Tank Bund Wall Calculator

Purpose: size a bund (secondary containment) based on tank inventory and bund footprint.

Inputs		
Bund internal plan area (m²)	911.00	Enter the INTERNAL bund floor area available for containment (excluding wall thickness).
Freeboard (m)	0.15	Safety allowance to prevent overtopping (typ. 0.15 m; increase for heavy rainfall or firewater planning).
Additional capacity allowance (%)	0.00	Extra allowance on top of the regulatory minimum (e.g., for rainfall, foam, uncertainties).
Displacement / unusable area (%)	20.00	Percent of plan area lost due to tank footprints/plinths/sumps etc. (simple allowance). Retentate tank disregarded as worst case is failure of this tank, and associated flooding of surface area.
Max practical wall height (m)	1.80	Flag if computed wall height exceeds this (adjust bund area or layout).

Tank inventory (edit quantities and volumes as needed)

Tank / Service	Tag(s)	Qty	Volume per tank (m³)	Total volume (m³)	Notes
Conditioning wash water tank	T-01	0	30.00	0.00	Tanks not in bund
Wet milling wash water tank	T-02	0	30.00	0.00	Tanks not in bund
Slurry tanks	T-05, T-06	2	90.00	180.00	
Filter press buffer filtrate tank	T-07	1	20.00	20.00	Tank not in bund and c/w internal covered bund.
CSTR reactor tanks	T-08, T-09	2	30.00	60.00	
Filtrate storage tanks	T-10, T-11	2	90.00	180.00	
Clarified water storage tank	T-12	1	10.00	10.00	
Slurry storage tank	T-13	1	20.00	20.00	
Waste filter press buffer filtrate tank	T-14	1	20.00	20.00	
RO feed handling tank	T-15	1	80.00	80.00	
RO feed tanks (CSTRs)	T-16, T-17	2	30.00	60.00	
Clean water storage tank	T-18	0	738.00	0.00	Removed from bund
Retentate storage tank	T-19	1	1000.00	1000.00	
Acid storage tank		0	10.00	0.00	Tank c/w internal covered bund.
Sodium aluminate make-up tank		0	3.00	0.00	Tank c/w internal covered bund.
Sodium aluminate solution storage tank		0	10.00	0.00	Tank c/w internal covered bund.
Flocculant make-up tank		0	1.00	0.00	Tank c/w internal covered bund.
Flocculant solution storage tank		0	10.00	0.00	Tank c/w internal covered bund.
			TOTAL	**1630.00**	

Calculations & Outputs		
Largest single tank (m³)	1000.00	
Total stored volume (m³)	1630.00	
Regulatory minimum bund capacity (m³)	1100.00	Rule-of-thumb: max(110% largest, 25% total) for multiple containers.
Required capacity incl. allowance (m³)	1100.00	
Effective bund plan area (m²)	728.80	
Bund wall height required (m)	1.66	
Containment volume provided at that height (m³)	1100.00	
Compliance check	**PASS**	
Height check (vs max practical)		**OK**

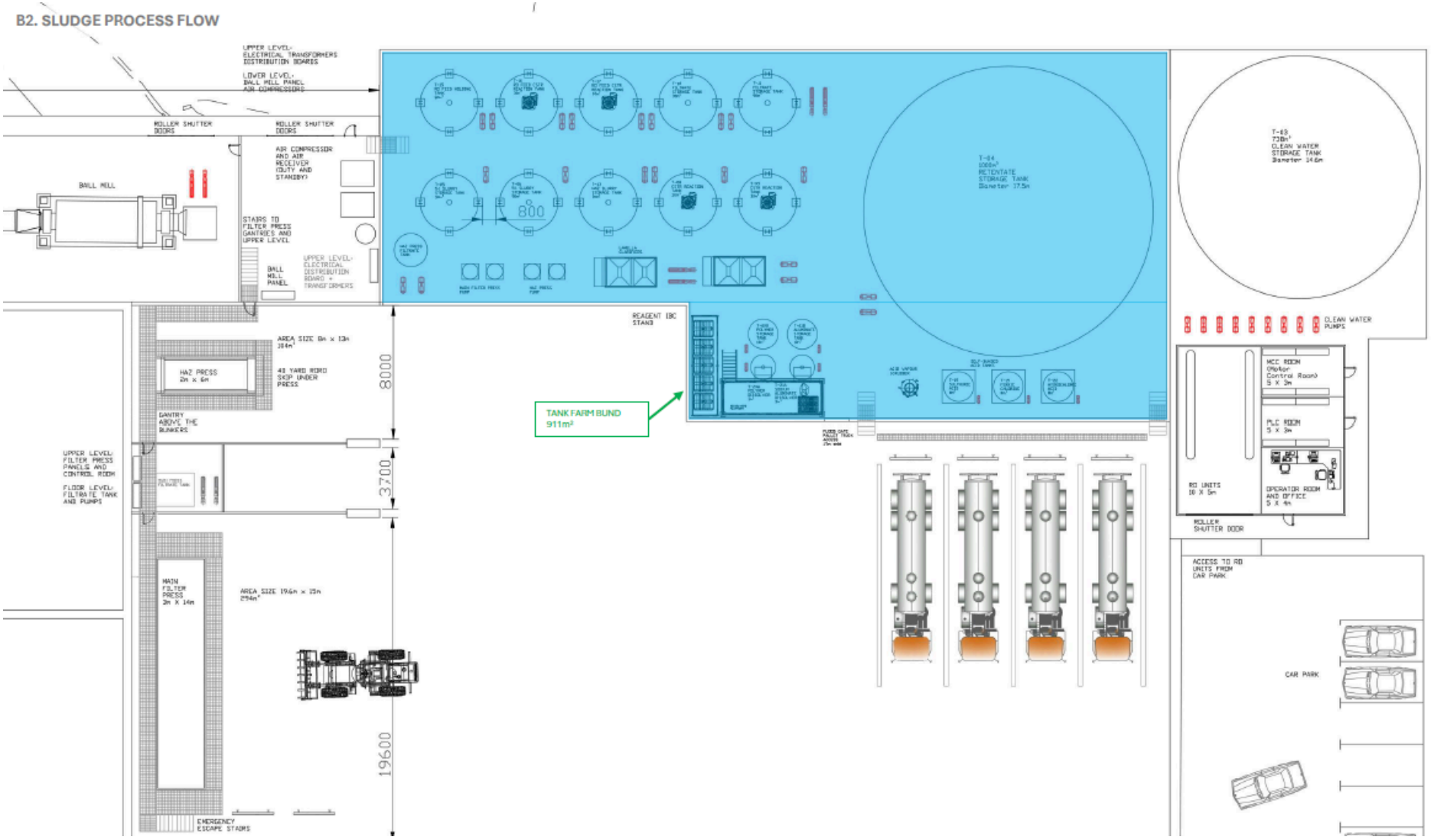
Suggested bund construction spec (starting point – to be confirmed by civil/structural design)

- Reinforced concrete bund with impermeable floor and walls; joints sealed; falls to a sump for pump-out.
- Concrete strength class: C35/45 (or higher as required). Select cement/exposure class to suit chemical environment (e.g., chloride exposure) and groundwater conditions.
- Base slab thickness: 200–250 mm typical; bund wall thickness: 200 mm typical (increase with height/loading).
- Rebar: B500B (UK common), designed to Eurocode 2; provide adequate cover (often ≥50 mm for aggressive environments).
- Waterproofing: hydrophilic or PVC waterstops at construction joints; chemical-resistant coating/liner internally where needed.
- Freeboard: keep at least the input freeboard value clear; keep rainwater out where possible (covers) and manage firewater per site emergency plan.

Reference notes (paste links into your design basis / permit submission as needed)

- HSE COMAH – Secondary containment (110% guidance): https://www.hse.gov.uk/comah/sragtech/techmeascontain.htm
- SEPA COMAH containment policy support guidelines (110% or 25% whichever greater): https://www.sepa.org.uk/media/426907/comah_containment_policy_supporting_guidelines.pdf

B2. SLUDGE PROCESS FLOW



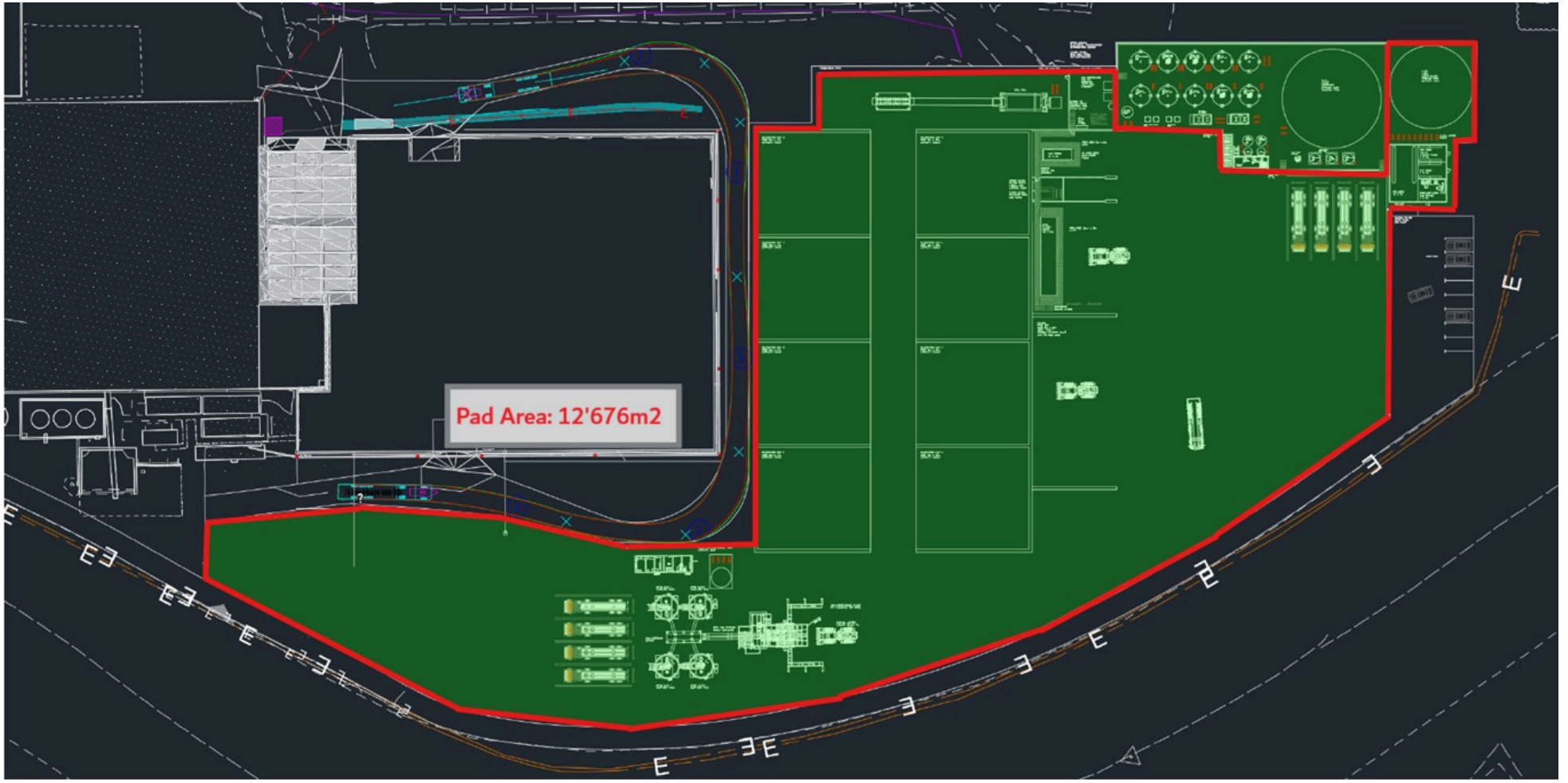
CIRIA C736-style 1% AEP (1 in 100 year) Rainfall Storage Volume (Depth Method)

Calculates required containment volume from a user-entered pad surface area using a rainfall depth (mm) for a chosen duration, with an EA climate change uplift. Mirrors the CIRIA report method: Volume = Area × (Adjusted Depth) × Runoff Coefficient.

Inputs (edit blue cells)		
Pad surface area (m^2)	12676.00	Enter the contained pad plan area (m^2) within kerbs/bunds.
Rainfall duration (hours)	12.0	Duration used for the depth value (example report used 12 hours).
1% AEP rainfall depth for duration (mm)	77.38	Example FEH/Wallingford 1% AEP, 12h depth from the CIRIA report.
Climate change uplift (%)	45.0	Example EA uplift from the CIRIA report.
Runoff coefficient (0–1)	1.00	Impermeable slab normally 1.0 (conservative).
Contingency / freeboard (%)	0.0	Optional margin on required storage (e.g., 10%).

Calculated outputs		
Adjusted rainfall depth (mm)	112.20	Adjusted depth = depth × (1 + climate change uplift).
Required containment volume (m^3)	1422.26	Volume = area × adjusted depth (m) × runoff coefficient.
Required volume incl. contingency (m^3)	1422.26	Optional additional margin.
Average intensity over duration (mm/hr)	6.45	Informational only (depth-based method is the CIRIA-style check).

Kerb height check (rainfall depth method – conservative)		
Freeboard allowance (m)	0.10	Typical freeboard for kerbs/bunds; edit as required.
Displacement / unusable area (%)	0.0	Optional: reduces effective storage area.
Recommended minimum kerb height (m)	0.21	Height = adjusted rainfall depth over effective area + freeboard.
Recommended minimum kerb height (mm)	212	Convert to mm.


Pad Area: 12'676m2