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Construct DSM Cutoff Wall: QA, Mixing Energy, Permeability

Construct DSM cutoff wall with an interactive checklist focused on mixing energy, overlap continuity, QA coring, and permeability.
Fully commentable and export as PDF/Excel.

Project:

Date:

Filled by:

Pre-Construction & Submittals

1	Confirm approved DSM mix design and wall geometry; record binder type, water-to-binder ratio, target diameter, and permeability criteria per approved project specifications and authority requirements; attach signed approvals and latest revisions.
2	Stake wall alignment and top-of-wall elevation using total station/GNSS; maintain horizontal tolerance ± 20 mm and elevation ± 10 mm; upload coordinate file, stake-out report, and photos of control points.
3	Verify materials traceability: cement/binder lot numbers, delivery tickets, and storage conditions; acceptance: tickets match mix design, moisture protected; upload tickets and silo level logs.
4	Approve construction method statement explicitly excluding secant and diaphragm wall methods; include sequencing, overlap geometry, spoil management, and contingency plans; evidence: signed method statement and ITP.

Equipment Calibration & Mixing Energy Control

5	Calibrate torque and rotation sensors on the DSM rig; acceptance: within $\pm 2\%$ of reference across operating range; attach calibration certificates and before/after check readings.
6	Calibrate grout flowmeter and pressure transducer with a prover tank; acceptance: flow error $\leq \pm 3\%$, pressure $\leq \pm 2\%$ of full scale; upload calibration sheet and photos.
7	Configure data logger to capture depth, torque, RPM, penetration/withdrawal rates, flow, and pressure at ≥ 1 Hz; verify time sync; evidence: sample log file and timestamp check.
8	Complete trial columns to establish baseline energy curve versus depth; acceptance: actual curve within $\pm 10\%$ of target over 90% of length; attach plots and trial reports.

Wet Mixing Operations & Overlap Continuity	
9	Survey start point and verify drill to design depth (toe elevation) with depth encoder; tolerance: depth $-0/+100$ mm; evidence: log extract and stake photo.
10	Maintain penetration and withdrawal rates per procedure (e.g., 0.2–0.6 m/min); acceptance: within specified band; upload rig trend chart showing steady rates without stalls.
11	Control binder dosage via flow vs. advance rate; acceptance: dosage within $\pm 5\%$ of target; capture flow/pressure plots and batch records for each column.
12	Ensure column overlap meets design (≥ 150 mm or $\geq 15\%$ of diameter, whichever is greater); verify by layout checks and drilling logs; evidence: as-built overlap calculations and field photos.
13	Monitor real-time energy index (torque $\times$ revs) and set low-energy alarms; acceptance: not below target for more than 0.5 m of depth; attach alarm screenshots and corrective action notes.
14	Check tool verticality with inclinometer; tolerance: deviation $\leq 1:100$; capture inclinometer readings at start, mid-depth, and toe for each column.
15	Observe and record returns/spoil consistency to confirm mixing; acceptance: continuous returns without segregation; upload photos and supervisor sign-off.

Quality Assurance Coring & Lab Testing	
16	Select core locations using a risk-based plan covering overlaps and variable soils; mark on as-built; evidence: core location map with coordinates and IDs.
17	Extract 100 mm diameter cores after specified curing (e.g., 7/28 days); seal ends to prevent moisture loss; evidence: core logs, photos, and chain-of-custody.
18	Test UCS and lab permeability per approved project specifications; acceptance: parameters meet target values; attach lab reports with sample IDs and curing records.
19	Assess core quality (RQD-like assessment, defects, inclusions); acceptance: no open voids or unmixed zones; upload inspection sheets and annotated photos.

In-Situ Permeability Verification	
20	Conduct falling-head or single-hole packer tests in selected columns; acceptance: hydraulic conductivity meets target (e.g., $\leq 1 \times 10^{-10}$ m/s) per approved specifications; attach raw data and calculations.
21	Investigate anomalies (rapid head loss or high k) by coring or GPR; implement remedial re-mixing or grout injection; evidence: corrective action record and passing retest.

Documentation & Acceptance	
22	Compile daily reports with instrument logs, batch tickets, crew notes, and weather; supervisor signs; upload PDF and native data files.
23	Produce as-built wall plan showing column centres, diameters, overlaps, and test locations; georeference to site grid; evidence: CAD/PDF and exported coordinate list.
24	Complete final acceptance review against ITP: mixing energy compliance, overlap continuity, core and permeability results; obtain client/engineer digital signatures.
25	Archive all records with QR-linked index; store photos, logs, approvals, and test certificates; verify backup to project server/cloud.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
Construct DSM cutoff wall requires disciplined controls over mixing energy, overlap continuity, QA coring, and permeability verification to deliver a continuous low-permeability barrier. This checklist targets deep soil mixing cutoff wall works and DSM barriers for groundwater control along embankments, cofferdams, and excavation perimeters. It excludes secant piles and diaphragm walls, keeping focus on wet mixing methods, data logging, and acceptance testing. By standardizing calibration, live monitoring, and test frequency, you minimize windows, segregation, and under-mixed zones that compromise hydraulic performance. The outcome is a traceable record set linking materials, equipment settings, energy curves, core strengths, and in-situ hydraulic conductivity to acceptance criteria. Use it to guide preconstruction, production, and verification—capturing photos, instrument screenshots, test IDs, and approvals. Start interactive mode to tick tasks, add comments with attachments, and export as PDF/Excel. Generate and affix the QR to field packs so crews access the latest version.	1. Preparation: gather approved mix design, method statement, ITP, rig calibration certificates, and survey control. Ensure access, spoil management, lighting, and emergency equipment. Equip the crew with PPE, tablet/phone, and camera for logging evidence. 2. Open the checklist on your device and switch to interactive mode. Assign roles to crew members so torque/RPM monitoring, survey, batching, and QA sampling tasks have clear owners. 3. During production, tick each task as completed, attach photos (stake-out, instrument screens), and upload data logs. Use comments to record anomalies, pauses, and corrective re-mixing. 4. At verification stages, add lab reports and field test sheets. Cross-reference sample IDs to column numbers and depths to maintain traceability. 5. Export progress snapshots to PDF/Excel for daily briefings. Share links with stakeholders to review comments and request clarifications before the next shift. 6. Sign-Off: obtain digital signatures from contractor, engineer, and owner. Generate a QR-linked final export and place it on the as-built drawing set for quick authentication.