(iv) Select the alternative with the least overall adverse impact on fish, wildlife, and related environmental values, including adverse impacts on water quality and aquatic and terrestrial ecosystems.

(4) Location. Maps and cross-section drawings showing the location of all proposed disposal sites and structures. You must locate fills on the most moderately sloping and naturally stable areas available; unless the regulatory authority approves a different location based upon the alternatives analysis under paragraph (a)(3) of this section or on other requirements of the Act and this chapter. Whenever possible, you must place fills upon or above a natural terrace, bench, or berm if that location would provide additional stability and prevent mass movement.

(5) Design plans. Detailed design plans for each structure, prepared in accordance with the requirements of this section and §§816.71 through 816.74 of this chapter. You must design the fill and appurtenant structures using current prudent engineering practices and any additional design criteria established by the regulatory authority.

(6) Geotechnical investigation. The results of a geotechnical investigation of each proposed disposal site, with the exception of those sites at which spoil will be placed only on a pre-existing bench under §816.74 of this chapter. You must conduct sufficient foundation investigations, as well as any necessary laboratory testing of foundation material, to determine the design requirements for foundation stability for each site. The analyses of foundation conditions must take into consideration the effect of underground mine workings, if any, upon the stability of the fill and appurtenant structures. The information submitted must include—

(i) The character of the bedrock and any adverse geologic conditions in the proposed disposal area.

(ii) A survey identifying all springs, seepage, and groundwater flow observed or anticipated during wet periods in the area of the proposed disposal site.

(iii) A survey of the potential effects of subsidence of subsurface strata as a result of past and future mining operations.

(iv) A technical description of the rock materials to be utilized in the construction of disposal structures containing rock chimney cores or underlain by a rock drainage blanket.

(v) A stability analysis including, but not limited to, strength parameters, pore pressures, and long-term seepage conditions. This analysis must be accompanied by a description of all engineering design assumptions and calculations and the alternatives considered in selecting the design specifications and methods.

(7) Operation and reclamation plans. Plans for the construction, operation, maintenance, and reclamation of all excess spoil disposal structures in accordance with the requirements of §§816.71 through 816.74 of this chapter.

(8) Additional requirements for keyway cuts or rock-toe buttresses. If keyway cuts or rock-toe buttresses are required under §816.71(d) of this chapter, the number, location, and depth of borings or test pits, which must be determined according to the size of the spoil disposal structure and subsurface conditions. You also must provide the engineering specifications used to design the keyway cuts or rock-toe buttresses. Those specifications must be based upon the stability analysis required under paragraph (a)(7)(v) of this section.

(b) Design certification. A qualified registered professional engineer experienced in the design of earth and rock fills must certify that the design of all fills and appurtenant structures meets the requirements of this section.

(73 FR 75878, Dec. 12, 2008)

§ 780.37 Road systems.

(a) Plans and drawings. Each applicant for a surface coal mining and reclamation permit shall submit plans and drawings for each road, as defined in §701.5 of this chapter, to be constructed, used, or maintained within the proposed permit area. The plans and drawings shall—

(1) Include a map, appropriate cross sections, design drawings and specifications for road widths, gradients, surfacing materials, cuts, fill embankments, culverts, bridges, drainage
§ 780.38 Support facilities.

Each applicant for a surface coal mining and reclamation permit shall submit a description, plans, and drawings for each support facility to be constructed, used, or maintained within the proposed permit area. The plans and drawings shall include a map, appropriate cross sections, design drawings, and specifications sufficient to demonstrate compliance with §816.181 of this chapter for each facility.

[53 FR 45211, Nov. 8, 1988]