

1. Record Nr.	UNISA996395806003316
Titolo	The humble address and recognition of the University of Oxford presented to His Sacred Majesty James II King of England, Scotland, France, and Ireland defender of the faith, &c [[electronic resource] ] : According to an act of convocation bearing date, Feb. 21. in the year 1685
Pubbl/distr/stampa	[Oxford, : Printed at the Theater, 1685]
Descrizione fisica	[1]+ p
Altri autori (Persone)	BurghersM
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
2. Record Nr.	UNINA9911007265103321
Autore	Federation Water Environment
Titolo	Design of Wastewater and Stormwater Pumping Stations MOP FD-4, 3rd Edition
Pubbl/distr/stampa	Chicago : , : Water Environment Federation, , 2023 ©2023
ISBN	9781523148400 1523148403 9781572784468 1572784466
Edizione	[Third edition.]
Descrizione fisica	1 online resource (309 pages)
Collana	Manual of practice
Disciplina	628.29
Soggetti	Pumping stations - Design and construction Sewerage - Design and construction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia

Intro -- Title Page -- Copyright -- Contents -- List of Figures -- List of Tables -- Preface -- Chapter 1. Introduction -- 1.0. Overview -- 2.0. Guide to the Manual -- Chapter 2. Station Capacity -- 1.0. Sanitary Wastewater Flow -- 1.1. Engineering Report -- 1.2. Design Life -- 1.3. Population Growth Projection -- 1.4. Land Development -- 1.5. Quantity of Available Water -- 1.6. Quantity of Wastewater Flow -- 1.7. Additional Contributors -- 1.7.1. Commercial -- 1.7.2. Industrial -- 1.7.3. Institutional -- 1.7.4. Infiltration and Inflow -- 1.8. Peak Hourly Wastewater Flowrate -- 2.0. Stormwater Flows -- 2.1. Inflow Hydrograph -- 2.2. Methods of Developing Inflow Hydrographs -- 2.2.1. Rational Method -- 2.2.2. Curve Number Method (Natural Resources Conservation Service Method) -- 2.2.2.1. Rainfall -- 2.2.2.2. Runoff Volume Parameters -- 2.2.2.3. Time Parameters -- 2.2.2.4. Determination of Runoff Volume -- 2.2.2.5. Time of Concentration, Travel Time, and Lag -- 2.2.2.6. Peak Discharge -- 2.2.3. Computerized Runoff Models -- 2.2.3.1. Planning Models -- 2.2.3.2. Design Models -- 2.2.3.3. Operational Models -- 2.2.3.4. Sensitivity Analysis -- 3.0. Combined Flow Systems -- 4.0. Flow Regulation -- 5.0. Quality of Influent -- 6.0. References -- Chapter 3. Station Configuration and Design -- 1.0. Location Considerations -- 2.0. Station Types -- 2.1. Ranges of Flow -- 2.2. Vertical Pumps -- 2.3. Submersible Pumps -- 2.4. Centrifugal Pumps -- 2.5. Horizontal Pumps -- 3.0. Wet Well Considerations -- 4.0. Aesthetic and Safety Considerations -- 5.0. Architectural Design Considerations -- 6.0. Structural Design Considerations -- 7.0. Reference -- 8.0. Suggested Readings -- Chapter 4. Pumping Systems -- 1.0. Wastewater and Stormwater Pumping Stations -- 2.0. Pumping System Hydraulics and Definitions -- 2.1. Capacity -- 2.2. Head. 2.3. Pump Efficiency and Power Requirements -- 3.0. Pumps -- 4.0. Centrifugal Pumps -- 4.1. Pump Classification -- 4.2. Impellers -- 4.3. Pump Characteristic Curves -- 4.4. Cavitation and Net Positive Suction Head -- 4.5. Pump Operating Range -- 4.6. Affinity Laws -- 4.7. Pump Construction -- 4.7.1. Radial-Flow Volute Pumps -- 4.7.2. Axial-Flow Column Pumps -- 4.7.3. Construction Materials -- 5.0. Positive Displacement Pumps -- 5.1. Archimedes Screw Pumps -- 5.2. Pneumatic Ejectors -- 5.3. Airlift Pumps -- 5.4. Progressive Cavity Pumps -- 6.0. Force Mains -- 7.0. Wet Wells -- 8.0. Pump Drives -- 8.1. Electric Motors -- 8.2. Variable-Speed Motor Operation -- 8.2.1. Variable-Frequency Drive. -- 8.2.2. Wound-Rotor Motor Variable Speed -- 8.2.3. Variable-Voltage Motors -- 8.2.4. Variable-Speed Clutches -- 8.3. Internal Combustion Engines -- 9.0. Pump Selection -- 9.1. System Design Considerations -- 9.1.1. Flowrates -- 9.1.2. System Head-Capacity Curve -- 9.1.3. Station Location and Area Served -- 9.1.4. Force Main -- 9.2. Selection Procedure -- 9.2.1. System Head-Capacity Curve Characteristics -- 9.2.2. Preliminary Selection of Pumps -- 9.2.3. Preparation of System Curves -- 9.2.4. Analyzing System Curves -- 10.0. Examples Of Pump Selection -- 10.1. High Friction Head System -- 10.1.1. On-Off Operation of Single Speed Pumps -- 10.1.2. Two-Speed Operation of Pumps -- 10.1.3. Variable-Capacity Operation of Pumps -- 10.1.4. Power Consumption -- 10.2. High Static Head System -- 10.2.1. On-Off Operation of Constant Speed Pumps -- 10.2.2. Two-Speed Operation of Pumps -- 10.2.3. Variable-Speed Operation of Pumps -- 10.2.4. Power Consumption -- 10.3. Large Pumping Station System -- 11.0. Specifying Pump Performance -- 12.0. Reference -- 13.0. Suggested Readings -- Chapter 5. Piping Systems -- 1.0. General Design Criteria -- 1.1. Piping -- 1.2. Valves. 1.3. Maintenance -- 1.4. Force Mains -- 2.0. Fluid Flow Fundamentals -- 2.1. System Curve -- 2.2. Equations -- 2.3. Pipe Flow Parameters --

2.4. Pipe-Fitting Parameters -- 2.5. Station Piping -- 2.6. Discharge Line Piping -- 3.0. Water Hammer and Surge -- 3.1. Surge Pressure Limits -- 3.2. Checklist for Surge Problems -- 3.3. Rigid Water Column Theory -- 3.4. Pressure Wave Velocity -- 3.5. Negative Surge Pressure -- 3.6. Operational Changes to Reduce Water Hammer by Design -- 3.7. Surge Attenuating Devices -- 3.8. Closing Check Valve or Pump Control Valve -- 3.9. Combination Air Vent and Vacuum Break Valves -- 3.10 Pressure Surge Relief Valves -- 3.11 Surge Accumulator Tanks -- 3.12 Surge Towers -- 3.13 Bypass Check Valves -- 3.14 Pump Flywheels -- 3.15 Surge Analysis Software -- 4.0. Piping Material and Fittings -- 4.1. Pipe Joints and Connections -- 4.2. Pipe Supports for Static Loads -- 4.3. Pipe Supports for Dynamic Loads -- 5.0. Valves -- 5.1. Valve Types -- 5.2. Valve Actuation -- 5.3. Valve Applications -- 6.0. Flow Meters -- 7.0. References -- 8.0. Suggested Readings -- Chapter 6. Electrical Design -- 1.0. Reliability and Redundancy -- 2.0. Voltage Considerations -- 3.0. Substations -- 4.0. Transformers -- 5.0. Switchgear -- 6.0. Conduit and Wire -- 7.0. Lightning Protection -- 8.0. Standby Power -- 9.0. Adjustable-Speed Drives -- 9.1. Matching Variable-Frequency Drives and Motors -- 9.2. Variable-Frequency Drive Interfaces -- 9.3. Some Problems With Variable-Frequency Drives -- 10.0. Power Factor -- 11.0. Arc Flash Hazard Analysis -- 12.0. References -- 13.0. Suggested Readings -- Chapter 7. Instrumentation and Control Systems -- 1.0. Process and Instrumentation Diagrams -- 2.0. Level Measurement -- 2.1. Float Switches -- 2.2. Bubbler Systems -- 2.3. Ultrasonic Sensors -- 2.4. Radar Level Sensors -- 2.5. Submersible Level Sensors. 3.0. Flow Measurement -- 3.1. Magnetic Flow Meters -- 3.2. Ultrasonic Flow Meters -- 3.3. Differential Producers -- 3.4. Open Channel Flow Meters-Primary Devices -- 3.5. Open Channel Flow Meters-Secondary Devices -- 3.6. Open Channel Flow Meters-Accuracy -- 3.7. Ancillary Flow Meters -- 4.0. Pressure Measurement -- 5.0. Alarms and Indication -- 5.1. Alarm -- 5.2. Equipment Status Indication -- 5.3. Process Variable Indication -- 6.0. Operator Interfaces -- 6.1. Control Panels -- 6.2. Ancillary Instrumentation -- 7.0. Control Systems -- 7.1. Conventional Control Relays -- 7.2. Programmable Logic Controllers -- 7.3. Single-Loop Digital Controllers and Other Devices -- 8.0. Control Algorithms -- 8.1. All Constant-Speed Pumps -- 8.2. All Variable-Speed Pumps -- 8.3. Combination of Constant- and Variable-Speed Pumps -- 8.4. Alternation -- 8.5. Abnormal Operating Conditions -- 9.0. Variable-Speed Drives -- 10.0. Miscellaneous -- 10.1. Installation -- 10.2. Seal Water -- 10.3. Surge Suppression -- 10.4. Contract Document Coordination -- 10.5. Training and Maintenance -- 11.0. Telemetry Systems -- 11.1. User Needs -- 11.2. System Types -- 11.3. Supervisory Control and Data Acquisition Systems -- 11.4. Communication Links -- 11.5. Remote Terminal Units -- 12.0. Reliability -- 12.1. Level Sensing Elements -- 12.2. Control Hardware and Algorithms -- 12.3. Control Power -- 12.4. Pumps and Drives -- 13.0. Testing -- 14.0. References -- 15.0. Suggested Readings -- Chapter 8. Appurtenances -- 1.0. Screening -- 1.1. Types of Screens -- 1.1.1. Trash Racks -- 1.1.2. Manually Cleaned Screens -- 1.1.3. Basket Screens -- 1.1.4. Mechanically Cleaned Screens -- 1.1.4.1. Multi-Rake, Chain-Driven Screens -- 1.1.4.2. Reciprocating Rake Screens -- 1.1.4.3. Catenary Screens -- 1.1.4.4. Continuous Self-Cleaning Screens -- 1.1.4.5. Overhead Trash Rakes. 1.1.5. Comminutors or Grinders -- 1.2. Screenings -- 1.2.1. Quantities of Screenings -- 1.2.2. Characteristics of Screenings -- 1.2.3. Handling of Screenings -- 1.2.4. Design Practice -- 1.2.5. Installation -- 1.2.6. Design -- 1.2.7. Instrumentation -- 1.2.8. Hydraulics -- 1.2.9. Grit

Removal -- 2.0. Odor Control -- 2.1. Nature and Origins of Odor -- 2.2. Odor Control Practices -- 2.2.1. Pumping Station Design and Operation -- 2.2.2. Odor Prevention -- 2.2.2.1. Flushing/Pigging -- 2.2.2.2. Air/Oxygen Injection -- 2.2.2.3. Chemical Addition -- 2.2.2.3.1. Chlorination -- 2.2.2.3.2. Hydrogen Peroxide -- 2.2.2.3.3. Potassium Permanganate -- 2.2.2.3.4. pH Adjustment -- 2.2.2.3.5. Metal Salts -- 2.2.3. Odor Treatment -- 2.2.3.1. Wet Chemical Scrubbing -- 2.2.3.2. Activated Carbon Adsorption -- 2.2.3.3. Dry Chemical Scrubbers -- 2.2.3.4. Ozone -- 2.2.3.5. Organic Media Biofilters -- 2.2.3.6. Biotrickling Filters -- 2.2.3.7. Odor Modification, Counteraction, and Masking -- 3.0. Noise Control -- 3.1. Noise Characteristics and Sources -- 3.2. Applicable Codes -- 3.3. Noise Reduction Measures -- 4.0. Building Services -- 4.1. Heating, Ventilating and Cooling -- 4.1.1. Codes and Standards -- 4.1.2. Cooling Systems -- 4.1.3. Ventilation Systems -- 4.1.4. Heating Systems -- 4.1.5. Wet Wells -- 4.1.6. Dry Wells -- 4.2. Electrical Design -- 4.3. Plumbing Design -- 4.3.1. Water Supply -- 4.3.2. Interior Sanitary Drainage -- 4.4. Site Storm Drainage -- 4.5. Utilities -- 4.5.1. Electric Utility -- 4.5.2. Telephone Utility -- 4.5.3. Gas Company -- 5.0. Other Appurtenances -- 5.1. Hoists -- 5.2. Safety Features -- 6.0. References -- 7.0. Suggested Readings.

---

### Sommario/riassunto

This Manual of Practice presents current design considerations for wastewater and stormwater pumping stations. It covers station capacity requirements and configuration, the selection and design of pumping equipment, piping system layout and hydraulic considerations, electrical and instrumentation systems design, and other station appurtenances. Intended for design professionals, it addresses design of stations of all sizes and highlights the differences between wastewater and stormwater stations.

---