Scottish & Southern Electricity Networks
TRANSMISSION

TG-NET-ENV-514

Environmental

General Environmental Management Plan (GEMP) – Working with Concrete

TG-NET-ENV-514	General Environmental Management Plan (GEMP)-Working with Concrete		Applies to Transmission ✓
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1 Working with Concrete

1.1 Background

1.1.1 The chemical reactions that enable fresh concrete to cure are complex. A by-product of these reactions is the production of calcium hydroxide, a highly alkaline chemical that has a pH in excess of 12.

1.1.2 There are a number of sources of alkaline water on construction sites, which include:

- Concrete wash water from cleaning of machinery and tools used with fresh concrete – e.g. chutes, drums, pumps, hand tools
- Cutting or coring of concrete structures
- Hydro-demolition (high pressure water cutting)
- Surface water runoff from newly concreted areas
- The storage or use of Cement Bound Sand (CBS) in backfilling of cable works
- Leaching form installed cabling works utilising CBS backfill
- Crushed demolition materials, and
- Concrete installed below groundwater level (e.g. piled foundations)

1.1.3 The release of untreated highly alkaline water into the environment from any of the sources described above can have a significant environmental impact, including on the ecology of receiving waters. The following are potential impacts of concrete and cement born contamination if not properly treated:

- Increase in pH of the water environment to toxic levels
- Kill invertebrate and other aquatic life including plants
- Adversely impact on surrounding habitats
- Particles can impact the turbidity of receiving waters
- Smother the bed and kill aquatic life
- Block gills of fish
- Impact directly and indirectly protected species which may be present e.g. otters, freshwater pearl mussels, or salmon
- Increase flood risk or agricultural drainage by blocking of drains and other structures

1.2 Legislation

1.2.1 Under the Controlled Activities Regulations, it is on offence to discharge polluting substances to controlled waters (surface water and groundwater) without prior approval from the Regulator (SEPA). This includes any discharge of concrete/ cementitious materials or contaminated water.

2 General Compliance Requirements

2.1 General use

2.1.1 Concrete shall not be used within 10m of any watercourse or loch. Should there be the requirement to use concrete and cement within 10m of a waterbody, this should be fully risk assessed and agreed in advance of the works.

2.1.2 Store bulk and bagged cement and concrete additives at least 30 metres away from watercourses, gullies and drains in properly secured, covered and bunded areas.

2.1.3 Ensure dust from storage areas is controlled. Securely cover stockpiles of cementitious materials such as CBS with a tarpaulin, or non-permeable sheeting.

2.1.4 Ensure all staff are briefed on the potential environmental risks of working with concrete.

2.1.5 Ensure that any residue from cutting/ coring/ hydro-demolition activities is correctly contained and treated where necessary.

2.1.6 Consider the materials being used e.g. recycled concrete aggregate may cause elevated pH levels as a result of run-off.

2.1.7 Recirculating systems should be used where possible to minimise the use of water resources and reduce volume of high pH waters produced requiring treatment.

2.2 Washout

2.2.1 Areas should be established for concrete washout which avoid important habitats and species.

2.2.2 Surplus concrete should be removed from equipment by scraping before washing down in order to minimise the volume of water required.

2.2.3 All concrete wash water should be contained for treatment on site or disposal off site. None shall be allowed to enter any drains, ditches or watercourses or land.

2.2.4 Concrete wash waters should be returned to batching plant as a first option (suitable temporary storage in IBCs or similar would be acceptable.) Where this is not an option, special wash water treatment units should be used, such as Roadside Concrete Washouts (RCWs) or similar. These units should filter/ separate solids from the wash water, and allow for pH treatment through CO_2 diffuser, using citric acid or similar to achieve a more neutral pH.

2.2.5 Discharge of treated wash waters to ground or other receiving environment should only be permitted when agreed with SEPA. The SSEN Environmental Representative is to be copied into all correspondence with the regulator in this regard, and consulted in the first instance of the intent to contact SEPA.

2.2.6 Lined pits or lined skips are not acceptable, unless these can be fully demonstrated to be impermeable and a treatment/ removal procedure agreed. No overlapping plastic sheets can be relied on in their construction. Where more than one width of sheet is required these should be welded and tested to demonstrate sealing. Additionally, regular monitoring is required to ensure ongoing effectiveness and to ensure they do not become overloaded, resulting in the escape of wash water and cementitious fines. Written record of inspections must be maintained.

2.2.7 Discharge of small volumes to land should only take place where there is no connectivity to surface and ground waters and can be demonstrated to be fully compliant with legislative requirements.

2.3 Treatment Options on site

2.3.1 The pH scale is a logarithmic scale which means that each unit change in pH, for example pH 7 to 8, represents a tenfold increase in alkalinity. Because of this, attempting to treat concrete washout by dilution alone has the potential to increase the risk of a serious pollution incident.

2.3.2 Dilution of high pH water is ineffective due to the logarithmic scale of pH. For example, to dilute one IBC of concrete wash water at pH 12, the equivalent of four Olympic swimming pools of fresh water would be needed to bring it back to neutral (pH 7).

2.3.3 In order to adjust high pH wash water in line with acceptable levels, a process of neutralisation using controlled amounts of reagent may be required. Typical reagents include mineral acid (either sulphuric or hydrochloric acid), citric acid, carbon dioxide (CO_2) and self-buffering solutions. Propriety units for treatment of high pH water on site are available, some of which use CO_2 diffusers to neutralise the high pH water.

3 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02	Addition of clauses 2.2.4,2.2.5, 2.2.6 Changes to job titles of author, checker & approver	TG-NET-ENV-514 General Environmental Management Plan (GEMP) – Working with Concrete (Rev 1.00)	2.00	Richard Baldwin
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