Quality Management System for the Production of Recycled Aggregates

Produced by

John Barritt Consulting Ltd

for

Neal Soil Suppliers Limited

Atlantic Ecopark, Newton Road, Rumney, Cardiff, CF3 2EJ

This Quality Management Systems describes the processes and procedures that have been designed and implemented to ensure that all aggregate products produced by Neal Soil Suppliers meet end of waste criteria and all other legal requirements to which we subscribe.

Issue & Review

Date	Issue	Note
1 Mar 2017	1	Original Issue Document
25 Feb 2018	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
25 Feb 2019	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
23 Feb 2020	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
25 Feb 2021	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
22 Feb 2022	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
22 Feb 2023	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
7 Feb 2024	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document.
4 Feb 2025	1	Review Conducted. No change to Neal process or WRAP requirement. No Change needed to document. Changes to Protocol due later in 2025 and review required when changes are published.

Contents

1.0 Introduction and Scope

Neal Soil Suppliers has introduced this Quality Management System(QMS) for the production of aggregates from suitable wastes in conformity to British/European aggregates Product Standards and meeting Natural Resources Wales requirements for 'end of waste'.

The QMS outlines the specific procedures and processes that have been implemented throughout the various stages of the production process to ensure conformity to both the 'Quality Protocol for aggregates from inert waste' (the aggregates Quality Protocol), and all other legal requirements to which Neal Soil Suppliers subscribe.

This Manual also forms part of the wider Integrated Management System (IMS) operated by Neal Soil Suppliers.

2.0 Organisation

2.1 Responsibility and authority

The ***Compliance Director*** has overall responsibility for:

- The effectiveness of the quality management system
- Ensuring that sufficient financial, human and physical resources are available for implementation of the system
- Implementing the quality management system
- Compliance with the quality management system
- Appointing responsible persons for duties specified within the manual
- Ensuring that regular compliance checks are undertaken of all related processes and procedures.

Responsible persons (Suitably qualified persons):

▪ Are accountable for all aspects of the implementation of the quality management system within their designated areas of responsibility and are defined in related procedures where necessary.

All Employees:

▪ Ensure the effective implementation of the quality management system within the sphere of their job responsibility.

▪ Where necessary training is provided to employees in accordance with IMS04 of the IMS to ensure that they are competent to perform the tasks assigned.

All Employees:

▪ Ensure the effective implementation of the quality management system within the sphere of their job responsibility.

▪ Where necessary training is provided to employees in accordance with IMS04 of the IMS to ensure that they are competent to perform the tasks assigned.

2.2 Management Audit/Review

This manual and all associated procedures are reviewed at least annually in accordance with IMS13 – Management Review. Compliance audits are also undertaken as part of the internal audit programme outlined in IMS11.

3.0 Control Procedures

3.1 Factory Production Control Manual

The factory production control manual procedures required for conformity to BS EN aggregates product standards are incorporated within this QMS.

3.2 Document & Record Control

All documentation and records used as part of the IMS is subject to control and is administered and maintained in accordance with IMS05 – Document and Record Control. This procedure describes the approval and issue of documents, how changes are made, revision levels identified and obsolete documents retrieved. Current versions of relevant documents and other data are available at all locations where operations relating to the IMS are performed. Records to demonstrate conformance to requirements of the applicable standards are maintained and retained for defined periods.

3.3 Training, Awareness and Competence

As part of the IMS, Neal Soil Suppliers and Atlantic Recycling has ensured that training needs are identified and relevant training plans have been created. All employees are made aware of their role and responsibilities and are provided with training appropriate to the activities performed. Competent personnel are assigned to specific tasks and selected on the basis of their education, training and experience.

Training needs and requirements are continually monitored and evaluated to ensure that levels of competence remain appropriate for the tasks assigned. Should Sub-contractors be used in any part of the process, they will operate under the requirements of this quality management system and steps will be taken to ensure that sub-contractors meet all specified requirements.

3.4 Waste Acceptance Criteria

3.4.1 Wastes acceptable for producing recycled aggregates

The acceptance criteria for waste for aggregate production requires that the wastes must conform to the waste codes and conditions in Table C1 of Appendix C of the aggregates Quality Protocol. Appendix C details wastes considered to be inert waste for the purpose of the Quality Protocol and to be acceptable for the production of recycled aggregates. For this QMS, the relevant waste codes from Table C1 are detailed in Table 1 below.

There are two waste streams managed within the site. Wastes suitable for processing into aggregates Quality Protocol compliant aggregates as received on site, and those requiring a treatment on site before becoming compliant with the aggregates Quality Protocol waste acceptance criteria.

3.4.2 Inspection of incoming waste

For wastes suitable for processing into aggregates Quality Protocol compliant aggregates on arrival at site, all legally required documentation e.g. waste transfer notes, waste carriers licenses etc. are inspected and relevant information recorded. A visual inspection of each load is also undertaken at the weighbridge to ensure the contents comply with the acceptance criteria outlined in both the Site Permit (EPR/VP3095FS) and the aggregates Quality Protocol.

If deemed acceptable by the fully trained Weighbridge Operators, the load is directed to the appropriate designated tipping area where a second visual inspection of the load is undertaken. Loads which are contaminated or deemed unacceptable are also rejected from the site.

Loads rejected at the weighbridge, rejected and reloaded at the stockpile, or removed to a quarantined area, are dealt with and recorded in accordance with IMS17-03 – Dealing with non-conforming loads which outlines the processes in place for quarantine, re-loading, removal and disposal of the load where applicable. All rejected loads are recorded in accordance with IMS12 – Non-conformance.

Wastes that have been wet processed on site will be placed in stockpiles and be subjected to waste classification. (Note: Compliance with inert WAC is NOT a requirement of the aggregates Quality Protocol.) Where the waste is classified as uncontaminated 19 12 09 Minerals, it will then come within scope of the aggregates Quality Protocol and this QMS, being subjected to the relevant Factory Production Control procedures, including aggregate testing and product characterisation requirements.

Table 1 – Acceptable EWC codes under both the Site Permit and aggregates Quality Protocol

European Waste Code	Description	Restrictions
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 07	
01 04 09	Waste sand and clays	Waste sand only. Must not include contaminated sand.
17 01 01	Concrete including solid dewatered concrete process waste	Selected construction and demolition waste acceptable only with low content of other types of materials (like metals, plastics, organics, wood, rubber etc.) The origin of the waste must be known. Must not include concrete slurry.
17 01 02	Bricks	
17 01 03	Tiles and ceramics	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	
17 05 04	Soil and stones other than those mentioned in 17 05 03	Must not contain any contaminated soil or stone from contaminated sites.
17 05 06	Dredging spoil other than those mentioned in 17 05 05	Allowed only if: ▪ Inert aggregate from dredgings. ▪ Must not contain contaminated dredgings. ▪ Must not contain fines.
17 05 08	Track ballast other than those mentioned in 17 05 07	Allowed only if it does not contain soil and stones from contaminated sites.
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03.	Only allowed if: ▪ The waste is generated from utilities trenchings. ▪ The waste consists of sub base aggregates i.e. granular material. ▪ The waste contains only materials that would be described by entries 17 01 01, 17 03 02
19 12 05	Glass	Does not include glass from cathode ray tubes.
19 12 09	Minerals (for example sand, stones)	Must not contain contaminated concrete, bricks, tiles, sand, stone or gypsum from recovered plasterboard.
20 02 02	Soils and stones	Must not contain contaminated stones from garden and parks waste.

3.5 Production and Storage

3.5.1 Method of production

A flow chart showing the method of aggregate production is in Appendix 1

Before processing the accepted material, large contaminants e.g. wood, plastic are manually removed. Material is then processed through a mobile crushing and screening plant. The equipment utilises magnets to remove any residual metal within the material being processed.

Once the material has been processed it is segregated into different stockpiles depending on the type of product. The stockpiles are kept in segregated storage bays to ensure that quality is maintained and cross contamination is avoided.

3.5.2 Management of Equipment

As part of the site's Integrated management system, Neal Soil Suppliers has in place a preventive maintenance programme which covers all equipment used in the handling and processing of aggregate. The operators of mobile plant undertake and record daily defect checks at the beginning of each day. If any issues are identified the Operation Manager is notified via the Corrective Action Request System (IMS12) and appropriate measures are undertaken.

Prior to operating the screening plants, an inspection takes place to ensure screens are not damaged and are in good working order. If damaged equipment is identified which could compromise the effectiveness of the plant, then production is stopped until all repairs are made and the production process is verified as effective. Again, all repairs and maintenance are recorded via a Corrective Action Form (CAF) system.

3.5.3 Aggregate Products, Standards, and Specifications

Table 2 lists the recycled aggregate product groups and the relevant aggregates standard to which they are produced and related end use specifications.

Table 2: Products, Standards, and Specifications

	Product & Use	Standard	Specification
1	Unbound aggregate: Pipe bedding Drainage	BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction	Highways England Specification for Highway Works (SHW): Series 500 Highway Authorities and Utilities Committee (HAUC): Specification for the reinstatement of openings in highways (SROH)
2	Unbound aggregate: Granular fill General fill Capping	BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction	Highways England Specification for Highway Works: Series 600 HAUC: Specification for the reinstatement of openings in highways BS EN 13285: Unbound mixtures: Specifications
3	Unbound aggregate: sub base	BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction	Highways England Specification for Highway Works: Series 800 HAUC: Specification for the reinstatement of openings in highways BS EN 13285: Unbound mixtures: Specifications
4	aggregate for concrete	BS EN 12620: Aggregates for concrete	BS 8500-2: Concrete

4.0 Product Inspection and Testing

All products produced by Neal Soil Suppliers conform to the respective aggregates standards and product specification detailed in table 2.

Samples of aggregates will be taken from product stockpiles to BS EN 932-1 ‘Tests for general properties of aggregates: Methods for sampling’. The frequencies for tests are listed in Table 3.

Tests applicable to individual products are listed in Appendix 2

All testing is undertaken via a UKAS accredited test laboratory. Records of all testing are retained indefinitely as part of our Integrated Management Systems and are provided to customers on request. If the testing identifies any issues with the products, then the appropriate action is taken as per IMS12 – Non-conformance.

In addition to the defined testing schedule, all products are inspected prior to loading for normal appearance. If materials appear different from normal they may be sold as a suitable alternative product or reprocessed through the plant. All instances of re-processing or release as an alternative product are recorded in accordance with IMS12 – Non-conformance.

Table 3 - Testing Schedule for Aggregates

Test Type	Test Standard	Frequency (Production Period) BS EN 13242	Frequency (Production Period) BS EN 12620
Particle size Distribution	BS EN 933-1	Weekly	Weekly
Fines Content	BS EN 933-1	Weekly	Weekly
Constituent Analysis	BS EN 933-11	Monthly	Monthly
Particle Density	BS EN 1097-6	Monthly	Monthly
Water Absorption	BS EN 1097-6	Yearly	Monthly
Water Soluble Sulfates	BS EN 1744-1	Monthly	Monthly
Resistance to fragmentation (LA)	BS EN 1097-2	6 Monthly	6 Monthly
Influence on setting time of cement	BS EN 1744-6	n/a	6 Monthly
Plasticity Index	BS EN 1377: part 2	Weekly	n/a
Frost Heave	BS EN 812: part 124	Yearly	n/a
Water Content	BS EN 1097-5	Weekly	n/a
Laboratory dry density and Optimum Moisture Content	Test options in BS EN 13285 cl 5.3	Yearly	n/a
Magnesium Sulfate Soundness	BS EN 1367-2	2 Yearly	2 Yearly
Acid soluble sulfate	BS EN 1744-1	n/a	6 Monthly
Acid soluble sulfide	BS EN 1744-1	Yearly	n/a
Total sulfur	BS EN 1744-1	Yearly	6 Monthly
Acid soluble chlorides	BS EN 1744-5	n/a	6 Monthly
Bulk Density	BS EN 1097-3	Yearly	Yearly

(a production week may be measured as five days of production in a period no longer than three months, a production month may be measured as twenty days of production in a period no longer than six months, a year or six months of production may be taken as the same as the calendar period.)

5.0 Transport & Delivery

When dispatching product, the customer is supplied with documentation which includes the following details as a minimum:

- Date of supply
- Serial number of the ticket

- Product description to aggregates standard and customer specification
- The name and contact details of the producer, including the address of the site of production
- Quantity supplied by weight
- A statement that the aggregate was produced under a quality management scheme conforming to the aggregates Quality Protocol.

Additional information:

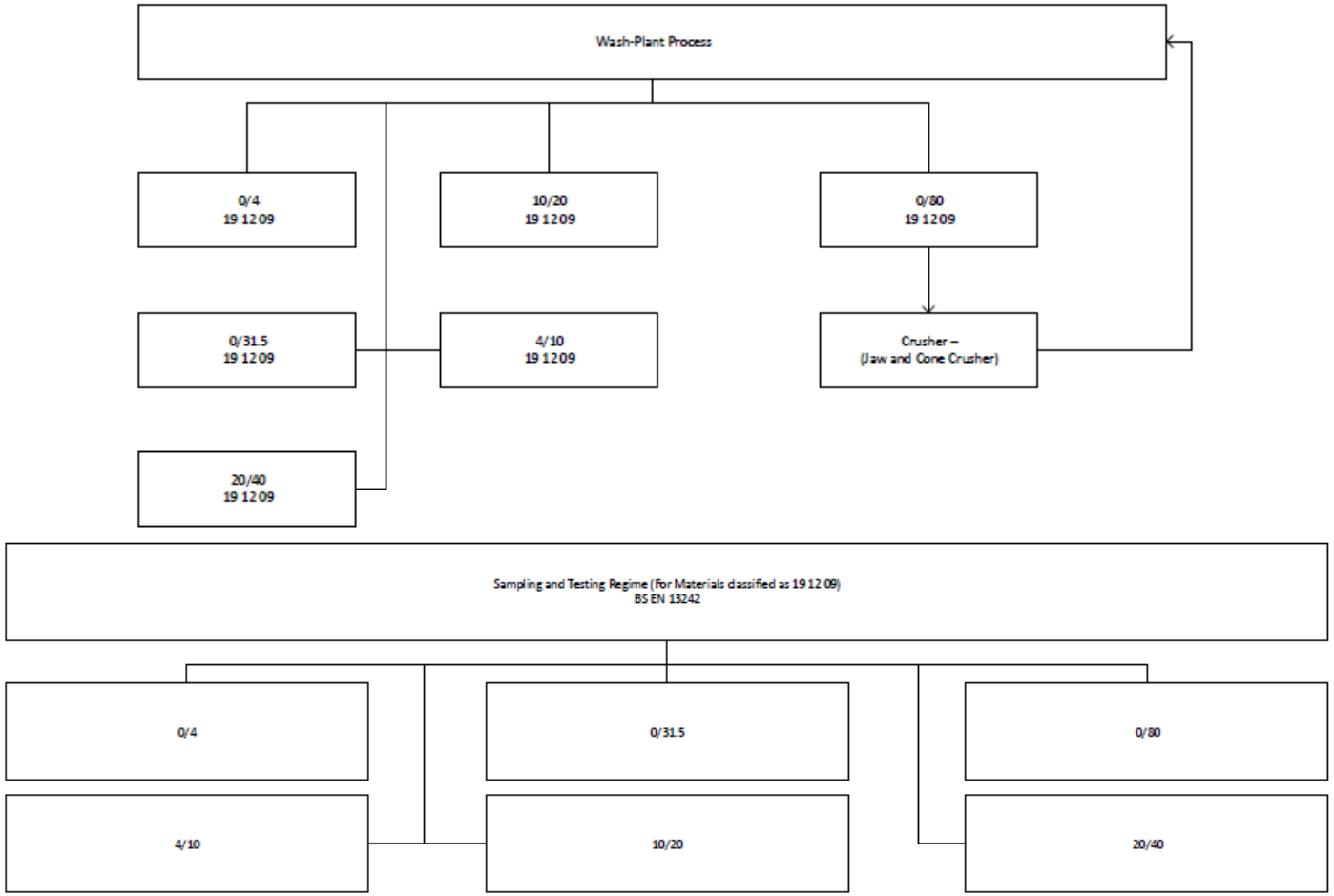
- If requested by the customer we will also supply them with results of our testing regime and outline details of this QMS.

When dispatching product, Neal Soil Suppliers ensures that all vehicles are within legal weight limits by ensuring that the load is weighed on the calibrated weighbridge. If the legal limits for the vehicle are exceeded, then the vehicle is not allowed to leave the site until suitable quantities of material are removed.

Appendix 1. Aggregate production flow chart:

Dry process:

Wet process output:



Appendix 2: Testing schedules and performance for all products:
Schedule 1

Unbound aggregate produced to BS EN 13242 d/D	Target Category G	Target Product Specification	PSD BS EN 933-1 See grading section	Fines content BS EN 933-1	Constituents BS EN 933-11 (see table 1 below)	LA Coefficient BS EN 1097-2	Acid soluble sulfide & total sulfur BS EN 1744-1	WS sulfates BS EN 1744-1	Water Content BS EN 1097-5	Plasticity Index BS 1377 part 2	Frost Heave BS 812-124	Dry density and Optimum moisture/water content Test options in BS EN 13285 cl 5.3	Magnesium sulfate soundness BS EN 1367-2	Bulk Density BS EN 1097-3
0/80	UF12 OC75 (BS EN 13285)	SHW Series 600 6F5 Capping		≤12% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1	Lower limit: OWC -2% Upper limit OWC			Declared value		Declared value
0/31.5	UF15 OC75 (BS EN 13285)	SHW Series 600 6F4 Capping		≤15% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 60	See Note 1	See Note 1	Lower limit: OWC -2% Upper limit OWC			Declared value		Declared value
6/14	Gc80/20 f4	SHW Series 500 Pipe bedding		≤4% passing 63 microns	≤1% Class X	≤LA 50	See Note 1	<0.38% of SO3 plus Note 1						
20/40	Gc80/20, f4	SHW Series 500: Pipe bedding & type B filter drain mat.		≤4% passing 63 microns	≤1% Class X	≤LA 50	See Note 1	<0.38% of SO3 plus Note 1						
10/20	Gc80/20, f4	SHW Series 500 Pipe bedding		≤4% passing 63 microns	≤1% Class X	≤LA 50	See Note 1	<0.38% of SO3 plus Note 1						
0/4	GF80 f11	SHW Series 500 Pipe bedding		≤11% passing 63 microns	n/a	n/a	See Note 1	<0.38% of SO3 plus Note 1						
4/10	Gc80/20, f4	SHW Series 500 Pipe bedding		≤4% passing 63 microns	≤1% Class X	≤LA 50	See Note 1	<0.38% of SO3 plus Note 1						
0/31.5	UF9, OC75 (BS EN 13285)	SHW Series 800 Type 1 subbase		≤9% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1	Lower limit: OWC -2% Upper limit OWC +1%	Non-plastic	≤15	Declared value	≤ MS35	Declared value

Unbound aggregate produced to BS EN 13242 d/D	Target Category G	Target Product Specification	PSD BS EN 933-1 See grading section	Fines content BS EN 933-1	Constituents BS EN 933-11 (see table 1 below)	LA Coefficient BS EN 1097-2	Acid soluble sulfide & total sulfur BS EN 1744-1	WS sulfates BS EN 1744-1	Water Content BS EN 1097-5	Plasticity Index BS 1377 part 2	Frost Heave BS 812-124	Dry density and Optimum moisture/water content Test options in BS EN 13285 cl 5.3	Magnesium sulfate soundness BS EN 1367-2	Bulk Density BS EN 1097-3
0/31.5	UF9, OC75 (BS EN 13285)	SHW Series 800 Type 2 subbase		≤9% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1	Lower limit: OWC -2% Upper limit OWC +1%	<6	≤15	Declared value	≤ MS35	Declared value
0/31.5	UF9, OC75 (BS EN 13285)	SHW Series 800 Type 4 Subbase		≤9% passing 63 microns	≤1% Class X ≤ 100% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1	Lower limit: OWC -2% Upper limit OWC +1%	Non-plastic	≤15	Declared value	≤ MS35	Declared value

Table 1: Classification of Constituents: BS EN 933-11

Constituent	**Description**
Rc	Concrete, concrete products, mortar, concrete masonry units
Ru	Unbound aggregate, natural stone, hydraulically bound aggregate
Rb	Clay masonry units (i.e. bricks and tiles), calcium silicate masonry units, aerated non-floating concrete
Ra	Bituminous materials
Rg	Glass
FL	Floating material in volume
X	Cohesive (e.g. clay and soil), Metals (ferrous & non-ferrous) Non-floating wood, plastic and rubber Gypsum plaster

Schedule 2

Unbound aggregate produced to BS EN 13242 d/D	Target Category G	Target Product Specification	PSD BS EN 933-1 See grading section	Fines content BS EN 933-1	Constituents BS EN 933-11 (see table 1 in Schedule 1)	LA Coefficient BS EN 1097-2	Acid soluble sulfide & total sulfur BS EN 1744-1	WS sulfates BS EN 1744-1	Water Content BS EN 1097-5	Particle Density and Water absorption BS EN 1097-6	Plasticity Index BS 1377 part 2	Acid soluble chloride BS EN 1744-5	Influence on the initial setting time of cement BS EN 1744-6	Bulk Density BS EN 1097-3
0/80	GA75 f15	SHW Series 600 Class 1A Granular fill		≤15% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg		See Note 1	See Note 1	Declared value					Declared value
0/80	GA75 f15	SHW Series 600 Class 1B Granular fill		≤15% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg		See Note 1	See Note 1	Declared value					Declared value
0/80	GA75 f15	SHW Series 600 Class 1C Granular fill		≤15% passing 63 microns	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1						Declared value
15/300	LMA 15/300 (BS EN 13383)	SHW Series 600 Class 6B Selected granular fill		n/a	n/a				Declared value		Non-plastic			n/a
20/63	Gc80/20	SHW Series 600 Class 6C Selected granular fill		n/a	≤1% Class X ≤ 50% Ra ≤ 25% Rg	≤LA 50	See Note 1	See Note 1	Declared value		Non-plastic			Declared value
0/31.5	GA75 f15	SHW Series 600 Class 6N Selected granular fill		≤15% passing 63 microns	≤1% Class X ≤ 1% Ra ≤ 5% Rg	≤LA 40	See Note 1	See Note 1	Declared value					Declared value
Aggregates for concrete produced to BS EN 12620							Acid soluble sulfate & total sulfur BS EN 1744-1							
0/4 MP	GF85 f3	BS 8500-2		≤3% passing 63 microns			Acid sol. AS 0.8 Total Sulfur ≤1%	Declared value		Declared value		Declared value	Declared value	Declared value

Note 1 to Schedules 1&2:

Sulfate testing requirements from SHW.

SHW Series 500, 600 and 800 set limits for water soluble sulfates, total sulfur and acid soluble sulfides for specific site applications relative to their proximity to concrete or structural metallic materials.

For other applications, these limits do not apply however it is prudent to operate to the water soluble sulfate (SO4) limit of 1500 mg/l (SS1.5) and total sulfur of 1% (S1).

The requirements of SHW are:

Unbound mixtures placed **within 500 mm**, (or any other distances described in contract specific Appendix 7/1), of **concrete, cement bound materials, other cementitious mixtures or stabilised capping forming part of the permanent works** shall conform to requirements A and B below.

A Mixtures shall conform to the following two criteria:

(i) **Water-soluble sulfate** (WS) content determined in accordance with BS EN 1744-1 clause 10 **shall not exceed 1500 mg of sulfate (as SO4) per litre**;

(ii) **Total sulfur** (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) **shall not exceed 1%** for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

B Mixtures shall conform **to at least one** of the following two options:

(i) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag **or crushed concrete** are predominant;
or

(i) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag **or crushed concrete** are predominant; or

(ii) The **sulfide** content of the mixture determined in accordance with BS EN 1744-1 clause 13 is **less than 0.5% (as SO4).**

(When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This also applies if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values. The pH of the mixture shall be reported.)

Unbound mixtures placed **within 500mm**, (or any other distances described in contract specific Appendix 7/1), of **metallic structural elements forming part of the permanent works** shall conform to requirements C and D below.

C Mixtures shall conform to the following two criteria:

(i) **Water-soluble sulfate** (WS) content determined in accordance with BS EN 1744-1 clause 10 **shall not exceed 300 mg of sulfate (as SO4) per litre**;

(ii) (ii) **Total sulfur** (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) **shall not exceed 1% for aggregates** other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

D Mixtures shall conform to **at least one** of the following two options:

(i) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or **crushed concrete** are predominant; or

(ii) The **sulfide content** of the mixture determined in accordance with BS EN 1 744-1 clause 13 is **less than 0.06% (as SO4).**

(When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This also applies if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values. The pH of the mixture shall be reported.)

The requirements in (i) and (ii) above shall not apply to metallic items protected by concrete and ancillary metallic items such as the tops of chambers and gullies.

Grading tables for Schedules 1&2

1. SHW Series 800:

Types 1 and 4 Subbase

Sieve size mm	% by mass passing		
	Overall grading range	Supplier declared value grading range	Tolerance on supplier declared value
63	100		
31.5	75-99		
16	43-81	54-72	±15
8	23-66	33-52	±15
4	12-53	21-38	±15
2	6-42	14-27	±13
1	3-32	9-20	±10
0.063	0-9		
Grading of individual batches – differences in values passing selected sieves			
Retained sieve size, mm	Passing sieve size, mm	Percentage by mass passing	
		No less than	No more than
8	16	7	30
4	8	7	30

Type 2 Subbase

Sieve size mm	% by mass passing		
	Overall grading range	Supplier declared value grading range	Tolerance on supplier declared value
63	100	No requirement	No requirement
31.5	75-99		
16	50-90		
8	30-75		
4	15-60		
1	0-35		
0.063	0-9		
Grading of individual batches – differences in values passing selected sieves			
Retained sieve size, mm	Passing sieve size, mm	Percentage by mass passing	
		No less than	No more than
8	16	5	35
4	8	5	35

2. SHW Series 600

Classes 6F4 and 6F5 capping layers

Sieve size mm	6F5 % passing	6F4 % passing
125	100	
80	75-99	
63		100
40	50-90	
31.5		75-99
20	30-75	
16		50-90
10	15-60	
8		30-75
4		15-60
2	0-35	
1		0-35
0.063	0-12	<15

Classes 1A, 1B and 1C Granular Fills

Sieve size mm	Class 1A % passing	Class 1B % passing	Class 1C % passing
500			100
300	100		
125	95-100	100	10-95
0.6			0-25
0.063	<15	<15	<15

Classes 6B, 6C and 6N Selected Granular Fills

Sieve size mm	6B % passing	6C % passing	6N % passing
500	100		
125	0-10	100	
80			100
40		0-100	
6.3		0-100	
4		0-35	
2		0-10	
0.5		0-2	
0.063			<15

3. SHW Series 500:

Pipe Bedding: Coarse

Sieve size mm	20/40 % passing	10/20 % passing	6/14 % passing	4/10 % passing
80	100			
63	98-100			
40	80-99	100		
31.5	20-70	98-100	100	
20	0-20	80-99	98-100	100
14		20-70	80-99	98-100
10	0-5	0-20	20-70	80-99
6.3			0-20	0-20
2.8				0-5
Fines content				
0.063	0-4	0-4	0-4	0-4

Pipe Bedding: Fine

Sieve size mm	0/4 % passing
8	100
6.3	98-100
4	80-99
0.063	0-11

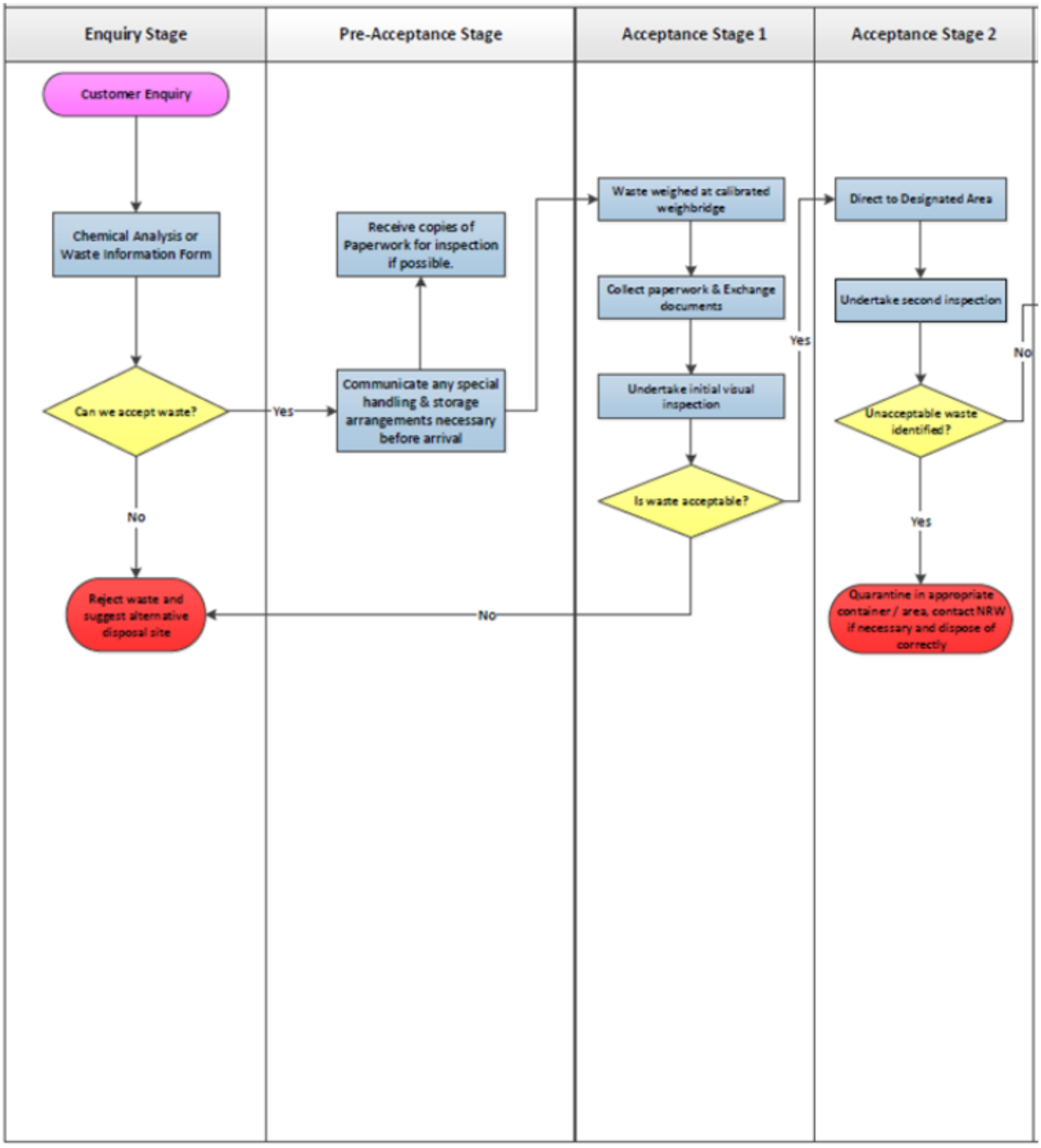
4. BS EN 12620 aggregates for concrete

Sand

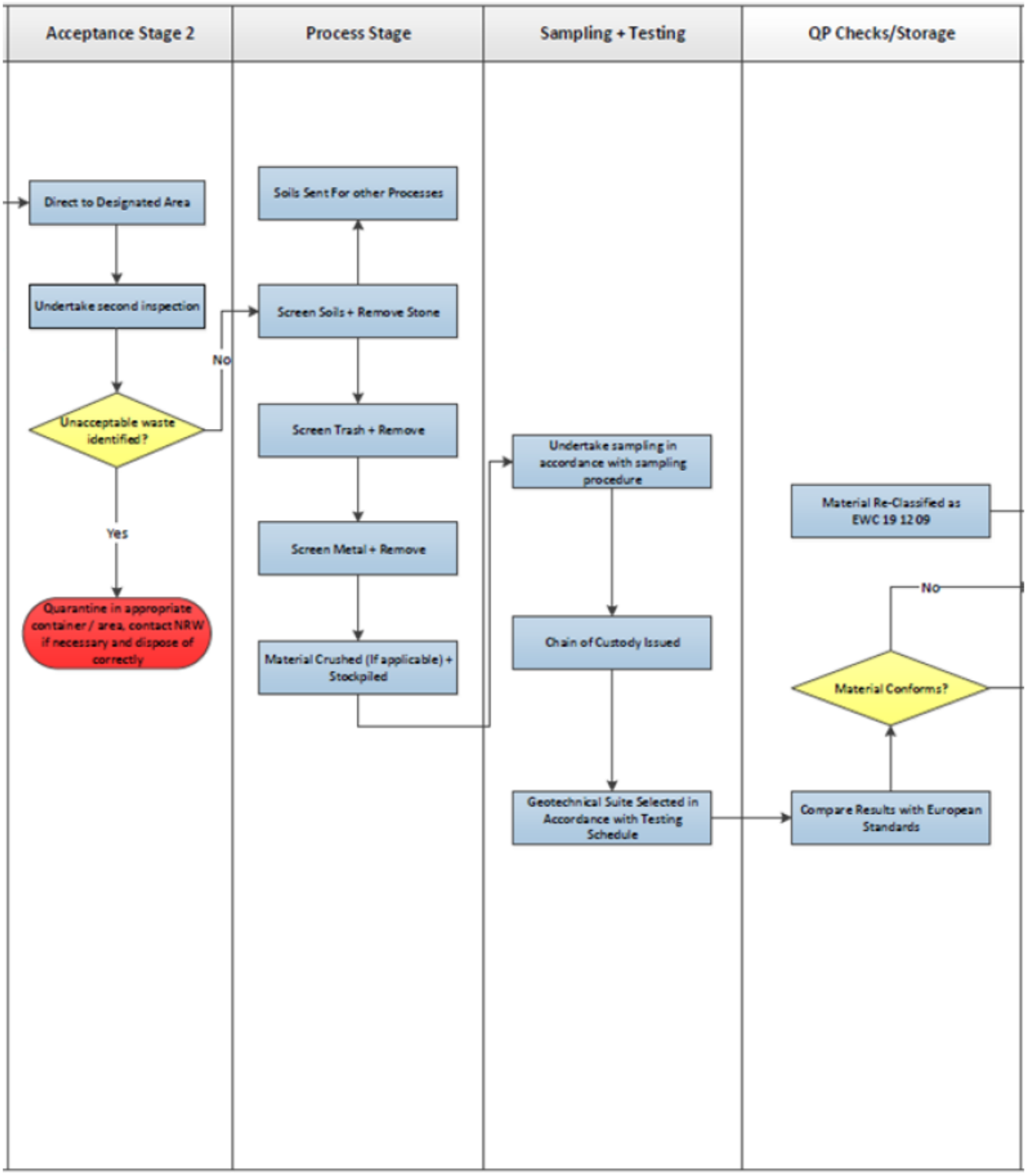
Sieve size mm	0/4 % passing
8	100
6.3	95-100
4	85-99
0.5	30-70
0.063	0-3

Appendix 3: Process control flow chart

Process control part 1:



Process Control: Part 2



Process Control: Part 3