

## **Retaining Wall**

A retaining wall means a permanent structure on land that retains earth or fill. Anchor plates supporting a rock or earth face will not be treated as a retaining wall.

### **Design and Construction**

2. The design and construction of a retaining wall should comply with section 23 of the Building (Construction) Regulation (B(C)R). Reference should be made to Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) APP-63 and the Geoguide 1 - Guide to Retaining Wall Design, Second Edition<sup>1</sup> (Geoguide 1) issued by the Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department (CEDD). Rock faces are not considered as “earth” for the purpose of earth pressure calculation.

### **Drainage Provisions and Filter**

3. Other than for a minor retaining wall defined in section 22 of the B(C)R, drainage provisions and the filter of a retaining wall should be designed and constructed in accordance with section 24 of the B(C)R. The filter should consist of clean, sound and durable material free from clay, organic materials and other impurities. Where site conditions are non-aggressive, geotextile filters composed of resistant synthetic polymers are suitable alternatives to granular filters in permanent works.

4. Section 8.5 of the Geoguide 1 gives some guidance on the design criteria for granular and geotextile filters. Further guidance can be obtained from GEO Publication No. 1/93 on Review of Granular and Geotextile Filters<sup>1</sup>.

### **Backfill**

5. The in situ properties of the backfill behind a retaining wall should meet the design requirements conforming to the Geoguide 1 and also the requirements in Table 1 at Appendix A.

6. The material selected for use as backfill generally must not contain:

- (a) peat, vegetation, timber, organic or other degradable materials;
- (b) dangerous or toxic material;
- (c) material susceptible to combustion;

/(d) ...

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<sup>1</sup> Available in CEDD website [www.cedd.gov.hk](http://www.cedd.gov.hk).

- (d) metal, rubber, plastic or synthetic material;
- (e) material susceptible to significant volume change, e.g. marine mud, swelling clays and collapsible soils; or
- (f) soluble material.

7. In addition, the backfill should not be chemically aggressive. For example, the presence of excessive sulphate in soils can cause accelerated deterioration of concrete and steel.

### **Remedial or Preventive Works to Existing Retaining Wall**

8. Where remedial or preventive works to an existing wall are proposed, the past performance of the wall during its service life is of considerable assistance to the designer. Guidance is given in Section 7.3.3 of Geotechnical Manual for Slopes<sup>1</sup> published by the GEO. Designs carried out in accordance with the recommendations therein will be acceptable to the Building Authority.

### **Monitoring during Construction of Retaining Wall**

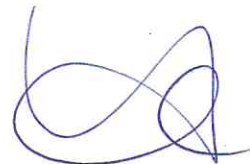
9. Monitoring should be carried out during construction of a retaining wall so as to measure accurately the performance of the retaining wall and the effects of construction on groundwater condition, the site and any building, structure, land, street or services.

### **Demolition of Existing Retaining Wall**

10. Where it is intended to demolish an existing retaining wall, demolition plans and supporting documents as prescribed in regulation 8(3) and (4) of the Building (Administration) Regulations should be submitted for approval.

### **Minor Works Relating to Retaining Walls**

11. Under the Minor Works Control System, certain minor building works relating to routine maintenance of slope or retaining walls are designated as minor works, which may be carried out under the simplified requirements as an alternative to obtaining prior approval and consent under the Buildings Ordinance. Reference can be made to Schedule 1 of the Building (Minor Works) Regulation and PNAP APP-147 regarding the list of minor works items and the simplified requirements respectively.



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**Table 1**  
**Grading and Plasticity Requirements for Retaining Wall Backfill**

<b>Requirement</b>	<b>Backfill Type</b>	
	<b>Crushed Rock Products</b>	<b>Soil</b>
Maximum Size (mm)	200	75 <sup>(2)</sup>
% Passing 63 µm BS Sieve Size	0	0 - 45
Coefficient of Uniformity	≥ 5	≥ 50 <sup>(4)</sup>
Liquid Limit (%)	Not applicable	≤ 45 <sup>(5)</sup>
Plasticity Index (%)	Not applicable	≤ 20 <sup>(5)</sup>
<p>Notes:</p> <p>(1) Relevant test methods for grading and plasticity of fill materials are specified in Sections 6 and 8 of Geospec 3 – Model Specification for Soil Testing prepared by the Geotechnical Engineering Office.</p> <p>(2) The backfill may contain up to 5% of rock fragments not exceeding 200 mm in size, provided that these do not interfere with the compaction requirements or cause any damage to the retaining wall.</p> <p>(3) In addition to the above requirements, the maximum particle size should not exceed two-thirds of the thickness of the compacted layer of backfill in order to ensure good compaction.</p> <p>(4) The above requirements apply to soil derived from in situ rock weathering only. For sands and gravels of alluvial origin, the coefficient of uniformity should be not less than 5 and the material should not be gap-graded (i.e. having two or more distinct sections of the grading curve separated by sub-horizontal portions).</p> <p>(5) There is no need to check the liquid limit and plasticity index of the soil if the backfill contains less than 30% by weight of particles less than 63 µm.</p> <p>(6) The determination of the particle size distribution of the backfill should be carried out without using dispersants.</p>		