

## Ten ♦ Design of the pumping station

### DESIGN PRINCIPLES AND OBJECTIVES

10.1 The pumping station is a functional engineering structure, the nature and scale of which are determined principally by operational requirements. The underground elements of the development, shown in section in figure 10.1, have thus been designed and scaled to meet a defined operational requirement, namely the transfer of given volumes of wastewater from a lower tunnel from the west into a higher tunnel for onward transfer to the proposed Peacehaven wastewater treatment works. The design also takes into account the additional flow that can arise following storm conditions, and the need to handle flows of wastewater in the event of pump failure.

10.2 However, the pumping station cannot be contained entirely underground. Vehicular access is required for maintenance purposes - for example, when one of the large pumps at the foot of the pumping station chamber needs to be removed for repair or replacement. Surface-level access is thus required.

10.3 The design objectives for the Portobello pumping station were thus to meet operational requirements whilst exploiting the fall in terrain provided by the existing headworks access road to provide a low-level vehicular access portal. This would enable the pumping station to be set into the ground with a green roof, rendering the structure unobtrusive in views from Telscombe Tye and the A259 corridor. The approach also helps to maintain the setting of the listed Badger's Watch pub.

10.4 The access road frontage of the pumping station would feature a vertical wall, topped by a safety railing. The design objective for this frontage is once more to ensure that it offers an unobtrusive appearance in those limited publicly-accessible views - principally from the cliff top paths and Badger's Watch pub to the south-east of the site - from which this southern elevation will be visible.

10.5 As Southern Water's *Environmental Statement* explains, the design approach also supports the design objectives of ensuring the effective containment of noise and odour from the pumping station. The pumping station will effectively operate as a sealed unit at most times.

### THE AMOUNT AND SCALE OF DEVELOPMENT

10.6 The proposed scale of development reflects the functional requirements of the pumping station, including the volume of wastewater it has to lift under normal and storm conditions, and maintenance requirements such as the need to service and replace the pumps at the foot of the shaft. At surface level, the proposed development is influenced by the local landscape and environmental context, as explained in the previous chapter.

10.7 The main vertical shaft of the pumping station will be approximately 27 metres deep and 17.5 metres in internal diameter. The two service shafts to the

west and east of the main shaft will, respectively, be 27.0 and 14.5 metres in depth, and each will have an internal diameter of six metres. Set partly into the ground above the main shaft will be a service hall, measuring approximately 21 x 18 metres in plan and with an internal ceiling height of 8.5 metres. This would accommodate a gantry crane and other equipment and services.

10.8 Alongside the service hall will be rooms accommodating a motor control centre and transformers. These will be approximately 16 x 15 metres in plan, with a ceiling height of six metres. Again, these will be set into the ground.

10.9 A safety railing approximately 96 metres in length will run along the top of the pumping station's south elevation. A 132 metre length of the existing brick boundary wall beside the A259 would have to be removed to facilitate construction, and would be replaced with a brick wall inset with traditional Sussex flint panels.

10.10 To provide access to the pumping station, the existing headworks access road would be permanently diverted by about three metres to the south over a length of 80 metres to provide room for construction of the pumping station.

## LAYOUT OF THE PUMPING STATION

10.11 The pumping station layout is shown in figure 10.2. It includes the pumping station substructure with a main hall above, a motor control centre, a room to house transformers, a fan room, a store room and welfare facilities.

10.12 The pumping station substructure would be located in a vertical shaft with an internal diameter of 17.5 metres. Above this shaft would be a main hall accommodating a gantry crane, vehicle loading bay and various other equipment and services. An underground L-shaped building adjacent to the main hall would house the motor control centre and transformers.

10.13 Portobello reception shaft 1 would be located to the west of the pumping station and would accommodate both a penstock for isolating the wet well and the Portobello pumping station combined sewer overflow and emergency outfall. During construction, the shaft would also serve as a reception shaft for the wastewater transfer tunnel drive from Ovingdean. The overflow tunnel would connect to the existing interceptor sewer at a new underground chamber just upstream of the existing penstock chamber at Portobello. This would allow overflow to discharge either to the Portobello headworks or to the Portobello emergency outfall.

10.14 Portobello reception shaft 2 would be located to the east of the pumping station and would receive intercepted flow from the Peacehaven sewerage network. During construction, it would serve as the reception shaft for the wastewater transfer tunnel drive from the Peacehaven wastewater treatment works.

10.15 The operating platform level of the main hall would be set at a level of 20.0 metres AOD, or approximately nine metres below the existing ground level at the northern edge of the pumping station, so that the superstructure roof would project no more than about 0.5 metres above existing ground level at its northern edge. However, as the existing ground level falls away in a southerly

direction from the site boundary wall beside the A259, the pumping station would project up to 4.0 metres above existing ground level at its southern edge. Retaining walls would be provided on the west and east sides adjacent to the access road to maintain the different ground levels, and much of the southern face of the pumping station main hall and adjacent electrical rooms would be exposed to allow access. The pumping station roof would be covered with soil and grassed, with all material placed in gentle slopes down to existing ground level except where retaining walls are proposed.

## DESIGN AND APPEARANCE OF THE BUILDING

10.16 Elevational drawings of the pumping station are shown in figure 10.3.

10.17 As noted, the pumping station will be set into the chalk face on the north side of the access road leading down to the existing headworks. It would be below the level of the existing boundary wall along the A259, and would respond to the local landscape context.

10.18 The south-facing external wall will be finished in a fair-faced, dense concrete block in a colour to complement adjacent chalk slopes.

10.19 The roof of the pumping station will be covered in soil saved on the site during construction, and grassed to match the appearance of the surrounding land.

10.20 External ventilation louvers will be of powder-coated aluminium to complement the walls of the building. The safety railing along the top of the external wall, along with the roller-shutter door required for vehicular access, will be of galvanised steel.

## SUSTAINABLE DEVELOPMENT CONSIDERATIONS

10.21 As noted earlier in this document, the overall project objective of ensuring a cleaner marine and coastal environment by providing a much-enhanced standard of wastewater treatment is inherently sustainable. The pumping station proposal is a sustainable solution in other respects, in that it would:

- make best use of existing wastewater infrastructure, being close to the existing Portobello headworks and log sea outfall, which would be retained to handle stormwater and provide a supplementary means of wastewater disposal in the event of major system breakdown;
- make use of land of low ecological value within an existing operational site, without disruption to other land uses;
- incorporate a green roof, with attendant landscape and ecological benefits;
- be served by an existing access road, obviating the need for a new access road to be built.

## SAFETY AND SECURITY

10.22 The pumping station would be located within an existing gated operational site and all entrances to the new structure will be secured. A safety railing will be provided along the retaining walls on the southern boundary of the underground structure where vertical retaining walls are required to provide access to the pumping station.