

12.4 Additional Considerations

12.4.1 Construction

The method of construction has a major impact on the cost of the pump station. For near continuous operation, such as pumping sewage, it has been estimated that construction represents more than 20% of the pump station costs over a 10-year period. With a less frequently operating stormwater pump station, operating costs may be insignificant compared to construction costs. Therefore, the type of construction should be chosen carefully, between caisson construction, in which the station is usually circular, or open-pit construction. Soil conditions are the primary factor in selecting the most cost-effective alternative.

Feedback should be provided by the construction personnel on any problems encountered in the construction of the station so the designers can improve future designs. Any changes should be documented by "as-built" drawings. Personnel who are knowledgeable and experienced with such equipment should conduct construction inspections of pump stations.

12.4.2 Maintenance

Since major storm events are infrequent, a comprehensive, preventive maintenance program should be developed for maintaining and testing the equipment so that it will function properly when needed. Instruments such as hour meters and number-of-starts meters should be used on each pump to help schedule maintenance. Input from maintenance forces should be a continuous process so that each new generation of stations will be an improvement.

12.4.3 Retrofitting Stations

Retrofitting existing stormwater pump stations may be required when changes to the highway increase runoff to them. The recommended approach to this problem is to first try to increase the capacity of the station without making major structural changes. This can be achieved by using a cycling sequence that requires less cycling volume or power units that allow a greater number of starts per hour (i.e., shorter cycling time). Submersible pumps have been used effectively in retrofitting stations because of the flexibility in design and construction afforded by their frequent cycling capability.

12.4.4 Safety

All elements of the pump station should be carefully reviewed for safety of operation and maintenance. Ladders, stairwells and other access points should facilitate use by maintenance personnel. Adequate space should be provided for the operation and maintenance of all equipment. Particular attention should be given to guarding moving components such as drive shafts and providing proper and reliable lighting. It may also be prudent to provide air testing equipment in the station so maintenance personnel can be assured of clean air before entering.

Pump stations may be classified as a confined space in which case access requirements along with any safety equipment are all defined by code. Pump stations should be designed to be secure from entry by unauthorized personnel and as few windows as possible should be provided.

12.4.5 Environmental

Pump stations should be located outside the flood zone. If this is not possible, then they must be flood proofed in accordance with the Flood Management statutes and Administrative Regulations.