Taylor Wimpey (South Wales)

Cefn Yr Hendy, Miskin, Pontyclun, Rhondda Cynon Taff

Site Discharge Management Plan

315257 R01 (01)

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RSK GEOSCIENCES

RSK GENERAL NOTES

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Title: Site Discharge Management Plan – Cefn Yr Hendy, Miskin, Pontyclun, Rhondda Cynon Taff

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1 INTRODUCTION

1.1 Scope and objectives

RSK Environment Limited (RSK) has been commissioned by Taylor Wimpey (South Wales); hereafter referred to as Taylor Wimpey, to produce a site discharge management plan (SDMP) for their Cefn Yr Hendy Development in Miskin, Pontyclun, Rhondda Cynon Taff; hereafter referred to as "the site".

This site-specific SDMP has been developed to outline the procedures associated with discharges to surface water.

The objectives of this SDMP are as follows:

- Employ appropriate mitigation, including monitoring and contingencies to control and minimise surface water pollution associated with site activities.

The following aspects have been considered during the development of this SDMP:

- The development activities that produce potential sources of surface water pollution and their point(s) of release to surface water; and
- The mitigation measures that are to be implemented to prevent, as far as is practicably feasible, the potential effect of the surface water pollution release, and details of the persons responsible for the actions at the site.

This document must be considered as a 'living' document and must be regularly reviewed and amended to reflect site-specific changes or conditions as the development/build progresses.

2 SITE SETTING

2.1 Site location

2.1.1 Site boundaries and surroundings

The site is located to the north and north-east of the existing residential development within Cefn-Yr-Hendy in Miskin, at National Grid Reference (NGR) ST 04850 81860. A site location plan is presented as **Figure 1**.

The site is roughly 'L' shaped and occupies an area of approximately 20 hectares and is located in an area with a mining legacy; predominantly associated with historical ironstone workings originating from the former 'Bute Hematite Works'. These former works are located along the south-eastern boundary of the development site. There is also anecdotal evidence for shallow historical lead mining on land immediately to the north of the site's northern boundary.

The boundaries of the site are defined by woodland and undeveloped fields to the north; existing residential development to the south-west; the estate road to the south-west of the southern area; mixed development and an existing road to the south-east of the southern area and Cefn Parc Farm and the A4119 to the east. Disused quarries are located beyond the road to the south of the site.

Access to development is achieved via Ffordd Cefn-Yr-Hendy, which is located to the south of the development area and Heol Waunhir that connects to the A4119.

2.1.2 Site topography

The northern area of the site generally falls to the north, north-west and north-east towards to Afon Clun from approximately 87 m above Ordnance datum (aOD) within the western end of the site to an approximately 67 m aOD within the north-eastern corner. The south-eastern area falls to the south from the northern part of the site towards the former quarries down to an elevation of approximately 64 m aOD.

2.1.3 Environmental designations

The site does not lie in a 'designated environmentally sensitive site' considered appropriate to the scope of this SDMP.

The nearest designated environmentally sensitive site relevant to the site discharge activities is the Ely Valley site of scientific interest (SSSI) that is located approximately 5.5 km down-stream of the site.

2.2 Site geology & hydrogeology

2.2.1 Superficial geology

The superficial geology comprises soils containing clay and boulders of glacial till. Proven depths of superficial cover ranges between 2.8 m and 7 m thickness.

The superficial geology is classified as a Secondary Undifferentiated aquifer.

2.2.2 Bedrock geology

The bedrock geology comprises dolomitic conglomerate, proven to extend to depths ranging between approximately 7.1 m and 27.0 m bgl.

The South Wales Middle Coal Measures, comprising interbedded sandstone, siltstone, and mudstone underlies the dolomitic conglomerate. No evidence of any coal seams was encountered during site investigation works.

The bedrock geology is classified primarily as a Principal aquifer for the dolomitic conglomerate with small sections classified as a Secondary A aquifer associated with the South Wales Middle Coal Measures.

2.2.3 Topsoil composition

Topsoil at the site comprises soft to firm brown silt/clay with rootlets, or loose slightly sandy slightly gravelly silt with rootlets.

2.2.4 General comments

Published British Geological Survey (BGS) mapping (1:50,000 scale) indicates that the bedrock strata in the area dips between approximately 10° and 30° to the north (towards the Afon Clun).

The site is not located within, or near to, a groundwater source protection zone (SPZ).

Groundwater vulnerability is classified by NRW as medium.

There was an absence of groundwater strikes observed during the intrusive site investigation however, anomalous drilling conditions, considered to represent evidence of potential shallow underground mine workings and/or suspected underground cavities/voids (potentially associated with dissolution/solution features within the dolomitic bedrock) were encountered at variable depths across the site.

The 2022 ground investigation report also identified natural infiltration capacity within the development area.

A copy of the ground investigation report(s) are presented in **Appendix A**.

2.3 Site hydrology

The Afon Clun flows in a south-westerly direction parallel to the northern boundary of the site. The Afon Clun is separated from the northern boundary of the site by a horizontal distance of approximately 220 m at its closet point. This land is in third party ownership.

There is an unnamed pond located in the industrial estate approximately 150 m to the south-east of the site and to the east of the A4119 that connects to the Afon Clun via an unnamed stream that flows north parallel to the A4119.

3 SURFACE WATER DISCHARGE DESCRIPTION

3.1 Site drainage arrangements

The site is to be developed for residential land use alongside associated infrastructure, hardstanding, and areas of soft landscaping. The proposed development plan is presented as **Figure 2**.

Engineering drawing showing the site surface water drainage arrangements are presented in **Appendix B**.

Surface water discharges from the site will be rainfall dependent and consist of run-off from the active development area, including haul roads, building footings and areas of disturbed/exposed ground following the installation of below ground infrastructure and the raising of site levels to finished floor levels (FFL) and run-off from completed sections of the site.

Collected surface water will be directed to engineered surface water attenuation basins, which prevent infiltration into the underlying geology.

Water will then flow under gravity or via pump assistance to designated discharge points along the site's boundary.

3.2 Site discharge locations and discharge rates

Site surface water run-off will be discharged from the site boundary from one of two locations:

- OF1 – Located at NGR ST 04733 82102; or
- OF2 – Located at NGR ST 05089 82109.

The maximum discharge rate from both OF1 and OF2 with be a combined rate of 132 litres per second (l/s). Depending on site arrangements, discharges will either be made:

- Via a single discharge point – either OF1 or OF2; or
- Via OF1 and OF2 simultaneously.

If site discharges are undertaken via a single discharge point then the maximum rate of discharge will be 132 l/s.

If site discharges are undertaken from both OF1 & OF2 simultaneously then the maximum rate of discharge from each location will be equivalent to flow limit of the hydrobrake installed within the outfall chamber at each discharge point.

A summary of the maximum discharge limits at each discharge point for each discharge scenario is presented in **Table 1**.

Table 1: Discharge rate for OF1 and OF2 at Cefn Yr Hendy

Discharge Point	Maximum Discharge Rate (l/s)
OF1	132 l/s – If discharge point OF2 not operational
	89.6 l/s – If discharge point OF2 operational
OF2	132 l/s – If discharge point OF1 not operational
	42.12 l/s – If discharge point OF1 operational

Depending on site arrangements, flow rates shall be controlled by a suitable method, such as utilising the physical hydrobrake infrastructure associated with OF1 and OF2 or a dedicated pump system with the discharge rate set to the appropriate flow rate.

Discharges from OF1 will initially flow overland before being collected by a pre-existing vegetated ditch and subsequently conveyed into the Afon Clun at approximate NGR ST 04577 82295.

Discharges from OF2 will initially flow through an engineered channel prior to leaving a second headwall and crossing established surface vegetation and flowing overland to the Afon Clun at approximate NGR ST 04875 82352. The channel will be vegetated, and its base lined with suitable media, such as interlocking rocks / pebbles (rip-rap) to slow water velocity and reduce erosion.

Due to the horizontal distance between the site boundary and the Afon Clun, the points at which surface water run-off leaves the site, OF1 & OF2, are designated as both the point of discharge and points of compliance.

Site discharge locations and indicative flow directions are presented on **Figures 2** and **3**.

4 SENSITIVE RECEPTORS

4.1 Identified sensitive receptors to surface water pollution

A review of published Ordnance Survey (OS) mapping data indicates that the Afon Clun is located approximately 220 m to the north the site.

The Afon Clun is considered to be the primary receptor associated with site discharge activities.

Secondary receptors associated with site discharge activities include:

- Residents in completed phases (upon completion and occupation).
- Wider public highway realm off site beyond the construction site entrances and site boundaries.
- Residents beyond the site boundaries within existing properties.

Due to the proximity of nearby surface waters, the absence of recorded shallow groundwater and in recognition that the surface water detention basins within the site will be engineered to prevent infiltration into the underlying geology, it is not considered necessary to consider risks to groundwater and the Principal Aquifer. Any groundwater beneath the site is considered to be in hydraulic continuity with the receiving surface water.

5 SURFACE WATER POLLUTION SOURCE INVENTORY

5.1 Potential pre-existing contamination considerations

Copies of the relevant ground investigation reports are included in **Appendix A**.

The site investigation works completed for this site did not identify any risk to controlled waters from on site sources of contamination. Minor hydrocarbon impact was observed as detailed below, Along the western boundary.

Additionally, results of soil testing have not identified any significant contamination that could pose a significant risk to controlled waters.

Furthermore, the 2022 ground investigation report identified a localised area of hydrocarbon impact. However, the report states that with the delineation, removal, and disposal of impacted soils from along the western-most boundary of the site, "*the risk to controlled water from site sourced contamination will be negligible and no further remedial measures are considered necessary*".

5.2 Sources of surface water pollution

Due to the nature of site activities, there is the potential for suspended solids to be generated and mobilised in water run-off.

Table 2 provides a summary of the surface water pollution source inventory as well as associated hazards, receptors, and consequences.

Table 2: Surface water pollution sources identified for Cefn Yr Hendy

Hazard	Receptor	Pathway	Consequence
Leak/spillage of hazardous material on site (e.g., oils and fuels)	Afon Clun	Via infiltration, overland flow or via the surface water drainage system (storm system)	Contamination of Afon Clun water with hazardous substances.
Leak of oil/fuel from pumps used as part of a water treatment system or other temporary pumping activity	Afon Clun		
Discharge of water containing suspended solids (silt)	Afon Clun	Overland flow from site boundary, or discharged from the outfall	Contamination of Afon Clun water with suspended solids (silt).
Discharge of water containing chemicals from active treatment process	Afon Clun	Overland flow from site boundary, or discharged from the outfall	Contamination of Afon Clun water with dosing chemicals.
Discharge of water containing chemicals from passive treatment process	Afon Clun	Overland flow from site boundary, or discharged from the outfall	Contamination of Afon Clun water with dosing chemicals.
Spillage of collected solids from settlement system	Afon Clun	Overland flow from site boundary, or discharged from the outfall	Contamination of Afon Clun water with suspended solids (silt).
Failure of pumping equipment – overflow of water from drainage etc.	Afon Clun	Via surface flow or surface water drainage system	Contamination of Afon Clun water with suspended solids (silt).
Vandalism – resulting in release of contaminants from containers.	Afon Clun	Via surface flow	Contamination of Afon Clun water

6 SURFACE WATER DISCHARGE CONTROL MEASURES

6.1 Introduction

The potential sources, pathways and receptors to surface water pollution associated with discharges from the site have been taken into account and summarised in Section 5.

In order to prevent unacceptable surface water pollution and reduce the risk of surface water pollution incidents or accidents, the following control measures will be employed at the site, as required.

6.2 Procedural & management control measures

The following procedural and management control measures shall be implemented as appropriate:

6.2.1 Soil stockpiling

- Utilise topsoil/subsoil stockpiling procedures to ensure that the number and condition of stockpiles maintained on site are closely maintained and monitored in accordance with DEFRA guidance on best practice of topsoil storage during the construction phase.
- Locating stockpiles in designated areas as far as practicably feasible, away from sensitive water receptors and surface water drains.
- Seal stockpiles to prevent water ingress.
- Sediment collected via passive and active treatment measures will be stockpiled in designated locations for appropriate disposal or (if appropriate approval received) subsequent re-use on site.
- If required, silt fencing shall be installed around stockpile(s) to control run-off.
- If required, stockpiles shall be seeded or covered with an appropriate covering to provide additional stability, prevent water ingress, and reduce the potential for sediment run-off and dust generation.

6.2.2 Surface water management infrastructure

- Any pre-existing land drainage pipework or mining related voids identified during construction activities will be noted and sealed to prevent preferential flow pathways that bypass surface water protection measures.
- Installation of appropriate surface water management infrastructure, including surface water detention basins, headwalls, discharge points and road drainage infrastructure as a priority when commencing activities in active construction areas.
- Undertake seeding or turfing of surface water detention basins at the earliest practicable opportunity (season dependant) following the point of construction.
- Line surface water detention basins with a suitable substrate following construction to prevent erosion and provide a medium for vegetation establishment (if designed).
- If required, install temporary surface water storage ponds to provide additional water storage capacity during the construction phase.
- Installed surface water drainage infrastructure will be regularly inspected and appropriately cleaned, when required, to remove excess sediment and maintain surface water drainage rates/capacity.

6.2.3 Site access roads, surfacing and vehicle movements

- Early installation of surfaced access roads to reduce vehicle movements over bare/exposed ground.
- If required, install a suitable running surface along any temporary access roads to reduce the likelihood of soft ground disturbance and generating sediment run-off.
- Establish, maintain, and review vehicle movement routes across the development site.
- Minimise, as far as practicable, the movement of machinery on and off-site access roads to prevent tracking excess soil onto roads and highways.
- Prevent, as far as practicable, the movement of machinery on undisturbed ground, such as retained areas of vegetation.
- Utilisation of a road sweeper, or other suitable road cleaning equipment, on site roads and surrounding public highways where necessary. Frequency of road cleaning to be continually assessed and updated as appropriate to address site conditions.
- No road sweeper residues will be tipped or stored on site unless prior approval has been secured.
- Install a suitable surfacing in construction material storage areas and contractor car parking areas and key access points to each development phase.
- Utilisation of appropriate vehicle washing facilities that do not allow for uncontrolled run-off towards sensitive receptors.

6.2.4 Vegetation retention & growth

- Retain as much vegetation as practicable across the site and along site boundaries.
- Where feasible, a vegetated buffer will be maintained between the construction area and the site boundary.
- Landscaping of completed Public Open Spaces (POS) and gardens shall be undertaken as soon as practicable following their installation.

6.2.5 Site staff training

- Any new employees will be given full induction training by the site management team or other appropriately qualified person(s) as appointed by the site management team.
- Staff and operatives will also receive training to ensure they can perform their specific role competently. This will include the completion of role-specific toolbox talks.

6.2.6 Site monitoring

- Refer to Section 7 of this report.

6.2.7 Maintenance activities

- Replacement/repair of storage equipment and site equipment/plant containing hazardous materials (e.g., fuel and oils) if damage or evidence of leaking is observed.
- Site plant will be inspected routinely for damage and wear by plant users.
- Any defects noted by site personnel will be reported to the site management team so repairs can be scheduled.
- All plant items and equipment will be serviced and maintained with due regard to the manufacturer's recommendations in order to minimise the risk of breakdown or leaks.

6.2.8 Hazardous material storage

- All hazardous materials, including fuel, oils will be stored in suitable containers with appropriate bunding where required.
- Mortar silos will be located in designated areas and securely bunded to prevent surface water run-off.

6.2.9 Spillage control

- A supply of surface water protection and silt management equipment, such as spill kits, will be maintained on site for rapid deployment in the event of an emergency.
- Maintain sufficient bungs on site to install in discharge pipework and prevent discharges from surface water detention basins in the event of an emergency. Bungs should only be installed when safe to do so.

6.3 Physical control measures

To supplement the procedural and management controls listed in Section 6.2, where required, the following physical control measures listed below shall be implemented.

Figures 2 and **3** visually depict the indicative locations of large-scale long-term physical silt pollution controls.

Where necessary, Shorter duration temporary physical controls should be implemented as required during the construction process and their locations recorded on a site plan held within the site office for reference by the site management team and visitors.

6.3.1 Passive control measures

6.3.1.1 Silt fencing

- To be installed along site boundaries with identified sensitive receptors.
- Supplementary silt fencing to be installed along boundaries in the event that development activities alter surface water run-off flow directions.

6.3.1.2 Cut-off trenches

- Will be installed in front of silt fencing along boundaries with identified sensitive receptors.
- Cut-off trenches will direct intercepted run-off towards surface water detention basins for collection and subsequent settlement and discharge.
- Where required, suitable treatment measures, such as aggregate check dams or silt/flocculant matting will be placed at regular intervals, within the base of the cut-off trenches to provide additional sediment capture capacity prior to run-off entering surface water detention basins.
- If considered appropriate, cut-off trenches will be seeded or turfed to encourage vegetation growth or have a suitable installed to prevent erosion via flowing water.

6.3.1.3 Silt curtains/basin compartmentalisation

- Install silt curtains or other form of basin compartmentalisation across surface water detention basins at the point of basin construction.

6.3.1.4 Headwall protection

- Install suitable headwall protection measures within the surface water detention basins and OF1 and OF2 discharge headwalls.
- Retain headwall protection measures until the risk of contamination from construction related activities has ceased.

6.3.1.5 *Gully protection*

- Install suitable gully protection measures in all road gullies connected to active construction areas and within on-site road gullies along roads utilised by site plant at the earliest opportunity after gully construction.

6.3.1.6 *Road ramps*

- Where appropriate, install road ramps, or other suitable barrier feature, to direct surface water run-off from site roads into site road gullies.

6.3.1.7 *Off-site drainage features*

- Installation of a suitable substrate to prevent erosion via flowing water and prevent slippage of the banks of the channel and bund directing water discharged from the OF2 discharge point to the Afon Clun.
- Undertake seeding or turfing of off-site drainage features at the earliest practicable opportunity following construction (season dependant).

6.3.2 Active treatment systems

Due to the potential for high volumes of water containing suspended solids to be generated during heavy rainfall events, active treatment measures will be deployed to remove suspended sediment prior to discharge.

Where required, the active treatment measures will include either:

- In-line pipe reactors containing gel-flocculant; or
- Liquid flocculant, coagulant and pH balancer pump and treat system.

Indicative locations of active treatment measures are presented on **Figures 2** & **3**.

6.3.2.1 *In-line pipe reactor system*

The in-line pipe reactor system will be utilised to either encourage sediment settlement within surface water detention basins by being utilised as a water recirculation system or as a pump and discharge treatment system discharging water via the designated outfall locations.

Gel-flocculant will be placed within the in-line pipe reactor in volumes specified by the manufacturer and water passed through the in-line pipe reactor via a pump and either recirculated into the surface water detention basin for settlement and discharge or into a settlement tank; or series of settlement tanks, supported by additional passive treatment measures (if required) for discharge.

The in-line pipe reactor will utilise a range of gel-flocculants, namely WaterLynx™ 360, 394, 395, 398, and 494. Material Safety Data Sheets (MSDS) for these flocculants are presented in **Appendix C**. Further details on the use of flocculants are provided in Section 6.3.3 of this report.

Depending on site conditions, the pumps supporting in-line pipe reactor system will operate on a float switch or manually.

6.3.2.2 *Liquid flocculant, coagulant and pH balancer pump and treat system*

The active pump and treat system utilising liquid flocculant, coagulant and pH balancer shall comprise of a pump passing water through a chemical pre-treatment system, which will dose incoming water with a flocculant, coagulant, and a pH balancer (if required). The dosing rate will be determined by the supplier prior to the commencement of treatment activities.

The dosed water will then distribute into a settlement tank; or multiple tanks depending on discharge volumes, which will remove the particles from suspension by gravity and capture them within the individual settlement tank units.

The treated water will then be discharged from the treatment system and transferred via dedicated pipework to the designated discharge point(s).

The active pump and treat system will utilise Poly Aluminium Chloride (PAC) as a coagulant and the anionic polymer AQ2084 (otherwise known as Aquatreat 2084) as the flocculant. If required, a pH balancer (sodium hydroxide) will be included into the treatment process to ensure that pH levels of water discharged from the treatment system do not fall below 6. Copies of the MSDS for these components are presented in **Appendix D**.

Depending on site conditions, the pumps supporting in-line pipe reactor system will operate on a float switch or manually.

Further details on the use of the flocculant, coagulant and pH balancer are provided in Section 6.3.4 of this report.

6.3.2.3 *Maintenance of active treatment systems*

Active treatment systems (including supporting pumps and pipework) will be monitored and maintained in accordance with the manufacturer's recommendations.

When operational, the active treatment systems will be visually inspected on a regular basis by the site management team or other appointed person.

Additional monitoring will be undertaken as required during periods of higher use, such as during periods of heavy rainfall.

Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

6.3.3 Use of flocculants, coagulants, and pH balancer

Where employed, all flocculants, coagulants, and pH balancers present on the site will be deployed and utilised in accordance with the manufacturer's instructions.

Prior to their usage at the site, a settlement test / dosing trial will be conducted to confirm the appropriate dosing rates.

In the case of the liquid flocculant pump and treat system, the dosing trial will also confirm whether the additional of a pH balancer to the treatment system is required.

Given the constantly evolving nature of site activities, should any alteration in the effectiveness of the active treatment systems be identified during monitoring. The suppliers will be notified and a new settlement test / dosing trial will be complete to confirm whether any amendments are required to the dosing rates.

6.3.3.1 Use of flocculants in passive physical treatment measures

To supplement the active treatment measures, WaterLynx™ based flocculants will be deployed as necessary in passive treatment measures across the development site.

Positioning of flocculant containing passive treatment measures will be informed by manufacturer's recommendations and deployment locations will include:

- Surface water drainage chambers immediately up-gradient of headwalls into surface water detention basins.
- Flocculant matting within cut-off trenches
- Laced silt curtains within surface water detention basins.

Deployment locations for measures containing flocculants, coagulants and pH balancers shall be recorded on a site plan held within the site office for reference by the site management team and visitors.

6.3.4 Installation of physical control measures

Physical control measures will be installed in a phased approached determined by activities being undertaken across the site and the associated levels of risk posed to identified sensitive receptors.

In areas of little to no active construction activity a baseline level commensurate with the associated risk will be installed. Remaining physical control measures will be installed as prior to commencement of higher risk activities.

6.3.5 Maintenance of physical control measures

Physical control measures should be maintained in their position throughout the construction period.

Condition and efficacy of physical control measures will be monitored and those measures, such as silt fencing and curtains, shall be replaced as required to ensure continued efficiency.

6.3.6 Removal of physical control measures

Physical control measures will be removed in a phased approach determined by the residual risk posed to sensitive receptors.

In areas of the site where development activities have largely ceased, physical control measures will be reduced commensurate with the lower risk.

Complete removal of physical control measures will only be completed when the risks posed to sensitive receptors from construction related activities is negligible.

7 SURFACE WATER DISCHARGE MONITORING AND RECORDING

7.1 Surface water monitoring

The following monitoring procedures shall be carried out on a regular basis by the site management team to enable continuous review of site management practices.

A comprehensive record of the effectiveness of the system should then be maintained to enable further review by any parties attending site.

Any emissions to surface water identified will result in the implementation of the protocols detailed herein. Any complaints in relation to surface water emissions will be fully investigated as detailed in the following sections. The resultant actions will be recorded in site records.

7.1.1 Meteorological conditions

Meteorological forecasts and weather conditions (including precipitation) with be monitored to enable high rainfall events which could result in elevated site water levels to be predicated and appropriate additional management measure implemented.

7.1.2 Regular inspection and monitoring

Due to the nature of the development, visual monitoring techniques will principally be used within the boundary of the site. These will be supported by the collection of water samples from the designated surface water monitoring points as identified on **Figures 2** & **3**.

Regular inspections of surface water discharge quality as well as the overall condition of the wider site will be undertaken as part of general site walkovers completed by the site management team and site operatives and to complete their daily tasks.

When operational, the active treatment systems will be visually inspected on a daily basis by the site management team or other appointed person. Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

Additional monitoring beyond the site boundary will be completed in response to the identification of potential emissions to surface water from the site or receipt of complaints. All monitoring will be carried out in cognisance of the prevailing weather conditions and site activities.

In addition to this, weekly routine inspections of the site to monitor and record surface water run-off quality and other environmental issues with be undertaken by the site management team or other appointed person. Records of these inspections will be kept for the duration of the project for reference.

Taylor Wimpey's safety, health, and environment team, will also undertake monthly inspections which will include the condition of internal roads, adjacent public highways and any immediate surface water receptors.

Regular inspection of implemented surface water management measures, including passive and active treatment measures, will also be undertaken, either by Taylor Wimpey or a nominated third party.

Inspection frequencies will be increased as required in response to prevailing meteorological conditions.

7.2 Water sample collection and testing

To support the regular inspection and monitoring of surface water discharges from the site, spot samples of discharged water will be collected for analysis to confirm it adhere to permitted limits.

Water will be collected from the designated monitoring points, namely:

- OF1 – Located at NGR ST 04733 82102; or
- OF2 – Located at NGR ST 05089 82109.

Samples collected for laboratory analysis will be tested for the following determinands and limits:

Parameter	Limit (Including Unit)	Compliance Statistic
Total suspended solids	50 mg/l	Maximum
Total aluminium as Al	1,000 µg/l	Maximum
pH	6 to 9	Minimum and maximum

In addition to the above, visual inspection for oil and/or grease will be completed.

Water samples will be collected on a weekly basis (as a minimum) initially, with sampling frequencies increased accordingly during periods of higher rainfall. If there is no water being discharged at time of sampling this will be recorded in inspection records.

If required to provide on site, short notice results to confirm a potential surface water emission to assist decision making on treatment and discharge options, supplementary monitoring will be undertaken. This will comprise of recording turbidity (NTU) of discharged water using a suitable monitoring device, such as a portable turbidity meter. Turbidity is measured in nephelometric turbidity units (NTU), this relates to the transparency or clarity of the water. This test can be conducted in a few minutes in the field using meters and converted to a corresponding TSS value. However, an NTU/TSS calibration curve would first need to be established.

Additionally, a portable pH meter can be used to provide an on-site indication of the pH level of water being discharged from the site.

7.3 Site records

The following significant events at the site will be recorded:

- Maintenance.
- Breakdowns.
- Emergencies.
- Site inspections.
- Despatch of records to Natural Resources Wales (NRW).
- Severe weather conditions.
- Complaints received.
- Visitors to the site.

The site management team or nominated person(s) will maintain a record of all the above information in the site log or on inspection forms, as appropriate.

Records relating to significant events will be kept for up to 6 years, or where involving off site environmental effects or pollution of land or water until permit surrender.

All records and copies of inspection forms will be kept at the facility at all times and will be available for inspection at all reasonable times by any authorised officer of the NRW.

The facility records shall be kept as a combination of the following:

- Hand generated log.
- Computer generated hard copies.
- Computer permanent storage media (such as USB and portable hard drives).
- Off-site cloud storage systems.

To ensure the security of the records, they will be house in either locked containers or kept in offices that shall be locked when not attended.

8 COMPLAINTS HANDLING

8.1 Complaints process

Any complaints received at the site or via the regulatory bodies (including Natural Resources Wales and Local Authority), will be recorded and instigated via a combination of visual inspection at the location of the complaint and collection of water samples for analysis to determine the source of the pollution to be identified.

Where possible, as much information and detail about the complaint will be recorded, whether this be from the relevant authority or complaint direct to the site. This information will assist in the investigation and determining the source of the surface water pollution.

8.2 Means of contact

The site will be readily contactable to outside organisations and to members of the public. The site signage board (placed in a visible location) will contain the necessary details for both the site operations and NRW, including contact details.

Contact details will also be made available through the local community liaison groups.

As part of the site operation and development, community engagement will be developed as required, the purpose of which would be to identify all sensitive receptors and formulate a communications process. The community engagement will consider complaints management and reporting procedures, this will include, but will not be limited to:

- Information provided to the local neighbours (via NRW) regarding the point and method of contact for the site in the event surface water pollution has been detected or they want to discuss any activities etc at the site;
- Advice provided to the neighbours that any complaints / concerns will be addressed immediately following identification / notification and contingency action implemented; and
- The neighbours will be informed of any corrective action and a follow up call will be carried out if necessary.

Any complaints received directly to the site will be notified to the regulator as soon as possible. Therefore, should an off-site issue arise, the complainant has a means of contacting the operator.

8.3 Complaint recording

Should a complaint be received, the following information will be gathered and recorded:

- Complaint details (including the address of the complainant where possible) and the location where surface water pollution is perceived;
- Weather conditions including rainfall levels;
- Results of the latest round of monitoring carried out by site personnel;
- Operational status of the site (noting any abnormal conditions that may have caused the complaint); and
- Details of the proposed corrective action if required.

A subsequent follow up to the complainant detailing whether the corrective action, if required, was successful. If not, a new strategy will be implemented until the issue is resolved.

Records of complaints received will be kept for inspection and review by both internal and external personnel.

8.4 Complaint screening

As part of each complaint received, these will be objectively assessed against the wider environment to ensure that the source of the emission is traced back to the correct source.

It is essential that the source is correctly identified in order that mitigating measures can be applied effectively and correctly. The complaint will also be assessed against previous records to place the nature of the complaint into context.

8.5 Complaint investigation

In the event that surface water discharges from the site are found to be causing a problem, as determined, and confirmed by investigation into off site complaints or during routine monitoring, measures will be taken to determine the source, and the following actions shall be taken:

- Additional monitoring as detailed above will be undertaken to identify the extent and potential cause of the event i.e., damage to perimeter protection measures or fault in treatment system;
- Examination of the operational activities at the site at the time of the complaint or event identification;
- Examination of the meteorological conditions at the time of the complaint or event identification;
- Examination of the process conditions via the plant operational records / telemetry (where recorded);
- A review of the operational procedure and process controls and the instigation of any control measures immediately following identification of the problem; and
- Further olfactory monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

It is the operator's experience that complaints submitted to regulatory authorities can be made long after the actual surface water pollution event or delayed in their relay to the permit holder for actioning thereby making some investigations difficult due to the often-transient nature of surface water pollution or changing meteorological conditions. All complaints will be investigated however, direct calls to site from complainants will allow for an immediate response and review.

9 ACTIONS, CONTINGENCIES & RESPONSIBLITIES DURING PROBLEM EVENTS

9.1 Default procedures

In the event that surface water pollution is identified during the normal course of operations, either through routine monitoring, or in response to off-site complaints, the default procedure will be to investigate the emission in line with Section 8.5, which is an appropriate response to both off site complaints as well as on site investigations following on from routine inspections.

It is the responsibility of the site management team (site manager and associated technical staff) to ensure that the procedures set out in the SDMP are implemented.

9.2 Emergency procedure

9.2.1 Surface water emission emergency procedure

Additional monitoring for surface water emissions will be undertaken during times when the site is staffed in which surface water pollution is experienced.

Supplementary surface water protection measures, treatment capacity or off-site removal of surface water should be deployed as necessary to provide additional surface water treatment/management capacity.

If required, advise should also be sought from specialist environmental advisors.

9.2.2 Spillage emergency procedure

In the event of a major liquid spillage/leak the following actions will be taken, where appropriate:

- Report the occurrence to the site management team immediately;
- Trained facility operatives to take immediate action to try and contain the spillage/leak where it is safe to do so;
- If it is safe to do so, the cause of the spill or leak will be isolated and/or moved to a bunded area;
- Inert material such as clay or sandbags are to be used to make a temporary containment bund to prevent pollution of any water or land;
- Drainage covers will be installed over any road gullies to prevent ingress into the site's drainage system.
- Access to the immediate area will be restricted until a disposal/clean up solution is implemented;

- If the spillage cannot be contained using approved methods, senior management will be contacted immediately, and specialist advice and help will be sought;
- If a vehicle is identified as leaking, wherever practicable, it is to be stored on an impermeable pavement within a bunded area, where the spillage can be contained until such a time as the vehicle is repaired.

9.3 Event reporting

In the event of any significant environmental emergency/incident, a representative of Taylor Wimpey (South Wales) will notify NRW by telephone at the earliest practicable opportunity, but first having due regard for the incident at hand and any remediation actions required to ensure the safety of site personnel and the immediate environment.

Details of any environmental incident will be confirmed to NRW in writing at the earliest opportunity after identification of the incident. This confirmation will include the time and duration of the incident, the receiving environmental medium or media where there have been any emissions as a result of the incident, an initial estimate of the quantity and composition of any emission, the measures taken to prevent or minimise any further emission and a preliminary assessment of the cause of the incident.

Any incident notified to NRW will be investigated, and a report of the investigation sent to NRW. The report will detail, as a minimum, the circumstances of the incident, an assessment of any harm to the environment and the steps taken to bring the incident to an end. The report will also set out proposals for remediation (if appropriate) and for preventing a repetition of the incident.

9.4 Problem resolution

Once the identified problem has been resolved, a report will be prepared assessing the nature of the incident, the actions taken to resolve the issue, and what changes could be made to the operational practises that would ensure, wherever possible, that the issues had less of a chance of arising again in the future.

The SDMP will also be reviewed in the event that management practices require updating.

This information will be provided to NRW in accordance with the event report procedures discussed in Section 9.3 of this report. Any improvements or amendments to operational practices will be discussed with the NRW prior to their implementation.

10 REPORT CLOSURE

This document will be subject to on-going review and revision where necessary.

This review will be undertaken in response to events which may occur on site, and also to ensure that it accords with the latest regulations, construction phase and associated guidance documents.

The review of the SDMP for the site will occur at least once per annum.

All revisions to the document will be recorded and details of said revisions will be described as part of the required record relating to document review.

FIGURES

303000 304000 305000 306000 307000

183000 182000 181000 180000

Ysgol Gynradd Coed-yr-Esgob/Coed-yr-Esgob Primary School
Heol Las
B4595
Llantrisant
Llantrisant Road
A473
Talbot Road
Cross Inn Road
Cardiff Road
Talbot Green Retail Park
Ysgol Gynradd Penygawsi/Penygawsi Primary School
Cross Inn
Rhiwsaeson Road
Rhiwsaeson
Talbot Green
Glamorgan Vale Retail Park
Afon Clun
Coedcae Lane Industrial Estate
Lanelay Road Industrial Estate
Cowbridge Road
Ysgol Gyfun y Pant/Y Pant Comprehensive School
Cefn-y-Parc Cemetery
Beeches Industrial Estate
Afon Elái
Nant Melyn
Ynysddu
A4119
Ysgol Gynradd Gymunedol Gymraeg Llantrisant
Mwyndy
Tyla Garw
Pontyclun
Heol-Miskin
B4264
School Road
Ysgol Gynradd Pontyclun/Pontyclun Primary School
Groes-faen
Groesfaen
Brynsadler
Miskin
Afon Elái
M4
Talygarn
Glyn Park
Henllys Road
Fredericks Sport and Leisure Club
Peterston Road

Legend:
Site Boundary

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drn	Chk	App
00	03/02/2023	First Draft	DR	MK	MK

315257 - Environmental Permit Application: Cefn Yr Hendy, Miskin, Taylor Wimpey South Wales

RSK GEOSCIENCES

TITLE:
Figure 1:
Site Location Plan

0 200 400
Metres
SCALE: 1:15,000 @ A3

N W E S

REV 00

Document Path: C:\Users\droberts\Desktop\Workings\315257 - Cefn Yr Hendy\01 - GIS\11 - ArcPro\Figure 1 - Site Location Plan.aprx

304400 304600 304800 305000

182200 182000 181800

Indicative Entry Point of Water from OF1 into Afon Clun NGR: ST 04577 82295

Afon Clun

Indicative Route of Pre-Existing Vegetated Ditch to Afon Clun

OF1 Discharge Point a nd Monitoring Location (NGR ST 04733 82102)

Indicative Pump Route of Surface Water Active Treatment Systems (Post-Treatment)

Indicative Route of Surface Water Transfer Pumping Route

Indicative Locations from Which Site Run-Off will be Abstracted for Transfer.

Indicative Locations from which site run-off will be abstracted for active treatment

Indicative Location of Active Pump & Treat Sediment Treatment Systems

Recommended Location for Surface Water Monitoring Point (MP)

Indicative Pump Route of Surface Water Active Treatment Systems (Pre-Treatment)

Indicative Location of Headwall Protection Measures within Surface Water Detention Basins

Surface Water Detention Basin

Indicative Location of Silt Curtain within Surface Water Detention Basins

Indicative Flow Direction of Surface Water Cut-Off Trenches

Indicative Route of Silt Fencing

Indicative Route of Supplementary Silt Fencing – If Required

LAP NEAP

Legend:

- Site Boundary
- Watercourses
- Indicative Entry Point of Water from OF1 into Afon Clun NGR: ST 04577 82295
- Indicative Locations of Surface Water Discharge Point.
- Indicative Locations from Which Site Run-Off will be Abstracted for Transfer.
- Indicative Locations from which site run-off will be abstracted for active treatment
- Indicative Location of Headwall Protection Measures within Surface Water Detention Basins
- Recommended Location for Surface Water Monitoring Point (MP)
- Indicative Flow Direction of Surface Water Cut-Off Trenches
- Indicative Pump Route of Surface Water Active Treatment Systems (Post-Treatment)
- Indicative Pump Route of Surface Water Active Treatment Systems (Pre-Treatment)
- Indicative Route of Pre-Existing Vegetated Ditch to Afon Clun
- Indicative Surface Water Run-Off Flow Direction
- Indicative Route of Surface Water Transfer Pumping Route
- Indicative Route of Silt Fencing
- Indicative Route of Supplementary Silt Fencing – If Required
- Indicative Location of Silt Curtain within Surface Water Detention Basins
- Indicative Location of Active Pump & Treat Sediment Treatment Systems
- Discharge Catchment Area Not Subject to this Application
- Surface water attenuation basins

Rev	Date	Description	Drn	Chk	App
01	09/06/2023	Clarification of OF1 Overland Flow Arrangements	DR	MK	MK
00	30/05/2023	First Draft	DR	MK	MK

315257 - Environmental Permit Application: Cefn Yr Hendy, Miskin, Taylor Wimpey South Wales

RSK GEOSCIENCES

TITLE: Figure 2: Indicative Surface Water Management and Discharge Arrangements (Western Development Area)

0 20 40
Metres

SCALE: 1:2,250 @ A3

N W E S

REV 01

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Document Path: C:\Users\droberts\Desktop\Workings\315257 - Cefn Hendy\01 - GIS\Figure 2 - Indicative Surface Water Management and Discharge Arrangements (Western Development Area).mxd

304800 305000 305200

182200

182000

Afon Clun

Indicative Surface Water Run-OFF Flow Direction

Indicative Entry Point of Water from OF2 into Afon Clun NGR: ST 04875 82352

Indicative Route of Channel Directing Flows from OF2 Discharge Point Towards the Afon Clun

Indicative Pump Route of Surface Water Active Treatment Systems (Post-Treatment)

Indicative Pump Route of Surface Water Active Treatment Systems (Pre-Treatment)

Indicative Location of Active Pump & Treat Sediment Treatment Systems

Indicative Route of Silt Fencing

Indicative Route of Surface Water Transfer Pumping Route

Indicative Locations from which site run-off will be abstracted for active treatment

OF2 Discharge Point and Monitoring Location (NGR ST 05089 82109)

Indicative Flow Direction of Surface Water Cut-Off Trenches

Indicative Location of Headwall Protection Measures within Surface Water Detention Basins

Surface Water Detention Basin

Indicative Location of Silt Curtain within Surface Water Detention Basins

Indicative Route of Supplementary Silt Fencing – If Required

Discharge Catchment Area Not Subject to this Application

Inset image of indicative flow route and flow directions from OF2 channel towards Afon Clun

PS

NEAP

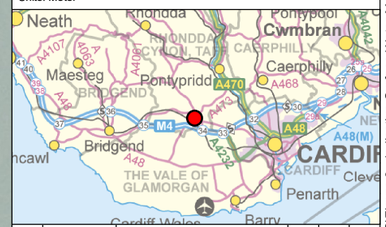
LAP

LEAP

Legend:

- Site Boundary
- Watercourses
- Indicative Point of Entry from Water from OF2 Channel into Afon Clun
- Indicative Locations of Surface Water Discharge Point.
- Indicative Locations from which site run-off will be abstracted for active treatment
- Indicative Location of Headwall Protection Measures within Surface Water Detention Basins
- Recommended Location for Surface Water Monitoring Point (MP)
- Indicative Flow Direction of Surface Water Cut-Off Trenches
- Indicative Pump Route of Surface Water Active Treatment Systems (Post-Treatment)
- Indicative Pump Route of Surface Water Active Treatment Systems (Pre-Treatment)
- Indicative Route of Channel Directing Flows from OF2 Discharge Point Towards the Afon Clun
- Indicative Surface Water Run-OFF Flow Direction
- Indicative Route of Surface Water Transfer Pumping Route
- Indicative Route of Silt Fencing
- Indicative Route of Supplementary Silt Fencing – If Required
- Indicative Location of Silt Curtain within Surface Water Detention Basins
- Indicative Location of Active Pump & Treat Sediment Treatment Systems
- Discharge Catchment Area Not Subject to this Application
- Surface water attenuation basins

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter



Rev	Date	Description	Drn	Chk	App
01	09/06/2023	Amendment to Run-off Point of Entry into the Afon Clun	DR	MK	MK
00	30/05/2023	First Draft	DR	MK	MK

315257 - Environmental Permit Application: Cefn Yr Hendy, Miskin, Taylor Wimpey South Wales

RSK GEOSCIENCES

TITLE: Figure 3: Indicative Surface Water Management and Discharge Arrangements (Eastern Development Area)

0 20 40
Metres
SCALE: 1:2,000 @ A3

N W E S

REV 01

Document Path: C:\Users\droberts\Desktop\Workings\315257 - Cefn Hendy\01 - GIS\Figure 3 - Indicative Surface Water Management and Discharge Arrangements (Eastern Development Area).mxd

APPENDIX A
CEFN YR HENDY GROUND INVESTIGATION REPORTS

PLEASE REFER TO SEPARATE APPENDIX A FOLDER

APPENDIX B
DRAINAGE LAYOUT

GENERAL NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDINGS AND SITE DIMENSIONS AND LEVELS, INCLUDING SEWER INVERT LEVELS, BEFORE WORKS START ON SITE. THE CONTRACTOR IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BUILDING LEGISLATION, BRITISH STANDARDS ETC.
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5. ALL LEVELS ARE IN TERMS OF THE OS DATUM.

NOTE

DRAINAGE SHOWN IS INDICATIVE AND SUBJECT TO DETAILED DESIGN AND SAB APPROVAL.

OUTFALL LOCATIONS AND RATES ARE TO BE CONFIRMED.

INVESTIGATIONS ARE ONGOING INTO THE SOUTHERN CATCHMENT OUTFALL AND THE FOUL DISCHARGE LOCATION.

DRAINAGE NOTES

1. DRAINAGE WILL BE DESIGNED IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 7th EDITION, BUILDING REGULATIONS AND THE CIRIA SUDS GUIDE.
2. ALL SURFACE WATER PIPES ARE SIZED AS SHOWN ON THE PLAN.
3. THE MATERIALS TO BE USED SHOULD BE SUITABLE FOR THE GROUND CONDITIONS.
4. NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED EASEMENTS.
5. ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SFA 7TH EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE TYPES.
6. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS8301 AND RELEVANT SECTIONS OF APPROVED DOCUMENT H OF THE BUILDING REGULATIONS
7. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE.
8. UN-USED SPURS TO BE CAPPED.
9. SAB APPROVAL WILL BE REQUIRED PRIOR TO CONSTRUCTION. THE DESIGN IS TO BE CONSTRUCTED STRICTLY IN ACCORDANCE WITH THE APPROVED PLANS.

KEY

- PROPOSED SURFACE WATER SEWER (SAB ADOPTABLE)
- PROPOSED FOUL SEWER (DCWW ADOPTABLE)
- EXISTING FOUL SEWER
- EXISTING SURFACE WATER SEWER
- EXISTING WATER MAIN AND EASEMENT
- RISING MAIN (DCWW ADOPTABLE)
- GEOGROW ROOTLOOK HEADWALL
- PROPOSED HEADWALL
- PRIVATE GULLY CONNECTION
- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WATER BREAK INLET (SAB ADOPTABLE)

ST DAVID'S HEIGHTS

SHADOW WOOD DRIVE

Revisions

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 1

Scale: 1:250 @ A0 Date: August 2022 Drawn by: JM

Drawing No: 10329 - 102 - 01 Rev: -

PHOENIX DESIGN Partnership Ltd.
Unit 9, Westway Garage, Marksbury, Bath, BA2 9HN tel. 01761 479950
Unit Three, Melin Cornwg Business Parc, Upper Boat, Pontypridd, CF37 5BE tel. 029 2049 0771
email. enquiries@phoenixdp.co.uk www.phoenixdp.co.uk

Drg.Status: PLANNING

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15m (L) x 750mm (W) x 150mm (D) CONCRETE WITH STONE PITCHING

NOTE
TRENCH AND ANCILLARY CONCRETE WORKS TO BE LAID AT CONSISTENT LEVEL OF 69.45m. EXISTING GROUND TO BE RE-PROFILED WHERE LEVELS EXCEED 69.45m ALONG THE NORTHERN FACE.

DETENTION BASIN 1 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE (1.8m DEPTH)
1:3 BATTER SLOPES (1.8m DEPTH) - 72.500
TOP OF BASIN LEVEL - 72.500
BASIN WATER LEVEL - 70.500
MAX ALLOWANCE OF 300mm FREE BOARD

GEOGROW ROOTLOK HEADWALL

KEY

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- PROPOSED HEADWALL
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- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WATER BREAK INLET (SAB ADOPTABLE)

Revisions

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 2

Scale: 1:250 @ A0
Date: August 2022
Drawn by: JM

Drawing No: 10329 - 102 - 02
Rev: -

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- WBI WATER BREAK INLET (SAB ADOPTABLE)

DETENTION BASIN 6 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE
1:3 BATTER SLOPES (1.8m TOTAL DEPTH)
TOP OF BASIN LEVEL 76.40
BASIN INVERT LEVEL = 75.40
MAX WATER LEVEL = 76.10
MIN ALLOWANCE OF 300mm FREE BOARD

15m (L) x 500mm (W) x 600mm (D) 30mm SINGLE SIZED CLEAN STONE.
3.5m (L) x 500mm (W) x 150mm (D) CONCRETE WITH STONE PITCHING.

Revisions

Project: Cefn yr Hendy
Pontyclun

Client:

Taylor Wimpey

Drawing: Drainage Layout
Sheet 3

Scale: 1:250 @ A0 | Date: August 2022 | Drawn by: JM

Drawing No: 10329 - 102 - 03 | Rev: -

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KEY

- PROPOSED SURFACE WATER SEWER (SAB ADOPTABLE)
- PROPOSED FOUL SEWER (DCWW ADOPTABLE)
- EXISTING FOUL SEWER
- EXISTING SURFACE WATER SEWER
- EXISTING WATER MAIN AND EASEMENT
- RISING MAIN (DCWW ADOPTABLE)
- GEOGROW ROOTLOOK HEADWALL
- PROPOSED HEADWALL
- PRIVATE GULLY CONNECTION
- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WATER BREAK INLET (SAB ADOPTABLE)

DETENTION BASIN 2 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE
1:3 BATTER SLOPES (1.8m TOTAL DEPTH)
TOP OF BASIN LEVEL 72.80
BASIN INVERT LEVEL – 71.00
MAX WATER LEVEL – 72.50
MIN ALLOWANCE OF 300mm FREE BOARD

Revisions

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 4

Scale: 1:250 @ A0 Date: August 2022 Drawn by: JM

Drawing No: 10329 - 102 - 04 Rev: -

PHOENIX DESIGN Partnership Ltd.
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email. enquiries@phoenixdp.co.uk www.phoenixdp.co.uk

Drg.Status: PLANNING

PUMPING STATION 1
ADOPTABLE TYPE 3 FOUL PUMPING STATION TO DWR CYMRU WELSH WATER SPECIFICATION.
STORAGE TO BE PROVIDED BELOW INCOMING PIPEWORK. FLOWS TO BE PUMPED TO PUMPING STATION 2
CL=69.025
INCOMING IL=TO BE CONFIRMED

PS

GEOGROW ROOTLOK HEADWALL

S20B–HB
CL–65.50m
IL–63.45m
DISCHARGE RATE 42.12l/s

DETENTION BASIN 3 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE
1:3 BATTER SLOPES (1.8m TOTAL DEPTH)
TOP OF BASIN LEVEL 65.300
BASIN INVERT LEVEL – 63.720
MAX WATER LEVEL – 63.220
MIN ALLOWANCE OF 300mm FREE BOARD

DETENTION BASIN 4 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE
1:3 BATTER SLOPES (1.8m TOTAL DEPTH)
TOP OF BASIN LEVEL 70.00
BASIN INVERT LEVEL – 68.20
MAX WATER LEVEL – 69.70
MIN ALLOWANCE OF 300mm FREE BOARD

Ty Cefn Parc

GENERAL NOTES

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5. ALL LEVELS ARE IN TERMS OF THE OS DATUM.

NOTE

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OUTFALL LOCATIONS AND RATES ARE TO BE CONFIRMED.

INVESTIGATIONS ARE ONGOING INTO THE SOUTHERN CATCHMENT OUTFALL AND THE FOUL DISCHARGE LOCATION.

DRAINAGE NOTES

1. DRAINAGE WILL BE DESIGNED IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 7th EDITION, BUILDING REGULATIONS AND THE CIRIA SUDS GUIDE.
2. ALL SURFACE WATER PIPES ARE SIZED AS SHOWN ON THE PLAN.
3. THE MATERIALS TO BE USED SHOULD BE SUITABLE FOR THE GROUND CONDITIONS.
4. NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED EASEMENTS.
5. ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SFA 7TH EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE TYPES.
6. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS8301 AND RELEVANT SECTIONS OF APPROVED DOCUMENT H OF THE BUILDING REGULATIONS
7. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE.
8. UN-USED SPURS TO BE CAPPED.
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- EXISTING SURFACE WATER SEWER
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- RISING MAIN (DCWW ADOPTABLE)
- GEOGROW ROOTLOOK HEADWALL
- PROPOSED HEADWALL
- PRIVATE GULLY CONNECTION
- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WATER BREAK INLET (SAB ADOPTABLE)

A 07.09.22 MINOR AMENDMENTS MADE.

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 5

Scale: 1:250 @ A0 | Date: August 2022 | Drawn by: JM

Drawing No: 10329 - 102 - 05 | Rev: A

PHOENIX DESIGN Partnership Ltd.
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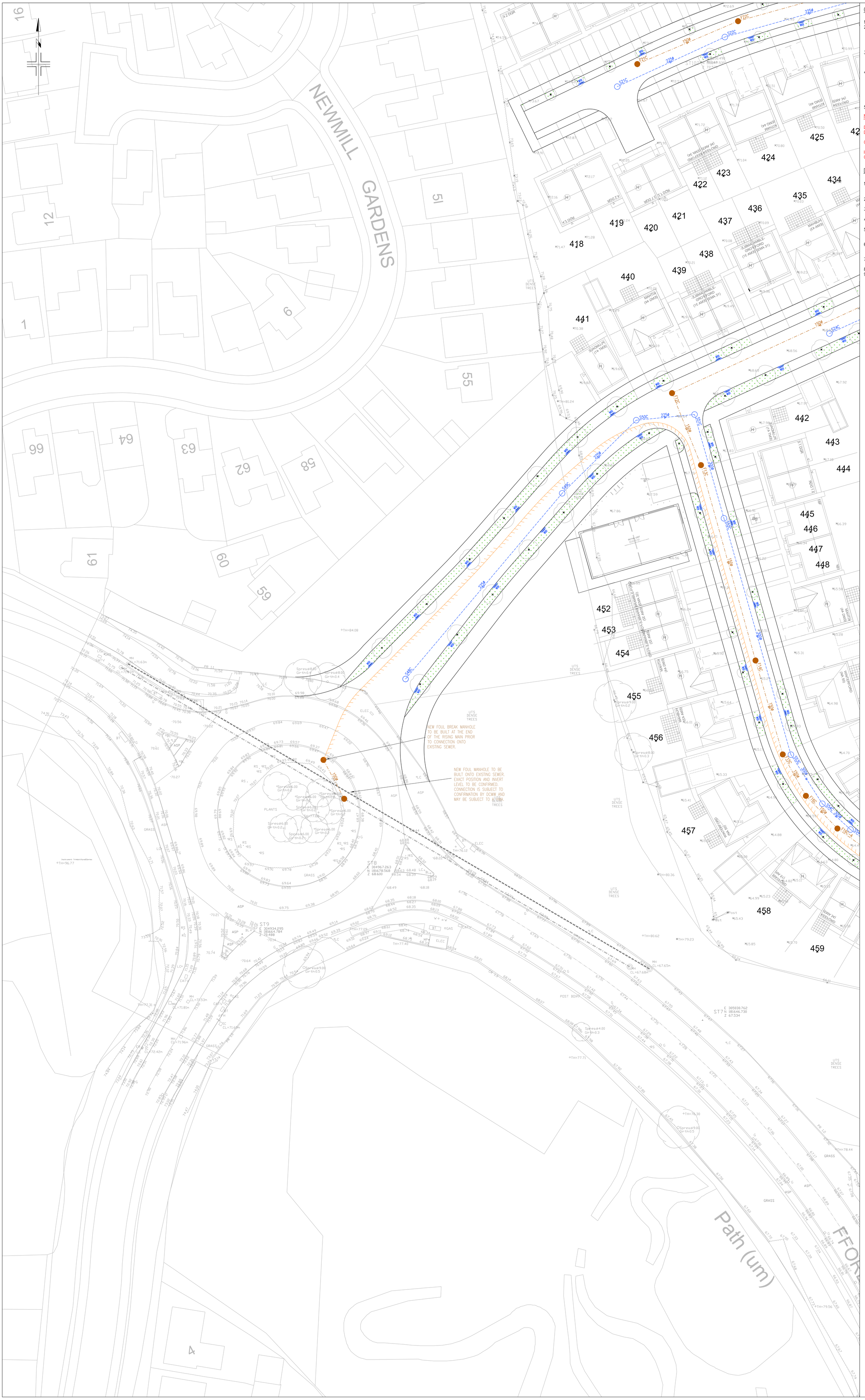
Drg.Status: PLANNING



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- PROPOSED HEADWALL
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- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WATER BREAK INLET (SAB ADOPTABLE)

Revisions

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 6

Scale: 1:250 @ A0

Date: August 2022

Drawn by: JM

Drawing No: 10329 - 102 - 06

Rev: -

PHOENIX DESIGN Partnership Ltd.
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email. enquiries@phoenixdp.co.uk www.phoenixdp.co.uk

Drg.Status: PLANNING

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- RAIN GARDEN / BIORETENTION (SAB ADOPTABLE)
- WSB WATER BREAK INLET (SAB ADOPTABLE)

Revisions

Project:	Cefn yr Hendy Pontyclun
Client:	Taylor Wimpey
Drawing:	Drainage Layout Sheet 7
Scale:	1:250 @ A0
Date:	August 2022
Drawn by:	JM
Drawing No:	10329 - 102 - 07
Rev:	-

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Drg.Status: PLANNING

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- WATER BREAK INLET (SAB ADOPTABLE)

PUMPING STATION 2
ADOPTABLE TYPE 3 FOUL PUMPING STATION TO DWR CYMRU WELSH WATER SPECIFICATION. STORAGE TO BE PROVIDED BELOW INCOMING PIPEWORK. FLOWS TO BE PUMPED TO EXISTING DCWW SEWER SYSTEM OFF SITE
CL=63.275
INCOMING IL=TO BE CONFIRMED

DETENTION BASIN 5 TO ACCOMMODATE 1:100 + 40 CLIMATE CHANGE
1:3 BATTER SLOPES (1.8m TOTAL DEPTH)
INVERT IN BASIN LEVEL 63.3
TOP OF BANK LEVEL 65.10
MAX WATER LEVEL = 63.50
MIN ALLOWANCE OF 300mm FREE BOARD

S145-HB DISCHARGE RATE TO BE CONFIRMED

GEOGROW ROOTLOK HEADWALL

Revisions

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Drainage Layout
Sheet 8

Scale: 1:250 @ A0 Date: August 2022 Drawn by: JM

Drawing No: 10329 - 102 - 08 Rev: -

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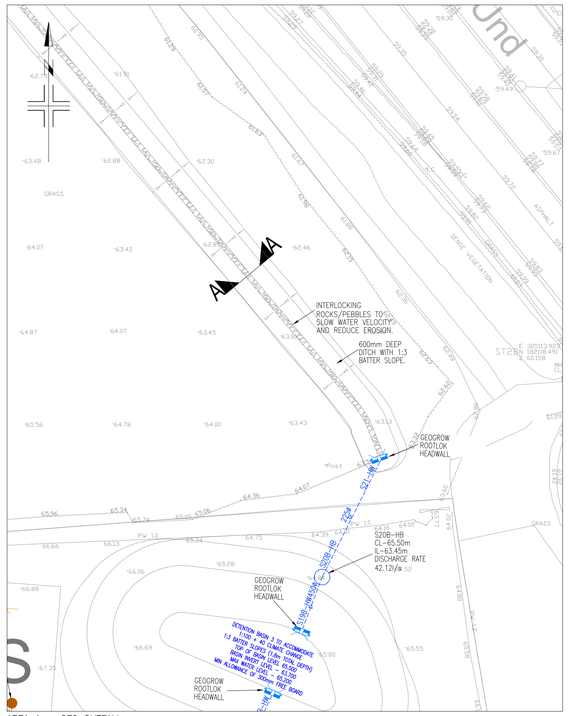
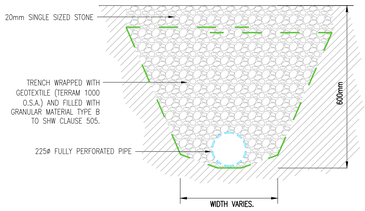
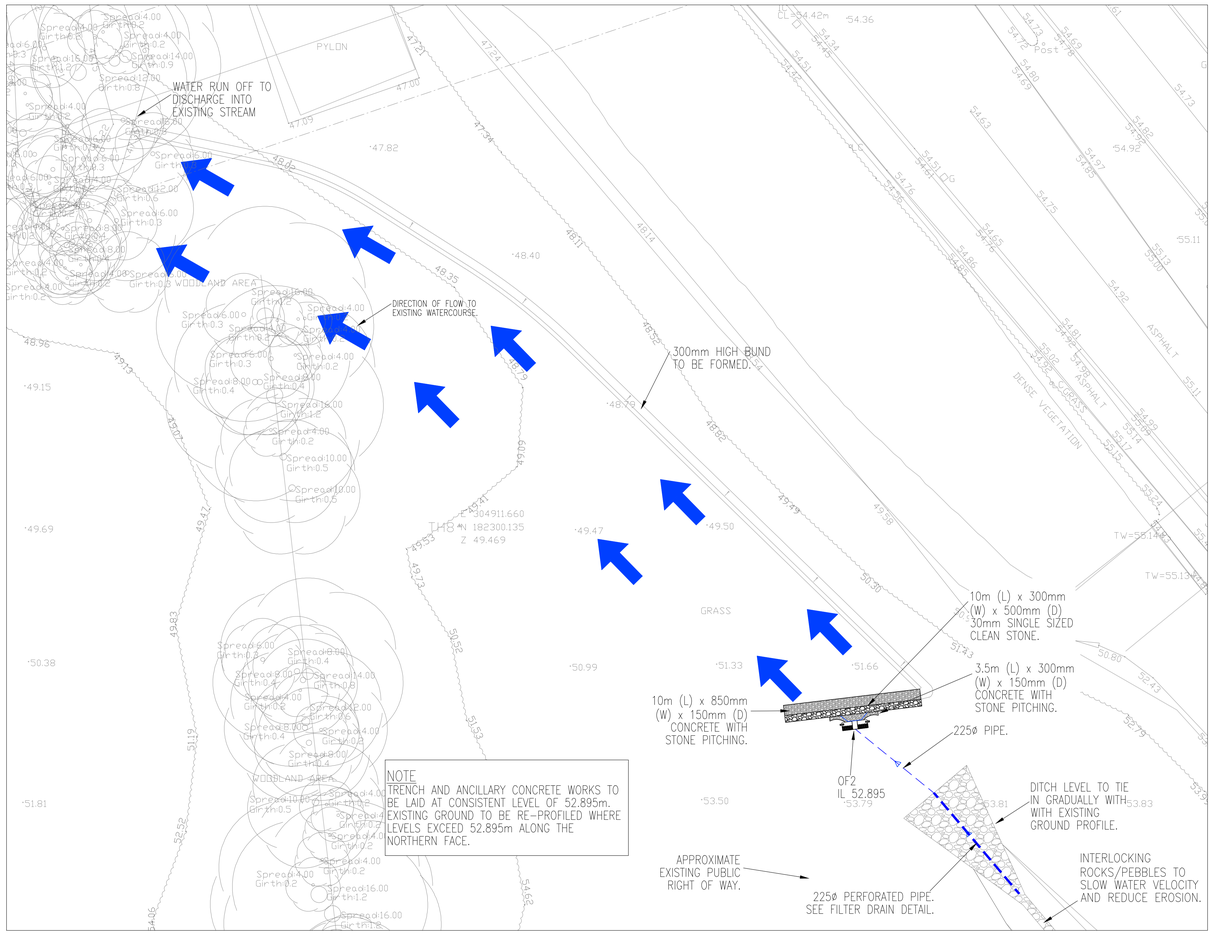
Drg.Status: PLANNING



AREA 1 – OF2 OUTFALL
1:250 @ A0



FILTER DRAIN DETAIL 225mmø PIPE



NOTE
TRENCH AND ANCILLARY CONCRETE WORKS TO BE LAID AT CONSISTENT LEVEL OF 52.895m. EXISTING GROUND TO BE RE-PROFILED WHERE LEVELS EXCEED 52.895m ALONG THE NORTHERN FACE.

AREA 2 – OF2 OUTFALL
1:250 @ A0

WATER QUALITY TREATMENT PLAN

POLLUTION HAZARD	POLLUTION HAZARD
RESIDENTIAL ROOFS AND DRIVEWAYS POLLUTION HAZARD – LOW TOTAL SUSPENDED SOLIDS – 0.5 METALS – 0.4 HYDRO-CARBONS – 0.4	MAIN ROADS POLLUTION HAZARD – MEDIUM TOTAL SUSPENDED SOLIDS – 0.7 METALS – 0.6 HYDRO-CARBONS – 0.7
TREATMENT TRAIN	TREATMENT TRAIN
PERMEABLE PAVEMENT TOTAL SUSPENDED SOLIDS – 0.7 METALS – 0.6 HYDRO-CARBONS – 0.7	BIORETENTION SYSTEM/RAINGARDENS TOTAL SUSPENDED SOLIDS – 0.8 METALS – 0.8 HYDRO-CARBONS – 0.8
DETENTION BASIN TOTAL SUSPENDED SOLIDS – 0.25 METALS – 0.25 HYDRO-CARBONS – 0.3	DETENTION BASIN TOTAL SUSPENDED SOLIDS – 0.25 METALS – 0.25 HYDRO-CARBONS – 0.3
SWALE TOTAL SUSPENDED SOLIDS – 0.25 METALS – 0.3 HYDRO-CARBONS – 0.3	SWALE TOTAL SUSPENDED SOLIDS – 0.25 METALS – 0.3 HYDRO-CARBONS – 0.3
TOTAL TREATMENT TOTAL SUSPENDED SOLIDS – 1.2 METALS – 1.15 HYDROCARBONS – 1.25	TOTAL TREATMENT TOTAL SUSPENDED SOLIDS – 1.3 METALS – 1.35 HYDROCARBONS – 1.35
TREATMENT ACCEPTABLE	TREATMENT ACCEPTABLE

OPERATION AND MAINTENANCE OF SWALE

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY
REGULAR MAINTENANCE	REMOVAL LITTER AND DEBRIS	QUARTERLY
	CUT GRASS – TO RETAIN GRASS HEIGHT WITHIN SPECIFIED DESIGN RANGE	MONTHLY (DURING GROWING SEASON), OR AS REQUIRED
	INSPECT INLETS, OUTLETS AND OVERFLOWS FOR BLOCKAGES AND CLEAR IF REQUIRED	MONTHLY
	INSPECT VEGETATION COVERAGE	HALF-YEARLY
OCCASIONAL MAINTENANCE	RESEED AREAS OF POOR VEGETATION GROWTH, ALTER ACCUMULATION, ESTABLISH APPROPRIATE SLIT REMOVAL FREQUENCIES	AS REQUIRED
REMEDIAL ACTIONS	REPAIR EROSION OR OTHER DAMAGE BY RE-TURFING OR RESEEDING	AS REQUIRED
	RE-LEVEL UNEVEN SURFACES AND REINSTATE DESIGN LEVELS	AS REQUIRED
	SCARIFY AND SPIKE TOPSOIL LAYER TO IMPROVE INFILTRATION PERFORMANCE, BREAK UP SILT DEPOSITS AND PREVENT COMPACTION OF THE SOIL SURFACE	AS REQUIRED
	REMOVE AND DISPOSE OF OILS OR PETROL RESIDUES USING SAFE STANDARD PRACTICES	AS REQUIRED

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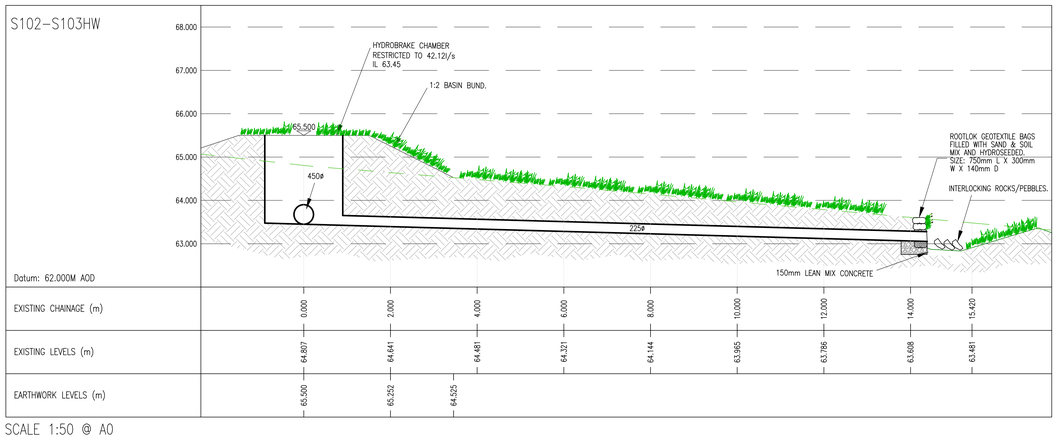
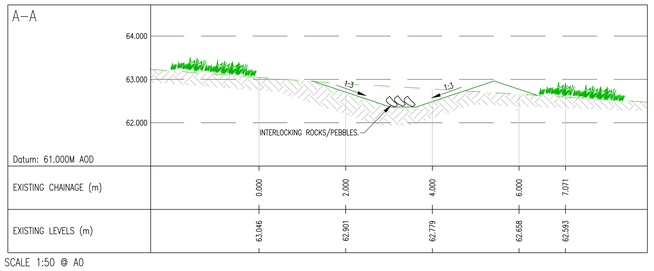


SCALE 1:50 @ A0



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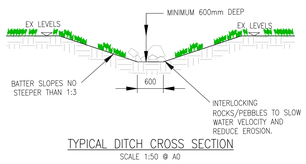
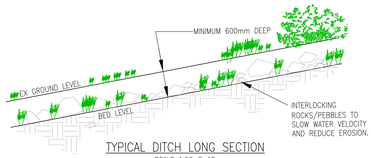
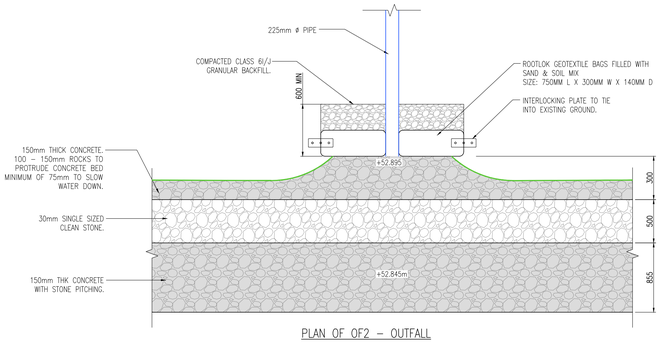


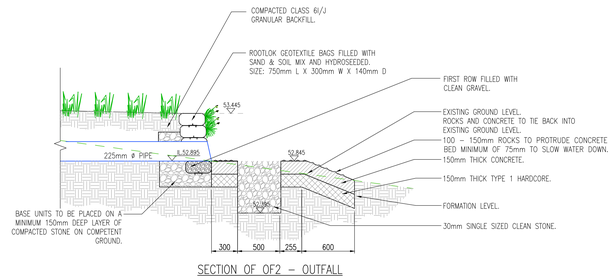
TYPICAL DITCH CROSS SECTION
SCALE 1:50 @ A0



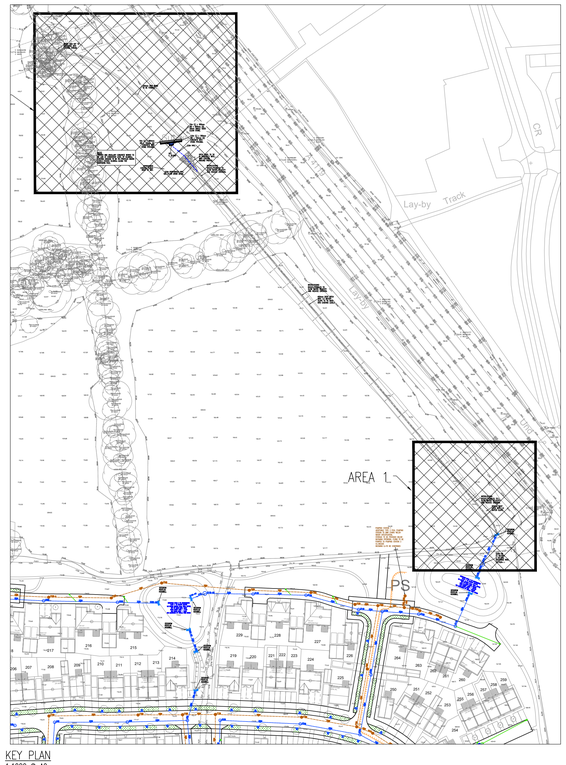
TYPICAL DITCH LONG SECTION
SCALE 1:50 @ A0



PLAN OF OF2 – OUTFALL



SECTION OF OF2 – OUTFALL



D	02.08.22	PLAN UPDATED TO SUIT LATEST LAYOUT
C	24.08.22	TREATMENT PLAN AND SCHEDULE ADDED.
B	22.08.22	MINOR AMENDMENTS MADE TO OUTFALL
A	27.05.22	PLAN UPDATED TO SUIT LATEST LAYOUT

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Outfall Details Sheet 2

Scale: 1:50, 1:250, 1:1000 @ A0 | Date: May 2022 | Drawn by: JM

Drawing No: 10329 - 115 - 02 | Rev: D

PHOENIX DESIGN Partnership Ltd.
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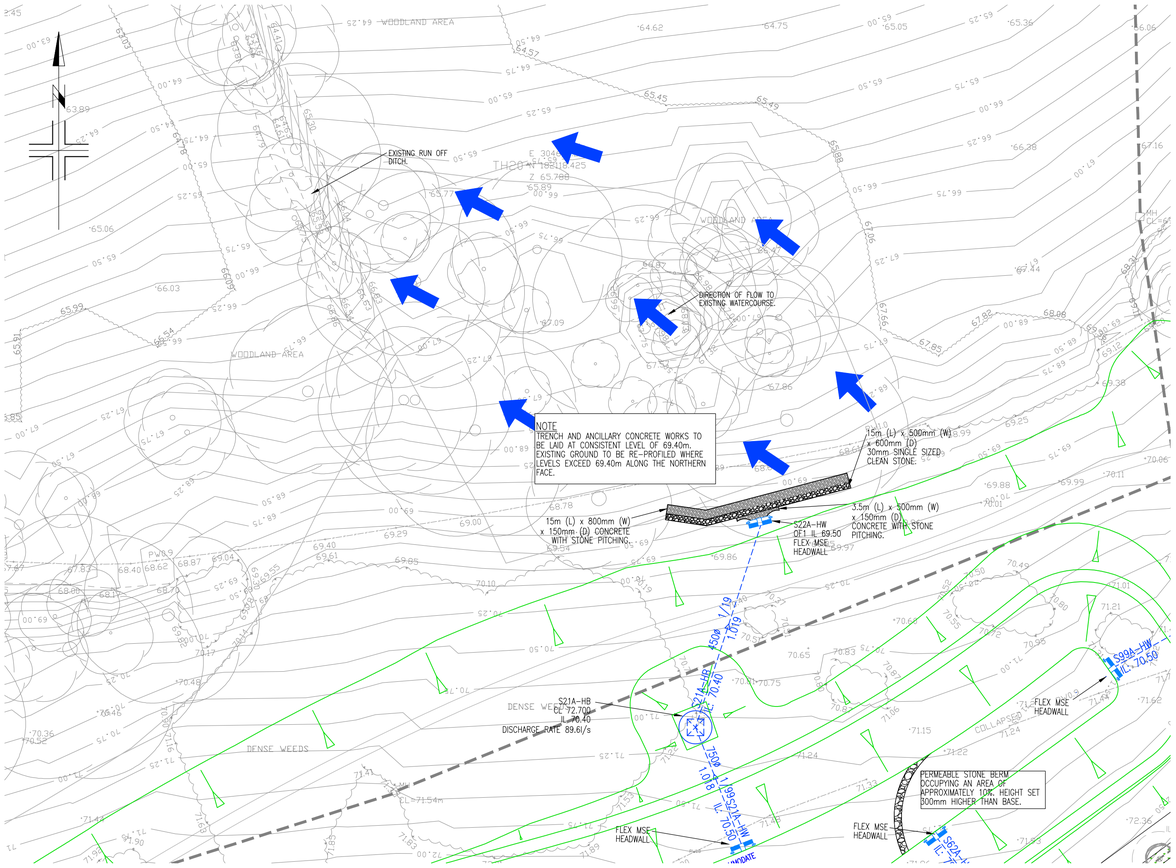
Unit Three, Melin Corneg Business Parc, Upper Boat, Pontypridd, CF37 5BE. tel. 029 2048 0771
email. enquiries@phoenixdp.co.uk www.phoenixdp.co.uk

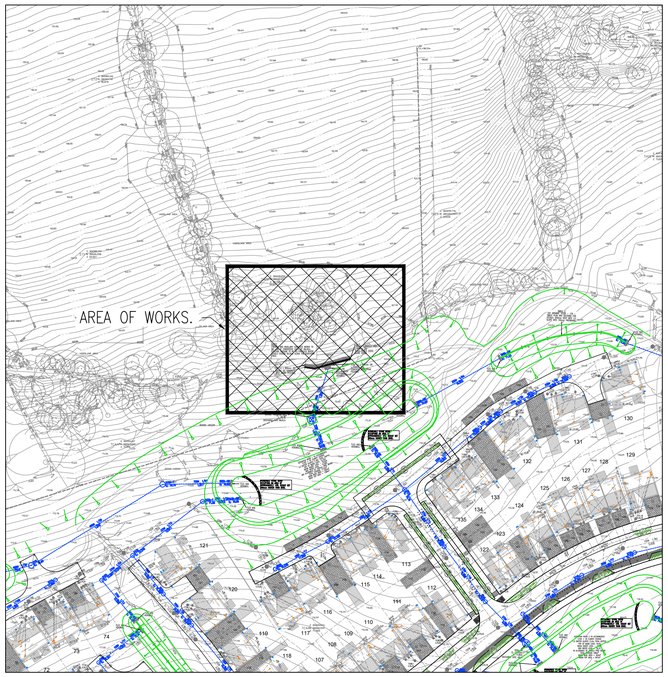
Drg Status: PRELIMINARY



PROPOSED OUTFALL OF1 LAYOUT

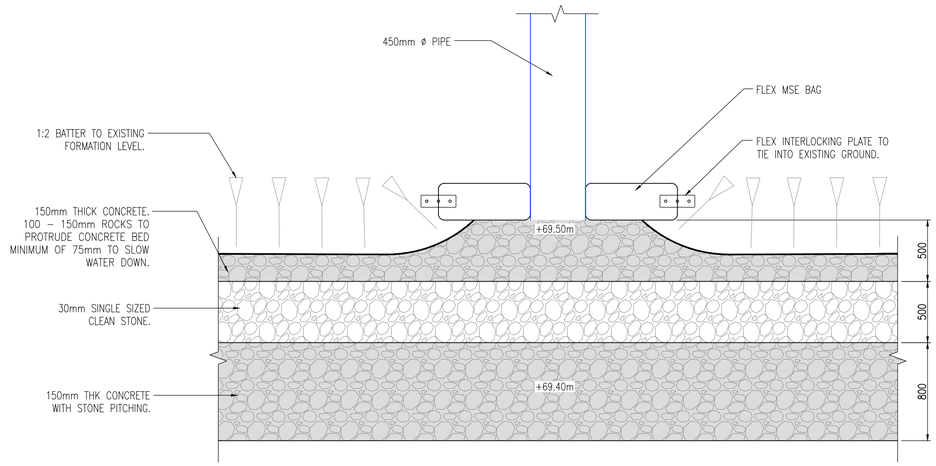
1:250 @ A1

SUBJECT TO DETAILED DESIGN.

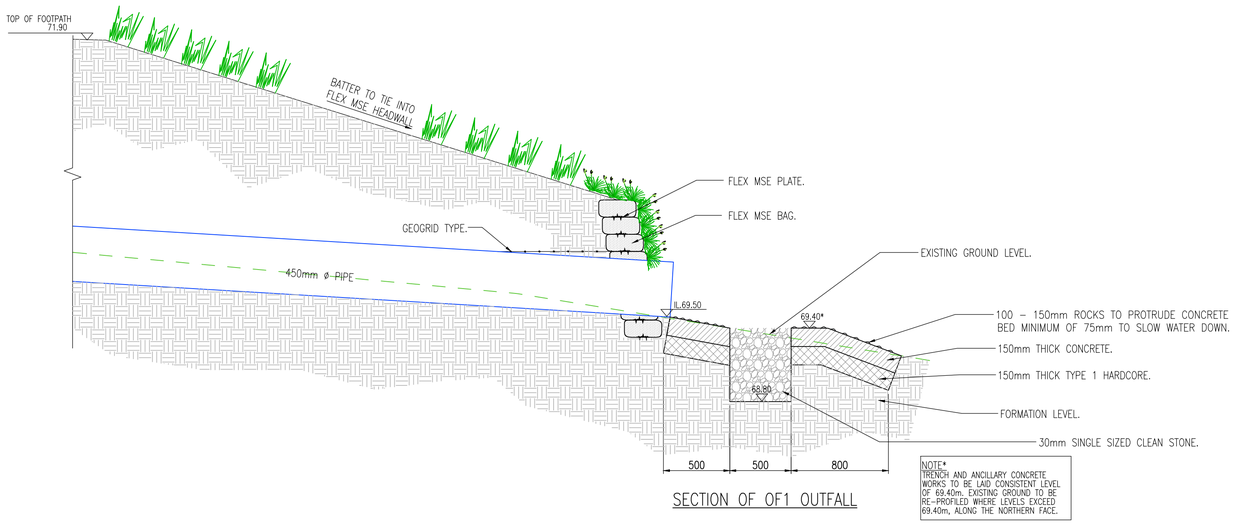


KEY PLAN

1:1250 @ A1



PLAN OF OF1 – OUTFALL



NOTE*
TRENCH AND ANCILLARY CONCRETE WORKS TO BE LAID CONSISTENT LEVEL OF 69.40m. EXISTING GROUND TO BE RE-PROFILED WHERE LEVELS EXCEED 69.40m, ALONG THE NORTHERN FACE.

SECTION OF OF1 OUTFALL

GENERAL NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDINGS AND SITE DIMENSIONS AND LEVELS, INCLUDING SEWER INVERT LEVELS, BEFORE WORKS START ON SITE. THE CONTRACTOR IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BUILDING LEGISLATION, BRITISH STANDARDS ETC.
3. POSITIONS OF EXISTING SERVICES/STATUTORY UNDERTAKERS APPARATUS ADJACENT TO OR CROSSING PROPOSED EXCAVATIONS ARE TO BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING WORK.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL OTHER DRAWINGS ENGINEERING DETAILS, SPECIFICATIONS AND ANY STRUCTURAL, GEOTECHNICAL OR OTHER SPECIALIST DOCUMENT PROVIDED. ANY ANOMALY OR CONTRADICTION BETWEEN ANY OF THE ABOVE IS TO BE REPORTED TO THE DEVELOPERS ENGINEER.
5. ALL LEVELS ARE IN TERMS OF THE OS DATUM.
6. HEADWALLS ARE TO BE CHECKED AND DESIGNED BY FLEX MSE PRIOR TO CONSTRUCTION.
7. FLEX MSE ARE TO BE INSTALLED AS PER MANUFACTURES SPECIFICATION.

E	19.04.23	LATEST LAYOUT ADDED TO DRAWING.
D	22.02.23	AMENDMENTS MADE TO SUIT LATEST LAYOUT.
C	16.02.23	AMENDMENTS MADE TO SUIT LATEST LAYOUT.
B	17.01.23	MINOR AMENDMENTS MADE TO PLAN AND SECTIONS
A	20.09.22	MINOR AMENDMENTS MADE TO PLAN

Project: Cefn yr Hendy
Pontyclun

Client: Taylor Wimpey

Drawing: Outfall Details
Sheet 1

Scale: 1:200, 1:25@A1 | Date: May 2022 | Drawn by: JM

Drawing No: 10329 - 115 - 01 | Rev: E

PHOENIX DESIGN Partnership Ltd.
Unit 9, Westway Garage, Marksbury, Bath, BA2 9HN tel. 01761 479950
Unit Three, Melin Corrwg Business Parc, Upper Boat, Pontypridd, CF37 5BE. tel. 029 2049 0771
email. enquiries@phoenixdp.co.uk www.phoenixdp.co.uk

Drg.Status: FOR APPROVAL

APPENDIX C
WATERLYNX™ FLOCCULANT MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEET

Gel Flocculant 360

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 360

CHEMICAL FAMILY: Polyacrylamide/polyacrylate polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire.

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO2, NOx)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Colour: Green to white or off-white

Odor: Slight vinegar odour.

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No Data Available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available.

pH: 7 (concentration dependent)

Viscosity: Not applicable.

Solubility (Water): Soluble in water but dissolves very slowly.

Partition Coeffecient (KOW): No Data Available.

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials.

10.2. Chemical Stability

This product is stable.

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur.

10.4. Conditions to Avoid

High temperatures.

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia.

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur.

Respiratory of skin sensitization: No known effects.

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: 140- 150 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: ≥ 125 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

DISCLAIMER OF RESPONSIBILITY

Information contained in this publication, while accurate to the best knowledge and belief of Frog Environmental Ltd (FEL) is not intended and should not be construed as a warranty or representation for which FEL assumes any legal responsibility.

Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

SAFETY DATA SHEET

Gel Flocculant 394

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 394

CHEMICAL FAMILY: Polyacrylamide polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: Red to white or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 7 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr $EC_{50:}$ immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

DISCLAIMER OF RESPONSIBILITY

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Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

SAFETY DATA SHEET

Granular Flocculant 395

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Granular Flocculant 395

CHEMICAL FAMILY: Anionic polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: White or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 7 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

DISCLAIMER OF RESPONSIBILITY

Information contained in this publication, while accurate to the best knowledge and belief of Frog Environmental Ltd (FEL) is not intended and should not be construed as a warranty or representation for which FEL assumes any legal responsibility.

Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

SAFETY DATA SHEET

Gel Flocculant 398

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Granular Flocculant 398

CHEMICAL FAMILY: Anionic polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: White or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 7 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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SAFETY DATA SHEET

Gel Flocculant 494

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 494

CHEMICAL FAMILY: Polyacrylamide polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

4.2. Most important symptoms and effects, both acute and delayed.

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

4.3 Indication of any immediate medical attention and special treatment needed.

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO_2, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: Yellow to white or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 5-7.5 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coeffecient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO_2 NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (Oncorhynchus mykiss): 96 hr LC_{50}: > 2500 mg/L.

Invertebrates (Daphnia magna): 48 hr EC_{50}: immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure. Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

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Information contained in this publication, while accurate to the best knowledge and belief of Frog Environmental Ltd (FEL) is not intended and should not be construed as a warranty or representation for which FEL assumes any legal responsibility.

Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

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APPENDIX D
POLY ALUMINIUM CHLORIDE, AQUATREAT 2084 AND SODIUM HYDROXIDE MATERIAL SAFETY DATA SHEETS

Section 1: Identification of Substance/mixture and of the company undertaking

1.1: Product Identifier

Product Name AQUATREAT 2084

1.2: Relevant Identified use of substance/mixture and uses advised against

1.3: Details of the Supplier of the safety data sheet

Company Name: Aquatreat
Albany House
North Dock
Llanelli
Carmarthenshire
SA15 2LF

Telephone: 01554 775236
Fax: 01554 772253
E-mail: enquiries@aquatreat.co.uk
Website: www.aquatreat.co.uk

1.4: Emergency Telephone Numbers:

Emergency Telephone: 0333 333 9499

Section 2: Hazards Identification

2.1: Classification of substance/mixture according to Regulation (EC) No 1272/2008

Classification under CLP: NC Not Classified

Additional Information:

2.2: Label Elements: Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Label elements under CLP: NC Not Classified as Hazardous

Signal Words:

Hazard Pictograms:

Precautionary Statements

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

2.3: Other Hazards

Section 3: Composition information on hazardous ingredients

Hydrocarbons, C12 - C15, isoalkanes, cyclics <2% aromatics

EINECS	CAS No	Classification according to Regulation (EC) 1272:2008	Percent
920-107-4		H302; ASP Tox.1	20 - 45

Isotridecanol, ethoxylated

EINECS	CAS No	Classification according to Regulation (EC) 1272:2008	Percent
Polymer		H318;Eye Dam.1, H302; Acute Tox.4	<5

Section 4: First Aid Measures

4.1: Description of First Aid measures

Skin Contact: Wash off immediately with soap and plenty of water and remove any contaminated clothing. If persistent irritation occurs, seek medical advice

Eye Contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Alternatively, rinse immediately with Diphoterine. Get prompt medical attention

Ingestion: Rinse mounth with water. DO NOT induce vomiting. Seek medical attention immediately

Inhalation: Move to fresh air. No special first aid measures required.

4.2: Most important symptoms and effects both accute and delayed

Skin Contact: None under normal use

Eye Contact: None under normal use

Ingestion: None under normal use

Inhalation: None under normal use

4.3: Indication of any immediate medical treatment and special treatment required

None reasonably foerseeable.

Section 5: Fire fighting measures

5.1: Extinguishing media

Use fire extinguishers appropriate to the surrounding fire

Unsuitable Media

None

5.2: Special hazards arising from the substance/mixture

Oxides of Carbon and Nitrogen. Hydrogen cyanide may be produced as a result of combustion in an oxygen deficient atmosphere.

5.3: Advice for firefighters

Wear self contained breathing apparatus and protective clothing. Spills become extremely slippery when wet

Section 6: Accidental Release Measures

6.1: Personal precautions, protective equipment and emergency procedures

Wear appropriate PPE - See section 8

6.2: Environmental precautions

Do not allow spills to enter surface water drains and watercourses

6.3: Methods and Materials for containment and clean up

Soak up with inert material. Sweep and shovel into suitable closed conytainers and arrange disposal

6.4: References to other sections

Section 7.0: Handling and Storage

7.1: Precautions for safe handling

Avoid contact with skin and eyes.Renders surfaces extremely slippery when spilled. Do not eat, drink or smoke when using this product

7.2: Conditions for safe storage.

Keep away from heat and sources of ignition. Do not allow the product to freeze. Incompatible with oxidising agents

7.4: Specific End Use(s)

Section 8: Exposurecontrols/PersonalProtection

8.1: Control Parameters

None known

8 Hour TWA: **15MinSTEL:**

8.2: Exposure Controls

Engineering Measures	Use local exhaust ventilation if misting occurs
Respiratory Protection	respiratory protective equipment is not normally required unser normal conditions of use
Hand Protection	PVC or other plastic material gloves
Eye Protection	Safety glasses with side shields
Skin Protection	Coveralls or chemical apron

Section 9.0: Physical and ChemicalProperties

9.1: Information on basic physical and chemical properties

State:	Liquid
Colour:	Milky
Odour:	Aliphatic
Specific Gravity:	1.05
pH:	5 - 8 @5g/l

9.2: Other Information

Section 10: Stability and Reactivity

10.1: Reactivity

Stable under recommended conditions of storage and use

10.2: Chemical Stability

Stable under recommended conditions of storage and use

10.3: Possibility of Hazardous Reactions

None known

10.4: Conditions to Avoid

Heat, Sunlight and frost

10.5: Incompatible Materials

Oxidising Agents

10.6: Hazardous Decomposition Products

Oxides of Carbon and Nitrogen

Section 11: Toxicological Information

Aqautreat 2084

Dermal	Rat	LD50	>5000 mg/kg (estimated)

Aquatreat 2084

Oral	Rat	LD50	>5000 mg/kg (estimated)

Section 12: Ecological Information

12.1: Toxicity

LC50/Oncorhyncus myKiss/ 96hours>100mg/l (estimated), EC50/Daphnia Magna/48 hours>100mg/l (estimated), IC50/Algae/72 hours>100mg/l(estimated)

12.2: Persistence and Biodegradable

Not readily biodegradable

12.3: Bioaccumulative Potential

This product is not expected to bioaccumulate

12.4: Mobility in Soil

No data available

12.5: Results of PBT and vPvB Assessment

Not according to the criteria of Annex XIII of REACH

12.6: Other adverse effects

None

Section 13: Disposal Information

Dispose of waste in accordance with local or national regulations

Section 14: Transport Information

UN Number	
Shipping Name	Not classified as hazardous for transport
Transport Class	
Packing Group	
Environment Hazard	
Special Precautions	
Tunnel Code	
Transport Category	

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Section 15: Regulatory Information

15.1: Safety, Health and Environmental regulations/legislation specific for the substance/mixture

15.2: Chemical safety assessment

Section 16: Other information

The above information is based on our present knowledge of the product at the time of publication. It is given in good faith, no warranty is implied as to the quality or specification of the product. Information contained in this data does not constitute an assessment of workplace risks. The user must satisfy himself that the product is entirely suitable for their purpose

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Polyaluminium chloride hydroxide sulphate (PAC)

Version 5.0
Revision Date 2010/12/03

Print Date 2010/12/03
MSDS code: MPAC100

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name	:	Polyaluminium chloride hydroxide sulphate (PAC)
CAS-No.	:	39290-78-3
EC-No.	:	254-400-7

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture	:	At this time we do not yet have information on identified uses. They will be included in this safety data sheet when available.
Recommended restrictions on use	:	At that time we do not yet have information on use restrictions. They will be included in this safety data sheet when available.

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag UK & Ireland Albion House, Rawdon Park GB LS19 7XX Leeds Yeadon
Telephone	:	0113 3879 200
Telefax	:	0113 3879 280
E-mail address	:	msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number	:	Emergency only telephone number (open 24 hours): 01865 407333 (N.C.E.C. Culham)

2. Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**

Hazard class	Hazard category	Target Organs	Hazard statements
Skin corrosion/irritation	Category 2		H315
Serious eye damage/eye irritation	**Category 2**		**H319**

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	**Risk phrases**
Irritant (Xi)	R36/38

For the full text of the R-phrases mentioned in this Section, see Section 16.

Most important adverse effects

Human Health : See section 11 for toxicological information.
No further information available.

Physical and chemical hazards : See section 9 for physicochemical information.
No further information available.

Potential environmental effects : See section 12 for environmental information.
No further information available.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :

Signal word : Warning

Hazard statements : H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements

General	:	P264	Wash hands thoroughly after handling.
		P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
		P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
		P332 + P313	If skin irritation occurs: Get medical advice/ attention.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
		P337 + P313	If eye irritation persists: Get medical advice/ attention.

Additional Labelling:

EUH210 Safety data sheet available on request.

Hazardous components which must be listed on the label:

- Aluminum chloride hydroxide sulfate

2.3. Other hazards

No other information is available.

3. Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Chemical Name	Identification Number		Amount [%]
Aluminum chloride hydroxide sulfate	CAS-No.	: 39290-78-3	< 100
	EC-No.	: 254-400-7	

4. First aid measures

4.1 Description of first aid measures

General advice	: Take off all contaminated clothing immediately.
In case of skin contact	: Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
In case of eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.
If swallowed	: Clean mouth with water and drink afterwards plenty of water.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms	: No further information available.
Effects	: No further information available.

4.3 Indication of immediate medical attention and special treatment needed

Treatment	: Treat symptomatically. No further information available.

5. Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	: No information available.

5.2. Special hazards arising from the substance or mixture

Specific hazards during fire	: The product itself does not burn.

fighting	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.3. Advice for firefighters

Special protective equipment for fire-fighters	:	Wear self contained breathing apparatus for fire fighting if necessary.
Further information	:	No further information available.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Wear personal protective equipment. Avoid contact with skin and eyes.

6.2 Environmental precautions

Environmental precautions	:	No special precautions required.

6.3 Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Treat recovered material as described in the section "Disposal considerations". Flush away residuals with plenty of water.

6.4 Reference to other sections

For personal protection see section 8.

7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Avoid contact with skin, eyes and clothing. Handle in accordance with good industrial hygiene and safety practice.
Hygiene measures	:	Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feedingstuffs. When using do not eat or drink.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep in an area equipped with acid resistant flooring. Use acid resistant materials only. Use chloride resistant materials only. Keep container tightly closed.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on common storage	:	Store separate from acidic- and chloride sensitive materials.
German storage class	:	8B: Non-combustible substances, corrosive
Storage temperature	:	0 - 30 °C

7.3 Specific end uses

Specific use(s)	:	No information available.

8. Exposure controls/personal protection

8.1. Control parameters

Component: Aluminum chloride hydroxide sulfate	CAS-No. 39290-78-3

Other OELs		
Regulatory Basis	:	UK. EH40 Workplace Exposure Limits (WELs)
Regulatory List	:	EH40 WEL
Value type	:	Time Weighted Average (TWA):
Value	:	2 mg/m3

8.2. Exposure controls

Engineering measures

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice	:	Breathing apparatus needed only when aerosol or mist is formed.

Hand protection

Advice	:	Neoprene gloves Protective gloves should be replaced at first signs of wear.
Glove thickness	:	0.75 mm

Eye protection

Advice	:	Tightly fitting safety goggles

Skin and body protection

Advice	:	Protective suit

Environmental exposure controls

General advice	:	No special precautions required.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	liquid
Colour	:	clear to slight cloudy
Odour	:	odourless
Odour Threshold	:	Currently we do not have any Information from our supplier about this.
pH	:	2 - 3 20 °C
Freezing point	:	-12 °C
Boiling point	:	> 100 °C
Flash point	:	not applicable
Evaporation rate	:	Currently we do not have any Information from our supplier about this.
Flammability (solid, gas)	:	Currently we do not have any Information from our supplier about this.
Upper explosion limit	:	Currently we do not have any Information from our supplier about this.
Lower explosion limit	:	Currently we do not have any Information from our supplier about this.
Vapour pressure	:	Currently we do not have any Information from our supplier about this.
Relative vapour density	:	Currently we do not have any Information from our supplier about this.
Density	:	ca. 1.192 - 1.3 g/cm3 20 °C
Water solubility	:	completely soluble
Partition coefficient: n-octanol/water	:	Currently we do not have any Information from our supplier about this.
Ignition temperature	:	Currently we do not have any Information from our supplier about this.
Thermal decomposition	:	Currently we do not have any Information from our supplier about this.

Viscosity, kinematic	:	Currently we do not have any Information from our supplier about this.
Explosive properties	:	Currently we do not have any Information from our supplier about this.
Oxidizing properties	:	Currently we do not have any Information from our supplier about this.

9.2 Other information

No further information available.

10. Stability and reactivity

10.1. Reactivity

Advice : No information available.

10.2. Chemical stability

Advice : No decomposition if stored and applied as directed.
No further information available.

10.3. Possibility of hazardous reactions

Hazardous reactions : No information available.

10.4. Conditions to avoid

Conditions to avoid : Extremes of temperature and direct sunlight.

10.5. Incompatible materials

Materials to avoid : Oxidizing agents
Bases

10.6. Hazardous decomposition products

Hazardous decomposition products : Oxygen
hydrogen chloride

11. Toxicological information

11.1. Information on toxicological effects

Product:	**CAS-No. 39290-78-3**

Acute toxicity

Oral

Value type	:	LD50
Value	:	> 5,000 mg/kg
Species	:	rat

Irritation

Skin

Remarks	:	Irritating to skin.

Eyes

Remarks	:	Irritating to eyes.

Sensitisation

Remarks	:	No sensitizing effect known.

12. Ecological information

12.1. Toxicity

Component: Aluminum chloride hydroxide sulfate	**CAS-No. 39290-78-3**

Acute toxicity

Fish

Species	:	Leuciscus idus (Golden orfe)
Exposure Time	:	48 h
Value type	:	LC50

Value	:	ca. 1,500 mg/l

12.2. Persistence and degradability

12.3. Bioaccumulative potential

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

Product:	**CAS-No.**
	39290-78-3
Additional ecological information	

Remarks	:	Solutions with low pH-value must be neutralized before discharge. Ecological injuries are not known or expected under normal use.

13. Disposal considerations

13.1. Waste treatment methods

Product	:	Can be disposed as waste water, when in compliance with local regulations.
Contaminated packaging	:	Empty remaining contents. Rinse with plenty of water. Store containers and offer for recycling of material when in accordance with the local regulations.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

14. Transport information

14.1. UN number

3264

14.2. UN proper shipping name

ADR : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminum chloride hydroxide sulfate)

RID : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminum chloride hydroxide sulfate)

IMDG : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminum chloride hydroxide sulfate)

14.3. Transport hazard class(es)

ADR-Class	: 8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code)	8; C1; 80; (E)
RID-Class	: 8
(Labels; Classification Code; Hazard identification No)	8; C1; 80
IMDG-Class	: 8
(Labels; EmS)	8; F-A, S-B

14.4. Packaging group

ADR : III

RID : III

IMDG : III

14.5. Environmental hazards

Labeling according to 5.2.1.8 ADR	: no
Labeling according to 5.2.1.8 RID	: no
Labeling according to 5.2.1.6.3 IMDG	: no
Classification as environmentally hazardous according to 2.9.3 IMDG	: no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

15. Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2. Chemical Safety Assessment

Currently we do not have any Information from our supplier about this.

16. Other information

Full text of R-phrases referred to under sections 2 and 3.

R36/38	Irritating to eyes and skin.

Full text of H-Statements referred to under sections 2 and 3.

H315	Causes skin irritation.
H319	Causes serious eye irritation.

Further information

Other information : The information provided in this Safety Data Sheet is correct to

the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use.

|| Indicates updated section.

ConnectingChemistry

BRENNTAG

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

CAUSTIC SODA LIQUOR >=2% - <=50% (11-106 ºTW)

Version 9.0 Print Date 2017/07/13

Revision date / valid from 2017/07/13 **MSDS code: MCSS550**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name	:	CAUSTIC SODA LIQUOR >=2% - <=50% (11-106 ºTW)
Substance name	:	sodium hydroxide
CAS-No.	:	1310-73-2
EC-No.	:	215-185-5
EU REACH-Reg. No.	:	01-2119457892-27-xxxx

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture	:	Identified use: See table in front of appendix for a complete overview of identified uses.
Uses advised against	:	At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag UK Limited Alpha House, Lawnswood Business Park GB LS16 6QY Leeds
Telephone	:	+44 (0) 113 3879 200
Telefax	:	+44 (0) 113 3879 280
E-mail address	:	msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number	:	Emergency only telephone number (open 24 hours): +44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1A	---	H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health	:	See section 11 for toxicological information.
Physical and chemical hazards	:	See section 9/10 for physicochemical information.
Potential environmental effects	:	See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :

Signal word : Danger

Hazard statements :

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Precautionary statements

Prevention :

P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response :

P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P390	Absorb spillage to prevent material damage.

Hazardous components which must be listed on the label:

- sodium hydroxide

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
sodium hydroxide			
Index-No. : 011-002-00-6 CAS-No. : 1310-73-2 EC-No. : 215-185-5 EU REACH-Reg. No. : 01-2119457892-27-xxxx	>= 2 - <= 50	Met. Corr.1 Skin Corr.1A	H290 H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice : Take off all contaminated clothing immediately.

If inhaled : In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

In case of skin contact : Wash off immediately with plenty of water. Call a physician immediately.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.

If swallowed : Rinse mouth with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms : See Section 11 for more detailed information on health effects and symptoms.

Effects : Extremely corrosive and destructive to tissue. If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. See Section

11 for more detailed information on health effects and symptoms.

4.3. Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Incomplete combustion may form toxic pyrolysis products.
Hazardous combustion products	:	Carbon monoxide, Carbon dioxide (CO2), The formation of caustic fumes is possible.

5.3. Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.Wear appropriate body protection (full protective suit)
Specific extinguishing methods	:	Control smoke with water spray.
Further advice	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Keep away unprotected persons. Use personal protective equipment. Ensure adequate ventilation. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.

	:	Use mechanical handling equipment. Keep in suitable, closed containers for disposal.
Further information	:	Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling	:	Keep container tightly closed. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
Hygiene measures	:	Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Store in original container.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Further information on storage conditions	:	Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.
Advice on common storage	:	Keep away from food, drink and animal feedingstuffs. Acids Light metals
Suitable packaging materials	:	Stainless steel, Polyethylene, Polypropylene, Polyvinylchloride
Unsuitable packaging materials	:	, Aluminium, Zinc, Copper

7.3. Specific end use(s)

Specific use(s)	:	No information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Component:	sodium hydroxide	CAS-No. 1310-73-2

Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL
Workers, Long-term - local effects, Inhalation : 1.0 mg/m3

DNEL
Consumers, Long-term - local effects, Inhalation : 1.0 mg/m3

Predicted No Effect Concentration (PNEC)

No PNEC value was derived. :

Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), Short Term Exposure Limit (STEL):
2 mg/m3

ELV (IE), Short Term Exposure Limit (STEL):
2 mg/m3

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Provide sufficient air exchange and/or exhaust in work rooms.
Personal protective equipment

Respiratory protection

Advice : In case of brief exposure or low pollution use breathing filter apparatus.
Respiratory protection complying with EN 141.
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice : Wear suitable gloves.
The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning

permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material	:	Natural Rubber
Break through time	:	>= 8 h
Glove thickness	:	0.5 mm

Material	:	polychloroprene
Break through time	:	>= 8 h
Glove thickness	:	0.5 mm

Material	:	Nitrile rubber
Break through time	:	>= 8 h
Glove thickness	:	0.35 mm

Material	:	butyl-rubber
Break through time	:	>= 8 h
Glove thickness	:	0.5 mm

Material	:	Fluorinated rubber
Break through time	:	>= 8 h
Glove thickness	:	0.4 mm

Material	:	Polyvinylchloride
Break through time	:	>= 8 h
Glove thickness	:	0.5 mm

Eye protection

Advice : Safety goggles
Face-shield

Skin and body protection

Advice : Impervious clothing
Chemical resistant apron

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
If material reaches soil inform authorities responsible for such cases.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	liquid
Colour	:	colourless
Odour	:	odourless
Odour Threshold	:	Not applicable
pH	:	ca. 14 (20 °C)
Melting point/range	:	-17 °C 10% solution 12 °C 50% solution
Boiling point/boiling range	:	105 °C 10% solution 145 °C 50% solution
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	21 hPa (20 °C) 12% solution
Relative vapour density	:	no data available
Density	:	ca. 1.0538 g/cm3 (20 °C) 5% solution ca. 1.175 g/cm3 (20 °C) 15% solution ca. 1.274 g/cm3 (20 °C) 25% solution ca. 1.34 g/cm3 (20 °C) 30% solution ca. 1.38 g/cm3 (20 °C) 35% solution ca. 1.48 g/cm3 (20 °C) 45% solution ca. 1.525 g/cm3 (20 °C) 50% solution ca. 1.2191 g/cm3 (20 °C) 20% solution
Water solubility	:	1090 g/l (20 °C)
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition	:	no data available
Viscosity, dynamic	:	79 mPa.s (20 °C)
Explosivity	:	Product is not explosive.

Oxidizing properties	:	no data available

9.2. Other information

Corrosion to metals	:	Corrosive to metals

SECTION 10: Stability and reactivity

10.1. Reactivity

Advice	:	No decomposition if stored and applied as directed.

10.2. Chemical stability

Advice	:	Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions	:	Corrosive in contact with metals Gives off hydrogen by reaction with base metals (zinc, aluminium). Reacts exothermically with water. Reacts exothermic with acids.

10.4. Conditions to avoid

Conditions to avoid	:	Heat, flames and sparks.
Thermal decomposition	:	no data available

10.5. Incompatible materials

Materials to avoid	:	Materials to avoid: Acids, Light metals, Alcohols, Halogenated hydrocarbon

10.6. Hazardous decomposition products

Hazardous decomposition products	:	hydrogen

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Data for the product
Acute toxicity
Oral
Please find this information in the listing of the component/components below in this section.
Inhalation
no data available

Dermal

no data available

Irritation

Skin

Result : Causes severe skin burns and eye damage.

Eyes

Result : Causes eye burns.

Sensitisation

no data available

CMR effects

CMR Properties

Carcinogenicity : no data available

Mutagenicity : no data available

Reproductive toxicity : no data available

Specific Target Organ Toxicity

Single exposure

no data available

Repeated exposure

no data available

Other toxic properties

Repeated dose toxicity

no data available

Aspiration hazard

no data available

Component: sodium hydroxide CAS-No. 1310-73-2

Acute toxicity

Oral

No valid data available.

Inhalation

No valid data available.

Dermal

No valid data available.

Irritation

Skin

Result	:	Very corrosive (Rabbit) (No guideline followed)

Eyes

Result	:	Irritating to eyes. (Rabbit) (OECD Test Guideline 405)

Sensitisation

Result	:	not sensitizing (human) (No guideline followed)Patch test on human volunteers did not demonstrate sensitisation properties.

CMR effects

CMR Properties

Carcinogenicity	:	No experimental references for cancerogenity available.
Mutagenicity	:	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects
Teratogenicity	:	no data available
Reproductive toxicity	:	Not expected to impair fertility.

Specific Target Organ Toxicity

Single exposure

Remarks	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

Remarks	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties
Aspiration hazard
Not applicable,

SECTION 12: Ecological information

12.1. Toxicity

Data for the product		
Acute toxicity		
Acute aquatic toxicity		
Result	:	The product is not classified as dangerous for the environment.

Component:	sodium hydroxide	CAS-No. 1310-73-2
Acute toxicity		
Fish		
LC50	:	125 mg/l (Gambusia affinis; 96 h) (No guideline followed)
LC50		145 mg/l (Poecilia reticulata; 24 h) (No guideline followed)
Toxicity to daphnia and other aquatic invertebrates		
EC50	:	40.4 mg/l (Ceriodaphnia (water flea); 48 h) (No guideline followed)
algae		
	:	no data available
Bacteria		
EC50	:	22 mg/l (Photobacterium phosphoreum; 15 min) (EPS 1/RM/24)

12.2. Persistence and degradability

Component:	sodium hydroxide	CAS-No. 1310-73-2

Persistence and degradability		
Persistence		
Result	:	no data available
Biodegradability		
Result	:	The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Component:	sodium hydroxide	CAS-No. 1310-73-2
Bioaccumulation		
Result	:	Does not bioaccumulate.

12.4. Mobility in soil

Component:	sodium hydroxide	CAS-No. 1310-73-2
Mobility		
Water	:	The product is mobile in water enviroment.

12.5. Results of PBT and vPvB assessment

Data for the product		
Results of PBT and vPvB assessment		
Result	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Component:	sodium hydroxide	CAS-No. 1310-73-2
Results of PBT and vPvB assessment		
Result	:	The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.

12.6. Other adverse effects

Data for the product
Additional ecological information

Result	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. Harmful effects to aquatic organisms due to pH-shift.
Result	:	

Component:	**sodium hydroxide**	**CAS-No. 1310-73-2**
	Additional ecological information	

Result	:	Harmful effects to aquatic organisms due to pH-shift. Neutralization is normally necessary before waste water is discharged into water treatment plants. Do not flush into surface water or sanitary sewer system.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
Contaminated packaging	:	Dispose of contaminated packaging in the same way as the product. In accordance with local and national regulations. Empty containers retain residue and can be dangerous.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information

14.1. UN number

1824

14.2. UN proper shipping name

ADR	:	SODIUM HYDROXIDE SOLUTION
RID	:	SODIUM HYDROXIDE SOLUTION
IMDG	:	SODIUM HYDROXIDE SOLUTION

14.3. Transport hazard class(es)

ADR-Class (Labels; Classification Code; Hazard identification No; Tunnel restriction code)	:	8 8; C5; 80; (E)
RID-Class (Labels; Classification Code; Hazard identification No)	:	8 8; C5; 80
IMDG-Class	:	8

(Labels; EmS) 8; F-A, S-B

14.4. Packaging group

ADR : II
RID : II
IMDG : II

14.5. Environmental hazards

Environmentally hazardous according to ADR : no
Environmentally hazardous according to RID : no
Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Data for the product

EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC) : Point Nos.: , 3; Listed

EU. Directive 2012/18/EU (SEVESO III) Annex I : ; The substance/mixture does not fall under this legislation.

Component: sodium hydroxide CAS-No. 1310-73-2

EU. Regulation EU No. 649/2012 concerning the export and import of dangerous chemicals : ; The substance/mixture does not fall under this legislation.

EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC) : ; The substance/mixture does not fall under this legislation.

EU. Regulation No 1451/2007 [Biocides], Annex I, OJ (L 325)	:	EC Number: , 215-185-5; Listed
EU. Regulation No. 1223/2009 on cosmetic products, Annex III: List of Restricted Substances in Cosmetic Products	:	Maximum concentration in ready for use preparation: 2 %; Hair straightener: General use; See the text of the regulation for applicable exceptions or provisions. pH < 12,7.; pH adjuster for depilatories; See the text of the regulation for applicable exceptions or provisions. Maximum concentration in ready for use preparation: 4.5 %; Hair straightener: Professional use; See the text of the regulation for applicable exceptions or provisions. pH < 11.; Uses as pH adjuster other than for depilatories; See the text of the regulation for applicable exceptions or provisions. Maximum concentration in ready for use preparation: 5 %; Nail cuticle solvent; See the text of the regulation for applicable exceptions or provisions.
EU. Directive 2012/18/EU (SEVESO III) Annex I	:	; The substance/mixture does not fall under this legislation.
WGK (DE)	:	WGK 1: slightly water endangering: 142; Classification source is Annex 2.

Component:	**sodium hypochlorite, solution**	**CAS-No. 7681-52-9**

Notification status
sodium hypochlorite, solution:

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	231-668-3
ENCS (JP)	YES	(1)-237
IECSC	YES	
ISHL (JP)	YES	(1)-237
KECI (KR)	YES	KE-31506
NZIOC	YES	HSR003698
PICCS (PH)	YES	
TSCA	YES	

15.2. Chemical safety assessment

no data available

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Abbreviations and Acronyms

BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references and sources for data	:	Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were

used to create this safety data sheet.

Methods used for product classification	:	The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	:	The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	:	The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

CAUSTIC SODA LIQUOR >=2% - <=50% (11-106 ºTW)

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance - liquid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES035
2	Manufacture of substance - solid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES057
3	Industrial use	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15, 19, 23, 24	2, 4, 6a, 6b, 7	NA	ES065
4	Professional use	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 19, 23, 24	8a, 8b, 8d, 9a	NA	ES067
5	Consumer use	21	NA	20, 35, 39	NA	8a, 8b, 8d, 9a	NA	ES075

CAUSTIC SODA LIQUOR >=2% - <=50% (11-106 ºTW)

1. Short title of Exposure Scenario 1: Manufacture of substance - liquid		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)	
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Environmental Release Categories	ERC1: Manufacture of substances	

2.1 Contributing scenario controlling environmental exposure for: ERC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct	

	contact and exposure by splashes (no working over one's head)
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area: Industrial use Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area: Industrial use In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face–shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Modeled exposure data, very low vapour pressure, Without Local Exhaust Ventilation, without respiratory protection	Inhalation worker exposure	0.17mg/m³	0.17
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.33mg/m³	0.33
PROC1, PROC2, PROC3, PROC4,	Measured exposure data, worst-case	Worker - inhalative, long-term - local	0.14mg/m³	0.14

PROC8a, PROC8b, PROC9				

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

1. Short title of Exposure Scenario 2: Manufacture of substance - solid		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)	
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Environmental Release Categories	ERC1: Manufacture of substances	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed	

and exposure	processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area: Industrial use In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face–shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.01mg/m³	0.01
PROC3, PROC9	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.1mg/m³	0.1
PROC4, PROC8a	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.5mg/m³	0.5
PROC9	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.26mg/m³	0.26

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure

to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

1. Short title of Exposure Scenario 3: Industrial use	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids ERC7: Industrial use of substances in closed systems

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6a, ERC6b, ERC7		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC19, PROC23, PROC24		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face–shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural

soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m³	---
PROC4, PROC5, PROC14	solid, no respiratory protection (RPE), With Local Exhaust Ventilation	Worker - inhalative, short-term - local	0.2mg/m³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

1. Short title of Exposure Scenario 4: Professional use	
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Professional use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19, PROC23, PROC24		
Product characteristics	Concentration of the	Covers percentage substance in the product up to

	Substance in Mixture/Article	100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Professional use
	Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head) Where possible use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Professional use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Professional use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face–shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m³	---
PROC4, PROC5, PROC11, PROC14	solid, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.2mg/m³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

1. Short title of Exposure Scenario 5: Consumer use		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC20: Products such as ph-regulators, flocculants, pre-cipitants, neutralization agents PC35: Washing and cleaning products (including solvent based products) PC39: Cosmetics, personal care products	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems	
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	There are no specific risk management measures related to environment.	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility)., If container is empty, trash as regular municipal waste., Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility)., Recovery of the substance from alkaline batteries includes emptying the electrolyte, collection and neutralization.
2.2 Contributing scenario controlling consumer exposure for: PC20, PC35, PC39		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions. It is advisable to deliver only in very viscous preparations. It is advisable to delivery only in small amounts. For use in batteries, it is required to use completely sealed articles with a long service life maintenance. It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce

		the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. Do not apply product into ventilator openings or slots. Keep out of the reach of children.
	Consumer Measures	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear impervious chemical resistant protective gloves. If splashes are likely to occur: wear tightly fitting safety goggles, face–shield

3. Exposure estimation and reference to its source

Environment

Consumer uses relate to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

Consumers

PC39, PC20, PC35: ConsExpo and SrayExpo

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC20, PC35, PC39	Assessed only for the most critical use, (use of the substance in a spray oven cleaner)	consumer inhalation, acute - local	0.3 - 1.6mg/m³	< 1

The calculated short-term exposure is slightly higher than the long term DNEL for inhalation, but smaller than the short term occupational exposure limit. The substance will be rapidly neutralised as a result of its reaction with CO2 (or other acids). Consumer exposure to the substance in batteries is zero because batteries are sealed articles with a long service life maintenance.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PCs listed above) as given below
If measured data are not available, the DU may make use of an appropriate scaling tool such as ConsEXpo software.
Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).