

Permit Variation Application – Change in groundwater or surface water compliance limits or monitoring frequency.

Use these notes for enhanced pre-application discussions and application review where a variation is requested for a change in groundwater or surface water compliance limits, and/or a change in monitoring frequency.

These notes reference the Landfill operators: environmental permits [guidance](#).

The notes set out the information needed to be presented to allow determination of whether the variation requested is suitable. This does not include what would be required for a change in leachate compliance limit.

NOTE: The Environment Agency will not accept increased compliance limits where there is evidence the site is the source of existing pollution. The operator must take appropriate action to reduce this impact. Improvement conditions may be imposed in the permit to require operator action.

Summary of Proposed Changes

A summary should be provided to detail the changes requested, which boreholes or surface water monitoring locations they apply to and where the changes are justified.

If the changes are for replacement or new groundwater boreholes, the borehole logs showing the geology and construction must be provided, and discussed within the Hydrogeological Risk Assessment.

Electronic copies of any models and data used to justify the changes must be provided.

Hydrogeological Risk Assessment (HRA)

A Hydrogeological Risk Assessment or up to date HRA review must be provided to present the justification for any requested changes in groundwater or surface water compliance limit.

Conceptual site model:

The review must provide the conceptual site model, including:

Source:

- Summary of leachate management compliance, where relevant
 - o Has the leachate level been in compliance with the permitted level;
 - o Have there been any identified leachate breakouts at the surface;
 - o Has hydraulic containment been maintained where this is the relevant management method, comparison time history graphs of leachate level and groundwater level in the relevant aquifers must be presented;
- Presentation of the leachate quality or summary of waste acceptance compliance for inert/DfR sites
- Assessment of suitability of priority contaminants used as indicators for leachate leakage
- Details of any investigations into alternative off-site sources of contamination

Pre-application Discussion Notes

Pathways:

- Discussion of the relevant engineered pathways, and any surface water or groundwater management
- Discussion of the natural aquifer pathways, including water levels and thickness of unsaturated zone where present
- Presentation of recent groundwater contours for all relevant aquifers to confirm flow direction. These should be from a representative winter high monitoring round and a representative summer low monitoring round.
- A plan of the location of up gradient/upstream and down gradient/downstream monitoring points
- Summary of relevant upgradient/upstream groundwater/surface water quality, this must include statistical identification of any outliers in the data set, and comparison with relevant water quality standards. The technical report [Techniques for the Interpretation of Landfill Monitoring Data, Guidance Notes 2002](#) provides detail of outlier identification.
- Review of the Environmental Assessment Levels applied for the site, do these remain relevant. These should be based on the relevant environmental standard or natural background groundwater quality.
 - o Relevant water quality standards are covered under the “Decide which environmental standards to use” section of the [identify compliance points guidance](#)
 - o Where the relevant standard is much higher than the natural background (up gradient/upstream) concentrations the EAL should be set at a level between the appropriate environmental standard and natural background level dependent on sensitivity of the site to sufficiently protect water quality for good quality aquifers. The chosen level must be justified.
 - o The EAL is used in the risk assessment to ensure that the waste deposit does not cause additional or future pollution. Where the background is affected by other off-site anthropogenic inputs this would be reflected in the compliance limit rather than the EAL.

NOTE: Where a site is operating under a hydraulic containment management system the HRA will need to assess if hydraulic containment has been maintained in the whole site to show that up hydraulic gradient concentrations from appropriate borehole locations have been applied when deriving down gradient compliance limits. Justification will also be required for any upward trends in up gradient groundwater concentrations.

Receptors:

- Summary of the sensitive receptors
- A review of the appropriateness of the compliance points, information is given in guidance within the [compliance points](#) and [surface water features as a compliance point](#) sections of the guidance.
- A review of the requirement for compliance limits for groundwater and surface water

Pre-application Discussion Notes

Review of Risk Assessment:

A review must be made of previous risk assessment modelling undertaken for the site, and an assessment of the impact of any changes observed in the site conceptual model completed. Any revised modelling carried out must be provided with the application for full review of appropriateness.

Where an impact is predicted on groundwater quality the Operator should explain if they plan to change site operations and where necessary put additional measures in place to mitigate any unacceptable emissions.

Review of Monitoring Infrastructure:

A review must be made of the monitoring infrastructure present at the site and evidence will be needed to show that it is fit for the purpose of applying compliance limits:

- To ensure the data we receive is representative of the media the operator is sampling, they should confirm that their monitoring infrastructure has been inspected and where necessary maintained (e.g. desilted) or repaired or replaced (if damaged). This is normally required in a site management plan.
- Is sufficient groundwater monitoring present at the site to assess the impact from the waste deposited? The landfill directive specifies the minimum of 1 up-gradient and 2 down-gradient locations, but states that “This number can be increased on the basis of a specific hydrogeological survey and the need for an early identification of accidental leachate release in the groundwater”.
- Have borehole logs been provided to show that the response zones and construction details are suitable for the defined use?
- Are sufficient surface water monitoring locations provided to assess the impact from the waste deposited where surface water is the main receptor? This must be a minimum of one upstream of the landfill and one downstream.

NOTE: Further guidance on the location and design of groundwater monitoring points, and surface water monitoring points is given in [Landfill Technical Guidance Note 2: Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water](#)

Compliance Limit Change Proposals:

Compliance limits are to be set at the point where pollution can be said to have occurred, and when it is discernible in groundwater. The compliance limit should in the majority of cases be set at the Environmental Assessment Limit (EAL) applied, with the only cases when it is not equal where the baseline groundwater quality is impaired by other off-site anthropogenic sources.

Where changes in compliance limit are proposed the operator needs to consider:

- The substances to which they are applied – this should refer back to the review of the source term in the CSM
- The [compliance point](#) locations they need to be set:
 - o for hazardous substances this should be to show that there is no discernible impact in the groundwater immediately downgradient

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- o for non-hazardous pollutants boreholes at the downgradient site boundary should be used, or [surface water receptors where this is identified as the highest priority risk](#)
- The concentrations at which they are to be set – details are in the [Setting the compliance limit](#) guidance:
 - o The compliance limit should be set at the EAL established in the CSM, unless the baseline groundwater quality is impaired by other anthropogenic inputs.
 - o If the baseline quality is impaired this needs to be taken account of in proposing compliance limits using the maximum excluding outliers in the up-gradient groundwater quality.

The operator will also need to show what control limits they intend to use as an early warning system that the site is not performing as predicted as in the [groundwater control levels guidance](#).

These control levels are not given in the permit, but will be relevant if changes to compliance limit concentrations are proposed.

Where additional measures have been put in place to mitigate any unacceptable emissions, such as improved capping, the groundwater compliance limit that has been set in the permit might need to be varied to reduce the concentration set. In this situation a limit suitable for surrender completion criteria should be discussed in addition to any proposed reduction in compliance limit.

Monitoring Frequency Change Proposals:

The monitoring frequency used for groundwater and surface water monitoring must be sufficient to confirm that the site is not having an impact on groundwater throughout the life of the site. The frequency should take account of the minimum requirements of the [Landfill Directive Annex III](#)

The frequency should take account of any seasonal variation in the groundwater system and the travel time to receptors identified in the site setting.

Revised Monitoring Plan

An updated monitoring plan will need to be provided detailing any changes to groundwater and surface water monitoring and for reference in any agreed permit variation.

Any proposed change in compliance limit needs to be accompanied by a plan of actions to be taken following breaches of control and compliance limits. The action plan detailed within the monitoring plan should have agreed response times for each action or corrective measure identified.

Further guidance on contingency actions is given in chapter 7.4 of [Landfill Technical Guidance Note 2: Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water](#)

If the compliance limits are reported within this monitoring plan the report may need to be resubmitted upon final agreement of limits.

Permit Variation Application – Change in waste tonnage only.

Use these notes for enhanced pre-application discussions and application review for landfill directive compliant permits where a variation is requested for a change in waste tonnage.

These notes reference the Landfill operators: environmental permits [guidance](#).

The notes set out the information needed to be presented to allow determination of whether the variation requested is suitable. This does not include what would be required for a change in waste codes or leachate compliance limit.

Revised Environmental Setting Report

A revised Environmental Setting and Site Design (ESSD) or Environmental Setting and Installation Design (ESID) report needs to be provided to detail the changes requested, this must include if a change in restoration contours is proposed, if any changes to engineering are proposed (e.g. capping material) and if any changes to monitoring infrastructure are included.

- Have the proposed restoration contours been provided?
- Have details of any engineering changes been provided? Including cross-sections where appropriate.
- Has a plan showing changes to monitoring infrastructure been provided?
- Has consideration been made for the extension of existing management and monitoring infrastructure through the additional waste? Have any adaptations to the design been presented?

Revised Risk Assessments

1. Hydrogeological Risk Assessment (HRA)

The impact of placing additional waste on the existing material should be assessed through the provision of a hydrogeological risk assessment. This should review the conceptual site model and the waste parameters used in any quantitative risk assessment undertaken for the site, and amend these to show that the proposed change will not have an impact on groundwater. Inputs that could change are:

- Waste thickness, where a change in restoration contours is proposed
- Years of operation, if the site is to be completed quicker
- Waste porosity, reduction from compression
- Waste permeability, reduction from compression
- Management of leachate levels where required if these are likely to be squeezed up

Any changes to risk assessment modelling must cover appropriate management control periods, to show:

- compliance with the Groundwater Directive – assuming that any long term active management control continues for as long as necessary (20,000 years in a LandSim model) or a conservative assessment for inert landfills.

- the robustness of technical precautions, particularly the importance of the leachate management system. Such as using a shorter period of management control period in LandSim to show the likely time that it would take for leachate levels to rise within the landfill upon cessation of management and result in breakout at the surface.

2. Stability Risk Assessment

A revised stability risk assessment (SRA) will be required to assess any changes to:

- The waste mass stability, through assessment of slopes
- The stability of any capping system, including any HDPE liners.
- Any monitoring carried out.

The assessment will need to provide plans of the actual settlement observed and comparison to those originally predicted. Additional stability modelling will be required for the additional tonnage.

The SRA will need to demonstrate with calculations that the site infrastructure is not compromised as a result of the proposed increase in tonnage. Where increased settlement has already occurred this will have put additional loads and strains on the infrastructure. Site infrastructure could include:

- Leachate management and monitoring infrastructure
- Gas management and monitoring infrastructure
- Basal lining systems
- Any capping installed

Further detail on the tests and design requirements are given at:

<https://www.gov.uk/guidance/landfill-operators-environmental-permits/design-and-build-your-landfill-site>, including information on cylinder tests.

3. Gas Risk Assessment

The Gas Risk Assessment (GRA) will need to demonstrate that the gas management system is not compromised as a result of the proposed increase in tonnage.

The GRA may also need to address the current gas production rates owing to observed settlement and any likely increase in gas volumes and how this will be managed.

Where environmental monitoring data is supplied, we will be looking for evidence that it was obtained from monitoring infrastructure that is fit for purpose. For relevant monitoring points, this should include presentation of the construction details (borehole logs) and evidence that the condition has been regularly checked and repaired where necessary.

Revised Management Plans

1. Leachate Management Plan

Where leachate is actively managed an updated leachate management plan (LMP) will be required. This will need to show how leachate can be compliantly managed as required by the hydrogeological risk assessment. This should include:

- a) A review of the leachate extraction and monitoring infrastructure to show that it is fit for purpose and will allow leachate to be managed across the site to prevent pollution, and meet the leachate compliance limit. Consideration should also be given to how existing infrastructure will be extended through the waste and any adaption of the design needed. The review should include construction design and standards of leachate monitoring and extraction wells including of retro-drilled extraction and monitoring wells, capacity of the leachate extraction system and any treatment plant, and information about the leachate monitoring methods used, including any changes in reference datums.
- b) Identification of potential deficiencies in the sites leachate infrastructure and the proposed mitigation measures to be put in place. If leachate levels are non-compliant a plan for bringing them back into compliance must be presented.
- c) Updated leachate management water balance flow calculations to show how the current abstraction volumes achieve the leachate compliance limits, and demonstrate that the leachate collection and treatment system is capable of managing any additional leachate volumes produced following the proposed increase in waste tonnage. Leachate abstraction data should be provided with the application.

2. Gas Management Plan

Where gas is or will need to be actively managed an updated gas management plan (GMP) must be provided to address any:

- Changes to written operational procedures for gas management
- Any changes to gas infrastructure and how it will be maintained
- Any changes to gas monitoring.

More detail is provided at: <https://www.gov.uk/guidance/landfill-operators-environmental-permits/manage-landfill-gas>

3. Surface Water Management Plan

An updated surface water management plan (SWMP) must be provided that identifies the changes due to the change in tonnage. This may include:

- Change in restoration contours resulting in changes to surface runoff management
- Detail of any changes to written operational procedures for the water management
- Any changes to surface water discharge or monitoring points.

4. Other Management Plans

Updates may also be needed to other management plans such as dust and noise.