CORE CONCEPT

Construction Dewatering and Groundwater Control Course: Wellpoints, Deep Wells and Cut-Off Walls

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Introduction:

Construction dewatering and groundwater control, using wellpoints, deep wells and cut-off walls, is a 1-week course for geotechnical, temporary works, site and contractor engineering units that ends with a Dewatering and Groundwater Control Plan for a case basement. Excavations below the water table flood, boil or heave when the drawdown target, pump capacity, discharge route and effect on neighbouring foundations are settled late or by guesswork. Nominees already plan, design or supervise basement and shaft excavations, and learn through a modelling build of drawdown, inflow and settlement spreadsheets. CoreConcept Training Center delivers this construction dewatering course.

Course Objectives:

- Assess groundwater conditions, permeability evidence and excavation geometry to set a drawdown target and a groundwater control strategy for a basement or shaft
- Select between sump pumping, wellpoints, deep wells, ejector wells and horizontal drains, alone or combined with cut-off walls and grouting, for a given soil profile
- Calculate inflow, radius of influence, well numbers and pump duty from dewatering trial data using equivalent-well and Thiem steady-state methods
- Plan discharge treatment for silt, saline and contaminated pumped water and prepare the records a discharge consent application requires
- Estimate drawdown-induced settlement under adjacent buildings and specify piezometer, settlement point and flow meter monitoring with trigger levels
- Supervise dewatering contractors through installation, commissioning, standby power, daily logs and controlled switch-off

Target Audience:

- Geotechnical design units responsible for groundwater control strategy and drawdown calculations
- Temporary works units responsible for dewatering design checks, standby provisions and method statements
- Contractor engineering units responsible for installing, running and decommissioning wellpoint and deep well systems
- Consultant supervision units responsible for reviewing dewatering submittals and monitoring returns
- Site engineering units responsible for basement, shaft and utility trench excavations below the water table
- Environmental units on construction sites responsible for pumped water discharge and consent conditions

Course Outline:

Day 1: Groundwater Behaviour in Excavations and Site Baseline

- Water Table, Perched Water and Artesian Pressure Recognition
- Permeability Ranges From Gravel to Clay for Dewatering Choice
- Excavation Failure Modes of Boiling, Piping and Base Uplift
- Coastal and Tidal Groundwater With Saline Intrusion Effects
- Site Baseline Sheet of Levels, Strata and Nearby Structures

Day 2: CIRIA C750 Methods, Cut-Off Options and Dewatering Trials

- CIRIA C750 Groundwater Control Method Selection Chart
- Sump Pumping, Wellpoints and Ejector Wells Compared by Lift
- Deep Well and Horizontal Drain Layouts Around Excavations
- Cut-Off Walls, Slurry Trenches and Permeation Grouting Options
- Dewatering Trial Pumping and Recovery Data Interpretation

Day 3: Dewatering Design Calculations and System Sizing

- Equivalent Well Radius and Radius of Influence Estimation
- Thiem Steady-State Inflow Calculation for Wellpoint Rings
- Deep Well Spacing, Pump Duty and Header Main Sizing
- Eurocode 7 Hydraulic Heave and Uplift Safety Checks
- Discharge Settlement Tanks, Silt Control and Saline Water Disposal

Day 4: Settlement Risk, Monitoring, Contractor Control and Failures

- Drawdown-Induced Consolidation Settlement Under Adjacent Foundations
- Recharge Wells and Cut-Off Toe Depth to Protect Neighbours
- Piezometer, Settlement Point and Flow Meter Trigger Schedule
- Contractor Daily Pumping Log, Standby Power and Pump Failure Drill
- Dewatering Failure Cases of Fines Loss, Clogging and Flooding

Day 5: Modelling Build of the Dewatering and Groundwater Control Plan

- Case Basement Drawdown Target and Method Selection Exercise
- Case Inflow and Well Layout Spreadsheet Build
- Case Settlement Estimate for Neighbouring Buildings
- Case Discharge Route, Treatment and Consent Record Pack
- Dewatering and Groundwater Control Plan Completion and Panel Review

Skills You Will Gain:

- Groundwater Control Strategy
- Dewatering Method Selection
- Inflow and Drawdown Calculation
- Cut-Off and Grouting Appraisal
- Pumped Water Discharge Management
- Settlement Risk Estimation
- Dewatering Instrumentation Planning
- Dewatering Contractor Supervision

Why Attend This Course:

- Deliver a Dewatering and Groundwater Control Plan for a case basement to the temporary works coordinator and the project manager
- Decide whether wellpoints, deep wells, ejector wells or a cut-off wall with internal pumping suits the soil, depth and nearby buildings
- Avoid flooded formation levels, base boiling, neighbour settlement claims and discharge breaches that stop excavation
- Share inflow spreadsheets, monitoring trigger schedules and pumping log templates with site and design colleagues

Conclusion:

Back at work, the participant hands the Dewatering and Groundwater Control Plan to the temporary works coordinator and the project manager. They use it to approve the dewatering method, the well layout and pump duty, the discharge arrangement and the monitoring triggers before excavation passes below the water table, and to brief the dewatering contractor. After the first excavation stage reaches formation level, the unit should compare measured inflow, piezometric levels and neighbour settlement with the plan and adjust pumping rates or trigger levels.

Frequently Asked Questions FAQ:

What should participants know before a construction dewatering and groundwater control course?

Participants should already plan, design or supervise excavations and be able to read borehole logs, site plans and basic soil parameters. Spreadsheet skills help, because inflow, well layout and settlement estimates are built during the course. Bringing a current basement or shaft drawing is useful.

How does a construction dewatering and groundwater control course differ from a hydrogeology or retaining wall course?

It concentrates on lowering and holding back groundwater temporarily so an excavation stays dry and stable. Hydrogeology courses address long-term water supply wells and aquifer yield, while retaining wall courses address earth pressure and structural support of the excavation sides.

When is a cut-off wall preferred to pumping in construction dewatering and groundwater control?

A cut-off wall is preferred where pumping would draw down groundwater under sensitive neighbouring buildings, where inflow is too high to pump economically, or where saline or contaminated water would be costly to treat. An impermeable stratum at reachable depth makes the cut-off far more effective.

What do participants take back from the construction dewatering and groundwater control course?

Participants take back a Dewatering and Groundwater Control Plan for a case basement, with a method selection, inflow and well layout calculations, a neighbour settlement estimate, a discharge treatment arrangement and a monitoring schedule with trigger levels.