

1. Soil Sampling

Soils will require classifying to determine their suitability for reuse or which waste disposal facility they should be removed to. Excavation bases and batters will also require verification sampling to ascertain that remaining soils have acceptable levels of contaminants in them.

Labour

- Site Manager
- Environmental Scientist

Equipment

- Stainless Steel sampling trowel
- Mixing board
- Digital Camera
- Sample identification board including colour correction card and scale indicator.

Materials

- Disposable Nitrile Gloves
- Laboratory grade detergent
- Disposable plastic sheeting
- Sample Containers
- Cool Box

Methodology

- Collection of soil samples shall be performed in accordance with the 'Code of Practice for Investigating of Potentially Contaminated Sites' (BS 10175:2011+A2013).
- Collection of Geotechnical soil samples shall be performed in accordance with 'Eurocode 7 – Geotechnical design – Part 2' (EN 1997-2:2007) and any subsequent amendments.
- In addition to the general practices contained in the British Standards cited above, NGP requires that the following additional practices are complied with during collection of soil samples.
- The locations of all samples are to be surveyed and their location recorded in the report.
- Prior to the collection of each sample all equipment should be cleaned.
- Fresh nitrile gloves are to be used for each sample.
- Each sample container shall include, as a minimum, the sample location, sample number, site name and company name, samplers' initials, date sampled and sample depth (where relevant).
- Once all sub-samples have been obtained, they should be placed on the mixing board (fitted with a fresh section of disposable plastic sheeting) and mixed using a clean stainless-steel hand trowel. Mixing should continue until such time that an approximately homogenous mix has been obtained.
- Upon completion of the homogenisation process the sample is to be placed into the appropriate sample containers and sent for laboratory analysis. Residual material is to be returned to the stockpile/excavation of origin.
- If samples are required for the analysis of volatile components, then the above sub-sampling technique is not appropriate, and an alternative must be agreed. As a minimum, the methodology for volatiles sampling will comprise the following:

- i. At the time of collecting each sub-sample the Consultant/Contractor should note the visible and olfactory evidence of contamination at each location.
- ii. Prior to the bulk mixing of sub-samples select material for volatiles sampling from that sub-sample which appear representative of the stockpiled material.
- iii. Extract a sample for volatiles analysis from within the undisturbed mass of the selected sub-sample. Material from the outer surfaces of the subsample should be avoided as potentially volatile components may have already been lost.
- iv. The sample should be placed into the appropriate sample containers and sent for laboratory analysis.
- v. Where sampling lags significantly behind the excavation works it is likely that volatile
- vi. components will have been lost from the material on the exposed surface of the excavation.
- vii. prior to the collection of the validation samples. In these cases, the upper 0.2 m of material should be removed from the location of each sample/sub-sample and placed to one side. The freshly exposed face should then be sampled.

Stockpiles

- This methodology for stockpile sampling is based on a maximum stockpile size of 200 m³. If, for any reason, this size limit is increased, then the number of test samples required to provide a representative sample shall be increased accordingly.
- Each 200 m³ stockpile shall, for the purposes of sampling, be divided into six theoretical sections of approximately equal volume, e.g. as shown below:
- Approximately 2 kg of material shall be collected from each section of the stockpile as follows:

From locations A to D

- i. The upper 0.3 m of material is to be removed and placed to one side.
 - ii. A 2 kg sub-sample is then collected using a clean stainless-steel trowel.
 - iii. A further 0.5 m depth of material from the same location is removed and placed to one side.
 - iv. A second 2 kg sub-sample is then collected using the same stainless-steel trowel.
- Stockpile batters are to be created with consideration to sampling. Typically, one end of the stockpile will be ramped to provide access for sampling and surveying. Where this is not the case steps will be cut into the stockpile with an excavator to provide access.

Verification Samples

- Verification sample density shall be:

- a minimum of 1 sample per 5 linear metres for excavation batters and a minimum of one per side
- One sample per **5m²** of the exposed excavation base or as directed by the Supervisor. Additional samples will be retrieved where contamination is observed to extend beyond the extent of the works area.
- The gridlines are to be orientated to the north-south and east-west excavation batters and labelled alpha-numerically starting at the most south-westerly point on the site plan.
- Following approval of the Verification Plan the Contractor should set out the grid using to demarcate each intersection. If line marking paint is to be used care is to be taken not to sample soils that have been painted.
- Once the sampling frequency has been agreed, each individual verification area (verification sample location) within the excavation should to be divided into five theoretical sub-sections as shown below. One basal sub-sample of approximately 2 kg of material is to be collected from each sub-section of the verification area.
- Once all five sub samples have been obtained, they should be mixed using a clean stainless-steel spade or hand trowel. Mixing should continue until satisfied that a homogenous mix has been obtained.
- Composite samples from the sides of excavations are to be formed from 2 kg sub-samples taken along the length of each distinct horizon. Sub-samples should be taken from equally spaced locations along the length of each horizon.

2. Water Sampling

Water present within excavations will require sampling both prior to, and post treatment. Sampling will be required prior to treatment to ascertain the level and nature of potential contaminants present within the water. This information will be used in the selection and design of the water treatment plant through which the water shall be passed before being discharged into the foul sewer. Once the water treatment plant has been established a closed loop test is to be conducted and the result sampled to ensure that the treatment method meets the requirements of the Consent to Discharge. Samples of treated water will then be taken at weekly intervals to ensure continued compliance with the Consent to Discharge.

Labour

- Environmental Scientist

Materials

- Disposable Nitrile Gloves
- 2 x 300mm Glass Sampling Bottles
- 2 x 40mm Glass Sampling Vials
- Cool Box or ESK Transport Container
- Chain of Custody

- Fine Permanent Marker Pen

Methodology

- Collection of water samples shall be performed in accordance with the '*Water quality. Sampling. Guidance on the preservation and handling of samples (BS EN ISO 5667-3:2018)*'.
- Sampling equipment shall be stored away from potential sources of contamination and is to remain within a suitable container until required. Only the required number of vessels should be removed and taken into the field.
- Fresh nitrile gloves are to be used for each sample.
- Care should be taken to ensure that contaminants present on workwear such as high viability vests, overalls etc are not transferred onto gloves or sample vessels. If cross contamination does occur, then these should be discarded, and fresh items used.
- When filling bottles consideration should be given to the placement of the vessel's lids. These should be placed away from contamination, ideally on a clean level surface. Do not allow vessel lids to touch the ground.
- Do not touch the openings of the sample vessels.
- Vessels should be filled to the brim, removing any headspace (air present within the bottle). Special care should be taken when filling the 40mm vials for VOC analysis.
- Each sample container shall include, as a minimum, the sample location/origin, sample number, site name/number, company name, and the date that the sample was taken on. Information should be written on the sample label in a fine point marker pen such as a Sharpie.
- Samples should then be placed immediately into an insulated transport container such as a cool box or ESK box, along with two ice packs. These containers are to be kept closed between use to maintain temperature.
- Once all the samples have been placed within the insulated transport container, along with the chain of custody, the box is to be taped shut, labelled with the shipping details for the courier, and collected for transport to the laboratory.
- Once per project a Trip Blank should be undertaken as a check against the integrity of the sample transportation procedure.

Sampling from a mobile water treatment plant

- When sampling from a mobile treatment facility a sample tap should be installed at the end of the treatment process before the treated water is discharged to the foul sewer. This tap should be located within the treatment plant's bund and easily accessible.
- Before a sample is taken, the tap should be allowed to run ensuring that any trapped water is flushed through.
- Once the vessels have been filled the tap should be securely turned off.

Sampling from a pit/chamber/or manhole

- When sampling from a below ground chamber such as a syphon pit or manhole consideration should be given to access arrangements and fall from height risks. Either the opening into the pit should be small enough not to pose a significant risk, and to be closable or the area is to be cordoned off and the appropriate measures put in place

as per the working from high methodology discussed elsewhere in this document package.

- If the water level is significantly below ground level, then it may be necessary to attach the sample vessel to a suitable length pole/boat hook/staff. The vessel should be attached vertically using water resistant tape or wire and in line with the axis of the pole before being lowered into the water. The pole should then be raised maintaining verticality to ensure minimal headspace within the sample vessel and the clean cap applied.

Sampling from standing water/floodwater

- When sampling from standing water a second vessel may be required to decant water into the sample vessel as the depth of the waters may not be sufficient to bring the sample bottle to vertical and remove any headspace.
- Care should be taken not to disturb silt/mud that may be present beneath floodwater.

3. Analysis & Review of Sample Data

- Sample results are to be emailed directly from the laboratory to a specialist environmental consultant. The results are to be screened against the conditions of the Permit to Discharge.
- The results of this compliance check are to be sent to Erith for distribution to the relevant parties.
- Should an exceedance be identified then the following procedures should be followed
 1. All dewatering pumps are to be shut off and discharging to the foul sewer shall be halted.
 2. An investigation into the cause of the exceedance shall be undertaken, and the existing treatment methods reviewed.
 3. Additional samples are to be taken of both the untreated water and treated water (to be taken from a closed loop test).
 4. Dewatering operations are not to be resumed until a preliminary investigation identifies the exceedance and a closed loop test has been carried out that conforms to the criteria identified within the consent to discharge.