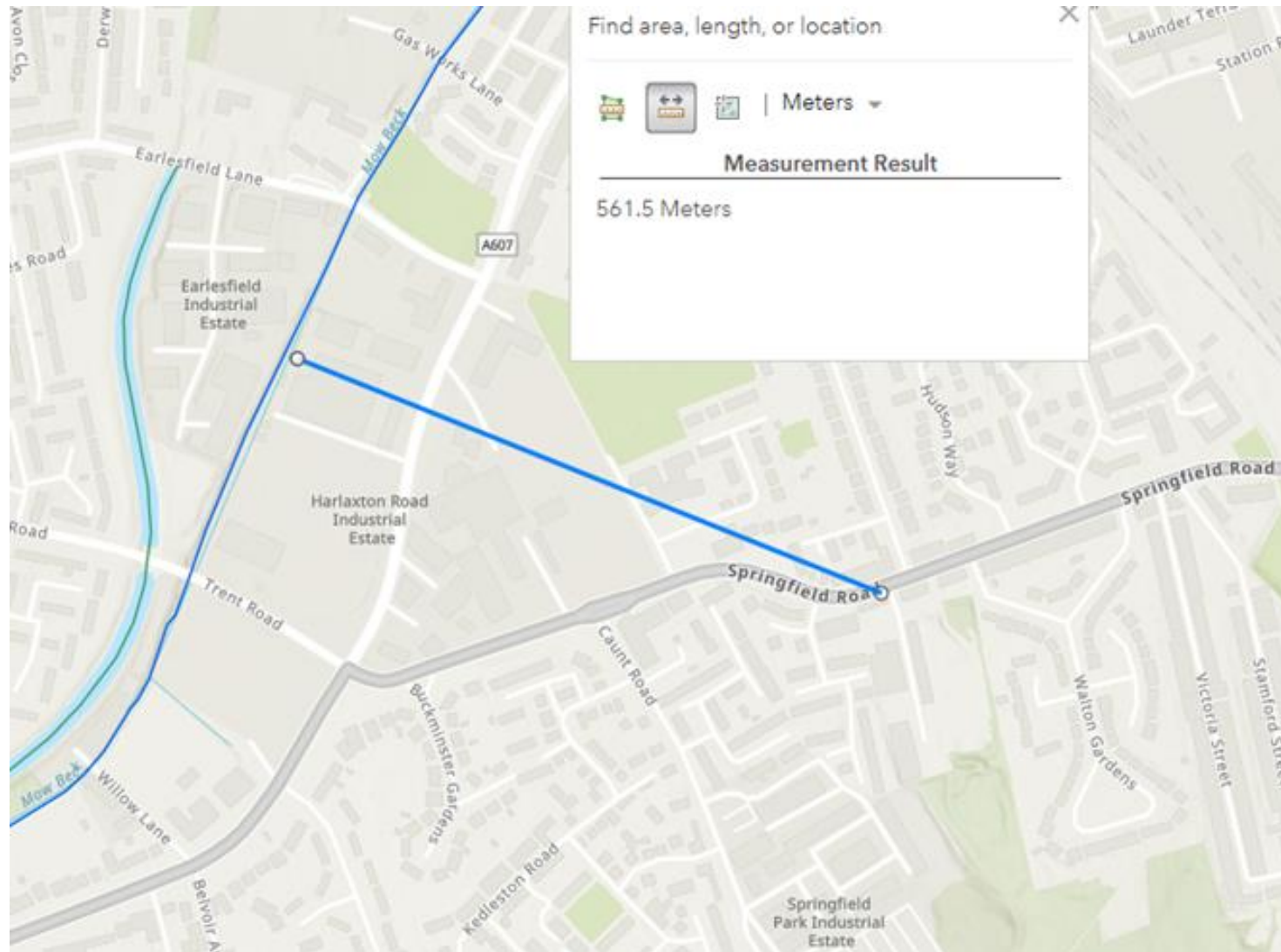
Site is located >50m from any well, spring or borehole used to supply water.

This example supply site is for a new industrial unit where IBAA is to be used for the following application:

- Road sub-base layers - Road sub-base (under asphalt) - 1000t.
- Structural Platform for Construction - Car Park (under asphalt) - 2,500t.
- Structural Platform for Construction - Platform (under concrete) - 5000t.
- Pipe bedding - Pipe Bedding (under asphalt) - 500t.

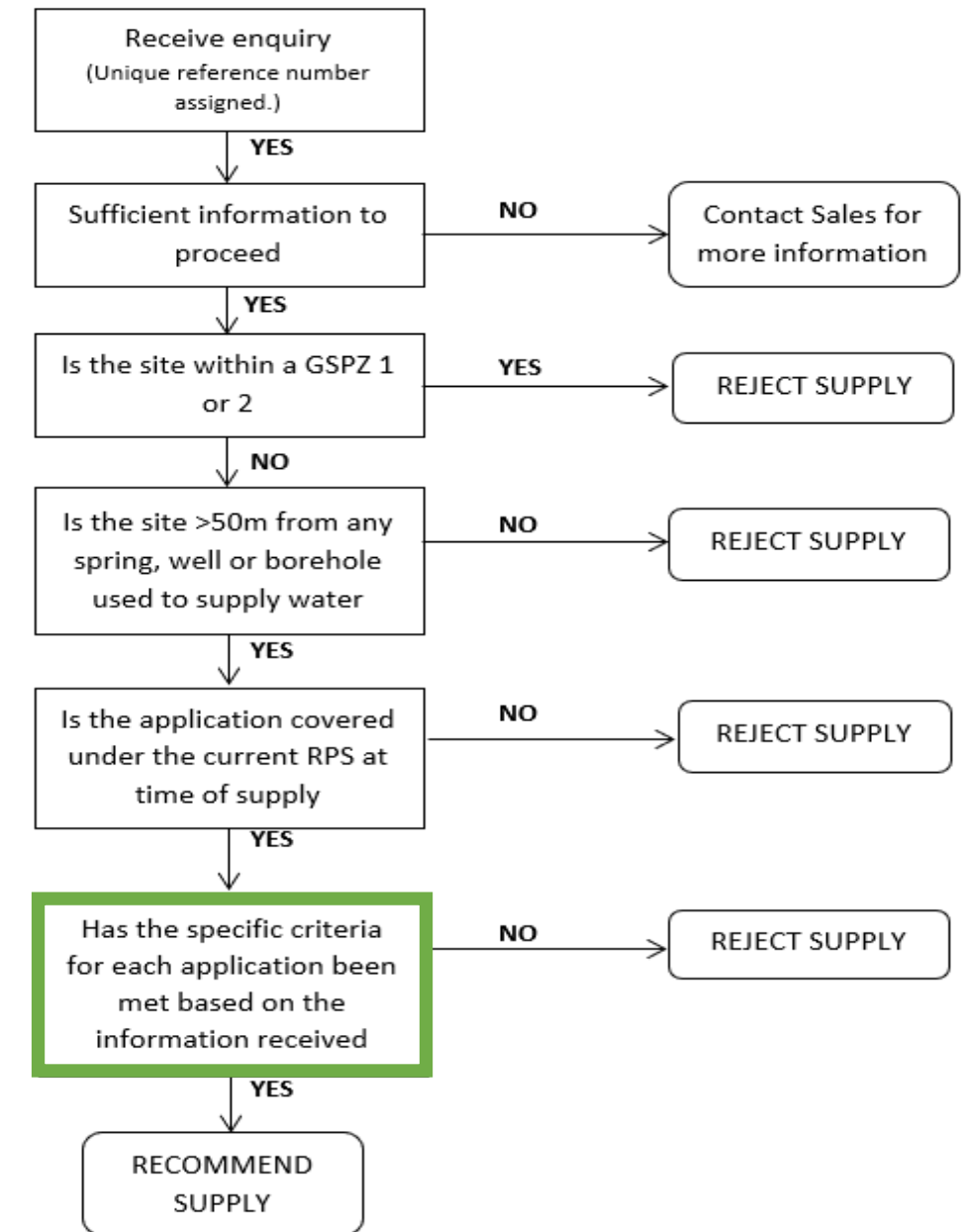


Example Assessment: Distance to Significant Surface Waterbody - Platforms



Site is located >500m from a significant waterbody so a maximum tonnage limit of 68,000t for construction platforms would apply.

The road is <40m in width and will be covered with asphalt, and therefore meets the requirements of supply.



This site would be **approved** to supply as it meets all the criteria of the RPS 247 for each application:

- The site is located outside any groundwater source protection zones 1 or 2.
- There are no wells, springs or boreholes used to supply water within 50m of the site.
- The site is greater than 500m away from a surface water body and the combined total for both construction platforms is below the limit of 68,000t allowable at this distance.
- The tonnage required for the pipe bedding does not exceed the limit of 510t.
- It is not being used under any residential building or garden.
- The IBAA will be adequately covered with a low permeable cover of concrete and asphalt.

Case Study: Beverley Road Cycle Route Improvement Scheme, Hull

Overview

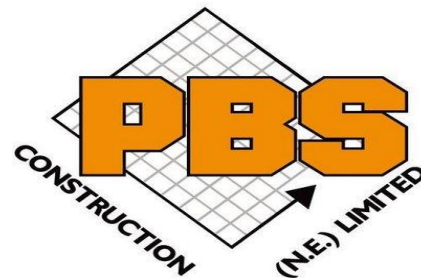
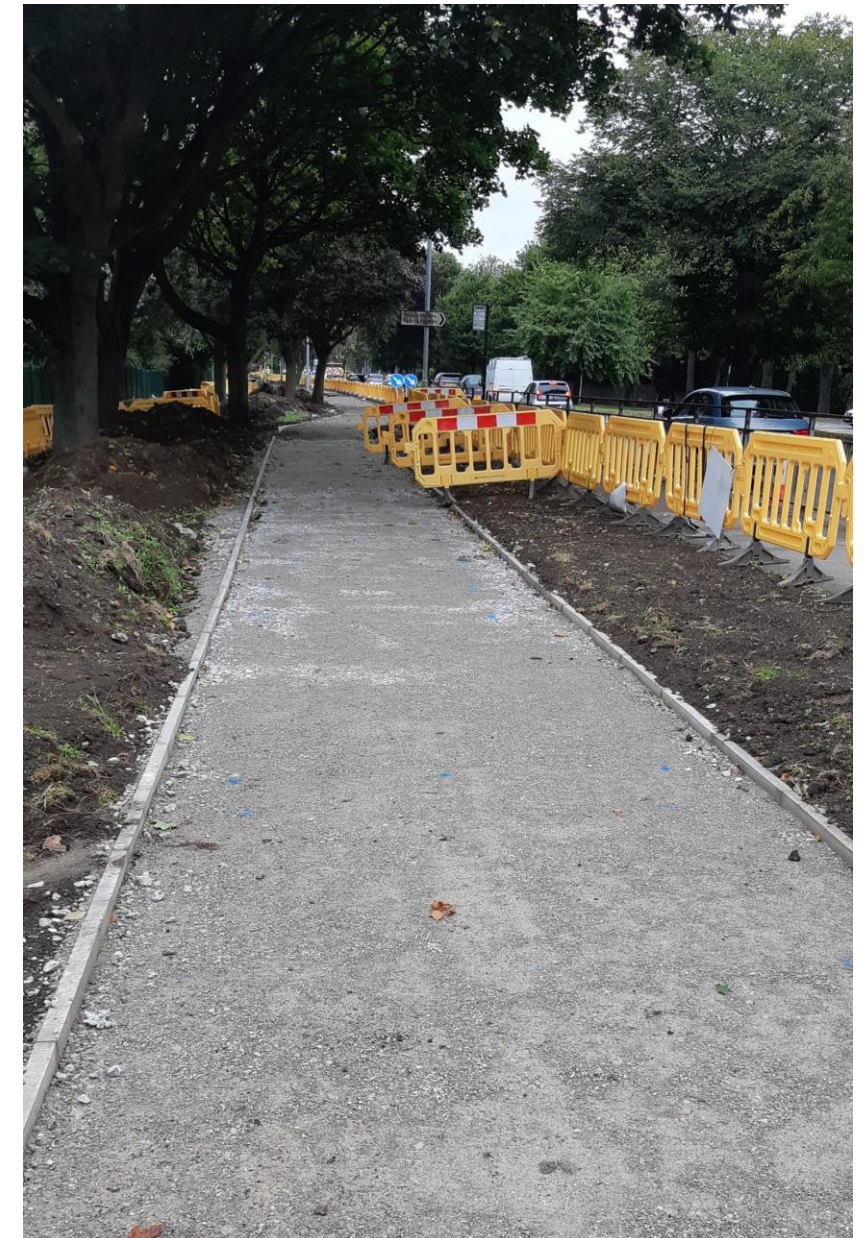
A £1.1 million 5km dedicated cycleway along Beverley Road, Hull from Dunswell Roundabout to Ferensway. Creating a safer cycling environment. Works included upgrades, new sections and new junction improvements at key points. Forming part of an integrated cycling network in Hull City.

Material

SHW Clause 803 Type 1 Subbase, 100% IBAA and an IBAA Limestone Blend.

Construction

150mm of Incinerator Bottom Ash Aggregate (IBAA) Type 1 sub-base topped off with a 20mm binder and 6mm surface course. Some sections of the cycleway were topped off with a green-coloured asphalt.





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Case Study: New Factory Premises, Barton-upon-Humber





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Compliance with the Netherlands Regulatory Framework for the use of IBAA

Mark van Kempen

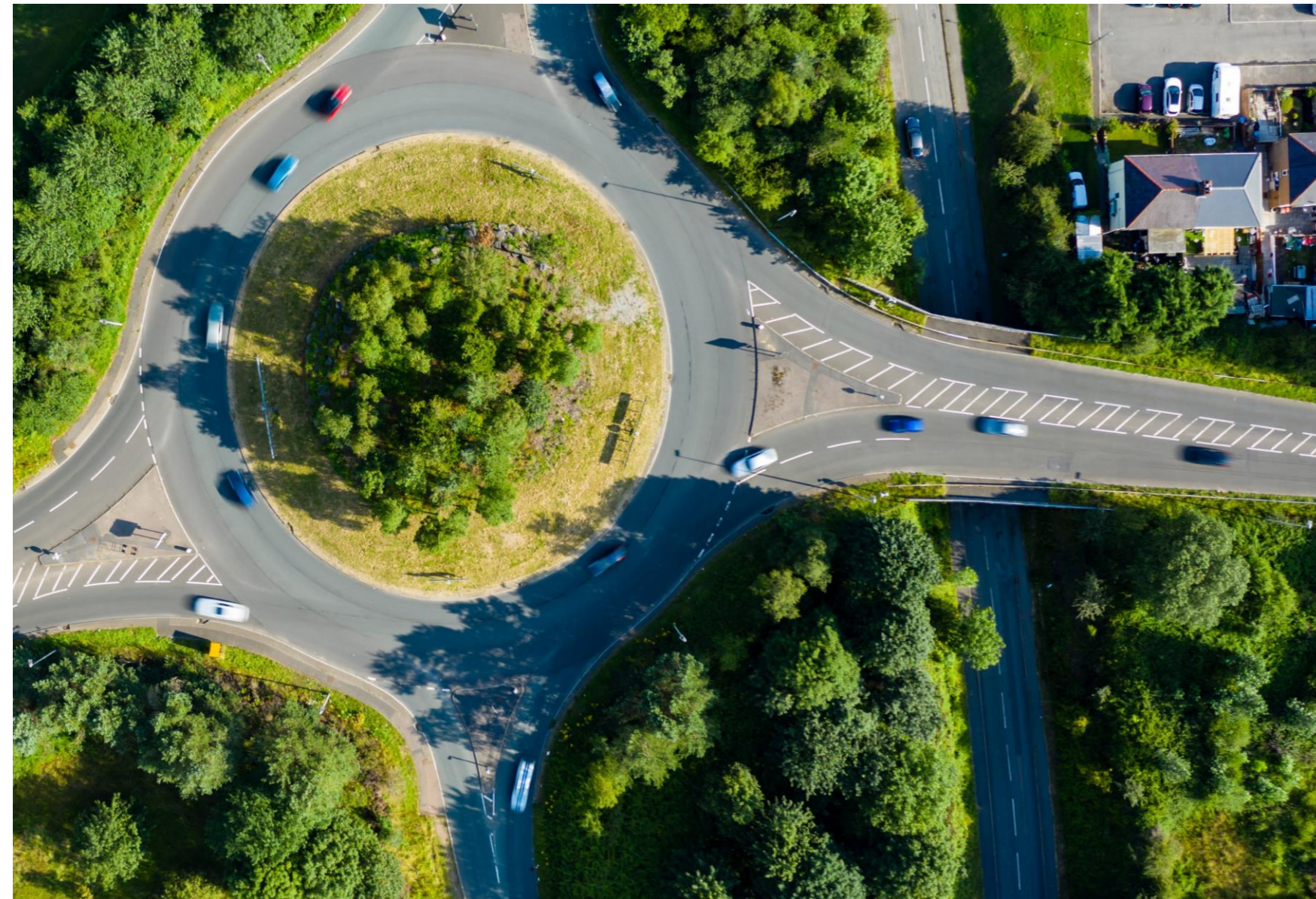
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1. Overview: technical & environmental
2. Case: IBAA Aggregate in road
3. Case: IBAA Aggregate in concrete
4. Case: IBAA Filler in concrete
5. Trends





	Market			Technical			Environmental		
Application	T/Y	%	Price ex works	Norms	Technical Guideline	Certification	Test	Form	Norms
Road	350,000	19%	€ 0.50	EN 13242		BRL2307	Percolation	Unbound	EN 14405
Concrete	250,000	14%	€ 5.00	EN 12620	CROW-CUR 116	BRL2507	Monolithic	Bound	EN 15863
Bound foundation*	1,200,000	67%	€ -25.00			BRL9322	Monolithic	Bound	EN 15863
Filler	-	0%	€ 65.00	EN 12620	CROW-CUR 128	BRL1804	Monolithic	Bound	EN 15863
	1,800,000 <i>NL IBA</i>		<i>Market prices</i>						

* Immobilisation

Landfilling is not allowed: only residue of washing is allowed to be landfilled 15% d.s.



Environmental			
Application	Test	Form	Norms
Road	Percolation	Unbound	EN 14405
Concrete	Monolithic	Bound	EN 15863
Bound foundation	Monolithic	Bound	EN 15863
Filler	Monolithic	Bound	EN 15863
<i>Batch test EN 12457 is not used for IBA</i>			

Environmental System
1. General system
2. Can be applied on all soil qualities
3. Higher thresholds on salt close to the coast
4. Percolation test with LS 10 & < 4mm

Leaching Thresholds Table 1 RBK 2022		
LS 10	BOUND	UNBOUND
Parameter	Vormgegeven (E _{64d} in mg/m ²)	Niet-vormgegeven (mg/kg d.s.)
antimoon (Sb)	8,7	0,32
arseen (As)	260	0,9
barium (Ba)	1.5	22
cadmium (Cd)	3,8	0,04
chrom (Cr)	120	0,63
kobalt (Co)	60	0,54
koper (Cu)	98	0,9
kwik (Hg)	1,4	0,02
lood (Pb)	400	2,3
molybdeen (Mo)	144	1
nikkel (Ni)	81	0,44
seleen (Se)	4,8	0,15
tin (Sn)	50	0,4
vanadium (V)	3201	1,8 ¹
zink (Zn)	800	4,5
bromide (Br)	6702	202
chloride (Cl)	110	616
fluoride (F)	2.5	552
sulfaat (SO ₄)	165	2.43

Conditions for the use of IBAA:

1. To be used in a useful & functional manner.
2. The volume used should be in line with the intended function.
3. End of life: losing it function, it should be possible to remove.
4. Should comply with environmental legislation RBK 2022

The preferred way is to wash to IBAA

IBAA Aggregate in road application





Table 2. Requirements on WEP granulate in concrete without reinforcement and without constructional application

Property	Unit	Testing method	Requirement for fine and coarse aggregate
content of very fine material (< 63 μm)	% (by mass)	NEN-EN 933-1	≤ 10
particle density (ρ_{rd})	kg/m ³	NEN-EN 1097-6	≥ 2000
water absorption	% (by mass)	NEN-EN 1097-6	to be specified by producer
sulphate content (SO ₃)	% (by mass)	NEN-EN 1744-1 Clause 12	≤ 0,8 ³
chloride content	% (by mass)	NEN-EN 1744-1 Clause 7	to be specified by producer
delay in setting time	minutes	NEN-EN 1744-6	≤ 120
alkali content (Na ₂ O-eq)	% (by mass)	NEN-EN 196-2	≤ 0,2 ⁴
metallic Al+Zn content	% (by mass)	Annex A	to be indicated by producer with a maximum of 1% by mass ⁵
loss on ignition	% (by mass)	Standard RAW test 28	≤ 5
fragmentation resistance (LA value)	% (by mass)	NEN-EN 1097-2	to be specified by producer; for coarse fraction only

Additional to EN 12620



- First guideline CROW-CUR 116 in 2012
- Updated guideline CROW-CUR 116 in 2017
- 2012-2023 approximately 1,5-2,0 Mio T sold to the market
- 2023 approximately 250.000T/275.000T for positive price.
- Nearly 100% is sold to concrete products without reinforcement
- Paving blocks (EN 1338) and paving flags (EN 1339)
- Two types of quality: dry treated and washed
- Expected new legislation all IBAA should be washed

IBAA in concrete





CROW-CUR Recommendation 128:2021
**MSWI filler in unreinforced
earth-moist concrete**



EAD 260009-00-0301

December 2016

PROCESSED BOTTOM ASH FROM
MUNICIPAL SOLID WASTE
INCINERATORS AS TYPE II
ADDITION FOR PRODUCTION OF
CONCRETE, MORTAR AND
GROUT





First Life		
Dutch Technical Guideline BRL1804	EN 196	EN 1338-1339
Characterization MSWI Filler	Paste and Mortar Tests	Concrete product 1e Life
3 sources MSWI Filler	Reference	Reference
Chemical analyses	Ground Limestone GL	Ground limestone GL
Particle size distribution PSD	3 sources MSWI Filler	3 sources MSWI Filler
Elementary composition XRF/XRD	Properties	Properties
Mineralogical composition X-Ray diffraction	Strength	Road salt resistance
	Expansion tests	Water absorption
	ASR	Water evaporation
Recycling		
EN 206	Committee	EN 14405
Concrete product 2e Life	Simulation innovative crushing/Cement Paste	Environmental/crushed concrete product
traditional crushed	Reference 100% CEM I 52,5N	Concrete product crushed < 4 mm
Particle size distribution PSD	75% CEM I 52,5N + 25% GL	Upflow percolation test LS 10
Mix design concrete	75% CEM I 52,5N + 25% MSWI	
concrete aggregate 4-12	Crushed/dried/ground	
river sand 0-4	Exchange 25% cement in new mortar	
Reference	Characterization Mortar	
Ground lime stone		
MSWI Filler		
Characterization concrete		



4 Conclusions: Suitability of MSWI filler

Based on the studies conducted, we can conclude that the MSWI filler produced by Blue Phoenix Group is suitable for use in unreinforced, non-construction concrete products made with dry or earth-moist concrete mortar. The study also showed that, when MSWI filler is used in these products, the material streams generated when the concrete in question is recycled (concrete granulate and powder fraction) can be reused as a raw material in a 2nd life concrete. This application of MSWI filler is therefore fully circular in terms of the aspects within the scope of this study.

1.2 Scope

This CROW-CUR Recommendation applies to MSWI filler used in unreinforced, non-construction concrete products made with wet concrete mortar in a consistency class of C0 (dry) or C1 (earth-moist) and with a maximum MSWI filler content of 140 kg/m³.

MSWI filler must meet the requirements set out in the table below.

Property	Method	Requirement
Particle distribution	NEN-EN 933-10	100% < 2 mm 85–100% < 125 µm 70–100% < 63 µm
Alkali content, expressed as Na ₂ O equivalent	X-ray fluorescence spectrometry (XRF) NEN-EN 196-2	≤ 5.0%(m/m) ¹⁾
Methylene blue adsorption	NEN-EN 933-9	≤ 1.2% (m/m)
Chloride content	NEN-EN 196-2	≤ 1.0%(m/m) ²⁾
Sulfate content – SO ₃	NEN-EN 196-2	≤ 4.0%(m/m) ³⁾
Effect on strength ^{4,5)}	NEN-EN 196-1	≥ 65%
Effect on setting time ⁴⁾	NEN-EN 196-3	< 120 minutes
Determination of soundness ⁶⁾	NEN-EN 196-3	< 10 mm
TOC content	NEN-EN 13639	≤ 6% (m/m)
Metallic Al + Zn content	CUR Recommendation 116	≤ 0.2% (m/m)

- Demonstration plant of 0,75T/Y 24H/7D
- Location at the WtE Plant Duiven (AVR)
- Test program Q1 2025-Q4 2025
- Including bottom ash from NL-B-D-UK-F
- Returning to EU member states to produce concrete products EN 1338-1339-1340
- Start planning commercial plant 10-25 T/H 24/7

IBAA Filler in concrete





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IBAA Filler in concrete





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IBAA Filler in concrete

1



Blue Phoenix Group B.V.

Watermanweg 106a
3067 GG, Rotterdam
Netherlands (the)

SUBMISSION NUMBER: **FJ932847-26**
SUBSTANCE NAME: **Ubryon**
COMMUNICATION NUMBER: **INQ-C-2114613207-58-01/F**

**COMMUNICATION RELATING TO YOUR INQUIRY DOSSIER SUBMITTED UNDER
REGULATION (EC) NO 1907/2006**

The European Chemicals Agency (ECHA) has concluded the assessment of your inquiry dossier.

Based on the information in the inquiry dossier, ECHA has provided the following inquiry identifiers:

Inquiry number: **06-2120926605-53-0000**

EC/List¹ number for this substance: **939-997-0**

EC/List name for this substance: **Reaction products of metal-free bottom ash from
municipal solid wastes incineration with water and with or without lime**

The above identifiers need to be included in your registration dossier.

The information given in your inquiry was sufficient to provide the identifiers listed above. However, it remains your responsibility to decide with the other potential registrants and previous registrants whether the substances you each manufacture/import are sufficiently similar to be jointly registered.

- 2025 new legislation expected & implementation within two years
- Anticipated change is still a generic system but
 1. pH change during first life could be considered (pH8-12)
 2. Visual aspects e.g. limited amount of (burned) batteries (0,01%) & plastics
 3. Building methods e.g. non permeable top layer (to reduce LS)
- Guideline 2: circularity of new products in concrete

Thank You