

ClearPath RD

clearpathrd.com

Email Sequence Specification

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What this document covers

- 8 email types with trigger logic, timing calculations, sender addresses, and content structure
- Voice and register rules for each email — mapped to the dual-register framework from the Brand Brief
- Timing diagram showing the full sequence across a 91-day test cycle
- Duplicate-send prevention logic for every email type
- Template variable register — all dynamic fields and their sources
- Resend integration notes: React Email template file names, scheduling approach
- Edge cases: real estate short-term kit timing, twin pack sessions, expired sessions
- Pre-send checklist for the engineering implementation

From addresses used in this spec

hello@clearpathrd.com — Transactional emails where a human reply is welcome (order confirm, activation, results, certificate)

no-reply@clearpathrd.com — System-driven educational emails and reminders where reply is not expected (Day 30, 60, 80, 88)

1. Sequence Overview

ClearPath RD sends exactly 8 transactional emails per completed test cycle. No marketing emails are sent without explicit opt-in. All emails are sent via Resend and logged to the email_log table before and after delivery.

Brand voice rule: every email speaks to the user as a capable adult navigating an unfamiliar process. No alarm language. No urgency theatre. The goal is to reduce friction at each stage of the journey, not to create it.

1.1 The Journey in One View

A long-term kit test from order to certificate spans approximately 100–110 days. Eight emails accompany that journey:

D0 Order confirmed	D0+act Kit activated	D30 Day 30 check-in	D60 Day 60 check-in	D80 Day 80 heads-up	D88 Retrieval due	D+10 post-mail Results prompt	On cert Certificate ready
EMAIL-1 order_confirm	EMAIL-2 activation	EMAIL-3 day_30	EMAIL-4 day_60	EMAIL-5 day_80	EMAIL-6 day_88	EMAIL-7 results_prompt	EMAIL-8 certificate_ready

Note: Day numbers are calculated from activated_at (the date the user confirms kit placement), not from the order date. The order_confirm email is the only email triggered before activation.

1.2 Timing Calculation Reference

All day-based emails are calculated against activated_at stored in the test_sessions table. The scheduled_at timestamp in email_log is set at activation time for all sequenced emails.

Email type	Trigger event	Timing calculation
order_confirm	kit_order.payment_status = paid	Immediate — fired by Stripe payment_intent.succeeded webhook handler
activation	test_session.status → active	Immediate — fired when user confirms kit placement via POST /sessions/:id/activate
day_30	test_session.activated_at set	scheduled_at = activated_at + 30 days. Set at activation time.
day_60	test_session.activated_at set	scheduled_at = activated_at + 60 days. Set at activation time.
day_80	test_session.activated_at set	scheduled_at = activated_at + 80 days. Set at activation time.
day_88	test_session.activated_at set	scheduled_at = activated_at + 88 days. Set at activation time. This is 3 days before the 91-day expected_completion_date.
results_prompt	test_session.mailed_at set	scheduled_at = mailed_at + 10 days. Set when user confirms mailing.
certificate_ready	certificate.status = valid	Immediate — fired when certificate generation job completes.

1.3 Email Dispatch Architecture

The email scheduling job (src/jobs/emailQueue.ts) runs every 15 minutes via node-cron. It queries email_log for rows where status = queued AND scheduled_at <= NOW(). For each matching row, it calls the Resend SDK and updates status to sent.

Immediate emails (order_confirm, activation, certificate_ready) are sent directly via the Resend SDK in the route handler or webhook handler — they do not go through the queue. Their email_log rows are created with scheduled_at = NOW() and status = sent immediately after the Resend API call succeeds.

Duplicate-send prevention: before sending any email, the system queries email_log for an existing row matching (user_id, test_session_id, email_type) where status NOT IN ('failed'). If found, the send is skipped. This prevents duplicate emails if a webhook fires twice or a job runs twice.

2. Email Specifications

2.1 EMAIL-1 — Order Confirmation

EMAIL-1 — Order Confirmation	
Trigger: kit_order.payment_status transitions to paid (Stripe payment_intent.succeeded webhook)	
From address	hello@clearpathrd.com — "ClearPath RD" display name
Subject line	Your ClearPath RD kit is on its way — here's what to expect
Send timing	Immediate. Sent synchronously in the Stripe webhook handler after order and TestSession records are created. Not queued.
Persona / register	Register A (warm peer). This is the first email in the journey. Tone: warm confirmation, practical, reassuring. The user has just paid money — they need to feel confident the order was received and know exactly what happens next.
Goal	Confirm the purchase, set clear expectations for kit delivery and activation, introduce the journey ahead.
Content structure	<ul style="list-style-type: none"> Opening: warm confirmation that the order is placed and payment received. No dry receipt language. Order summary: product name, quantity, shipping address. Simple, not a tax invoice. What happens next — 3 steps: (1) Kit arrives in 5–7 business days. (2) Place kit in lowest occupied level. (3) Come back to activate it in the app. Kit placement preview: one sentence on where to put it (basement or lowest occupied room, away from exterior walls, away from drains). More detail in the activation email. CTA: "Track your order" if lab partner provides a tracking URL; otherwise "Log in to your dashboard" to see the order. Footer: support link, unsubscribe note (required by CASL even for transactional emails).
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{product_name}}</code> — derived from <code>kit_orders.product_sku</code> <code>{{shipping_address}}</code> — assembled from <code>kit_orders.shipping_*</code> fields <code>{{order_number}}</code> — <code>kit_orders.id</code> (short display format) <code>{{estimated_delivery}}</code> — calculated as <code>fulfilled_at + 7 business days</code> (static estimate for MVP) <code>{{dashboard_url}}</code> — <code>APP_BASE_URL + /dashboard</code>
Duplicate-send guard	Guard checked: (<code>user_id</code> , <code>null</code> , <code>order_confirm</code>) — <code>test_session_id</code> is <code>null</code> for this email because the session may not exist yet at send time (twin pack creates two sessions). One <code>order_confirm</code> per order.
Notes	For twin pack orders, a single <code>order_confirm</code> email is sent — do not send one per session. The email references the order, not individual sessions.

2.2 EMAIL-2 — Kit Activation

EMAIL-2 — Kit Activation	
Trigger: test_session.status transitions to active (POST /sessions/:id/activate)	
From address	hello@clearpathrd.com — "ClearPath RD" display name
Subject line	Your radon test is now active – placement guide inside
Send timing	Immediate. Sent synchronously in the activate route handler. Not queued. One email per session — twin pack activations each generate their own activation email.
Persona / register	Register A (warm peer). The user has just taken action. Tone: encouraging, clear, confident. This email is practical — it needs to give the user exactly the placement information they need to succeed.
Goal	Confirm activation, provide clear placement guidance, set the expected completion date, and schedule anticipation for what comes next.
Content structure	<ul style="list-style-type: none"> Opening: confirm the test is active and give the user a sense of what is happening ("Your detector is now measuring radon levels in your home.") Placement confirmation: repeat back the room the user entered, confirm the kit serial number. Placement rules (brief): at least 20 cm from exterior walls and floors, away from drafts, not in bathrooms or kitchens, ideally at breathing height. Expected completion date: state the date clearly in plain language ("Your test period ends on [date]. We'll remind you when it's time to retrieve the kit.") What not to do: do not move the detector, do not store it in a bag. CTA: "View your active test" → links to the session detail page in the dashboard. Preview of what comes next: brief note that they will receive a check-in email at the 30-day mark.
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{placement_room}}</code> — <code>test_sessions.placement_room</code> <code>{{kit_serial}}</code> — <code>test_sessions.kit_serial_number</code> <code>{{expected_completion_date}}</code> — <code>test_sessions.expected_completion_date</code> (formatted: "Monday, June 2, 2026") <code>{{session_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id</code> <code>{{retrieval_due_date}}</code> — <code>test_sessions.retrieval_due_at</code> (formatted)
Duplicate-send guard	Guard checked: (user_id, test_session_id, activation). One per session. If the user somehow activates twice (should not be possible via API), the second send is blocked.
Notes	For real_estate_short kit type, expected_completion_date is 4 days from activation, not 91. Adjust copy: "Your test period ends in approximately 4 days." Retrieval reminder email (day_88) does not apply — see Edge Cases section.

2.3 EMAIL-3 — Day 30 Check-In

EMAIL-3 — Day 30 Check-In	
Trigger: test_session.activated_at set — scheduled_at = activated_at + 30 days	
From address	no-reply@clearpathrd.com — "ClearPath RD" display name
Subject line	One month in — your test is working
Send timing	Queued at activation. Dispatched by emailQueue job when scheduled_at <= NOW(). If test session is cancelled or expired before this date, the queued email is NOT sent (job checks session status before dispatch).
Persona / register	Register A (warm peer), educational lean. Tone: warm and informative. This is not a reminder or a nudge — it is a genuine value-add. The user has done nothing wrong and needs to do nothing right now.
Goal	Reassure that the test is progressing normally. Deliver educational content that adds value to the wait. Maintain engagement without creating anxiety.
Content structure	<ul style="list-style-type: none"> Opening: acknowledge the milestone without being cloying. ("You're one month into your radon test. The detector is doing its job quietly in the background — no action needed from you today.") Educational content block 1 — How radon enters your home: brief explanation of soil gas entry pathways (foundation cracks, sumps, floor drains, construction joints). 3–4 sentences. Practical, not alarming. Educational content block 2 — Why long-term testing matters: radon levels fluctuate seasonally and daily. A 91-day average gives a more accurate picture than a short-term snapshot. One paragraph. What is happening in the lab: brief description of how alpha track detectors work (CR-39 plastic, alpha particles leave tracks, lab counts the tracks). Optional inclusion — include if word count allows. Progress indicator: "You are approximately [30] days into your [91]-day test. [61] days remaining." Keep it factual, not a countdown. CTA: "Check your test status" → session dashboard page. Secondary CTA optional: link to the radon information page on the site.
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{days_elapsed}}</code> — 30 (static for this template) <code>{{days_remaining}}</code> — <code>expected_completion_date - send date (calculated at send time)</code> <code>{{expected_completion_date}}</code> — <code>test_sessions.expected_completion_date</code> <code>{{session_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id</code> <code>{{placement_room}}</code> — <code>test_sessions.placement_room</code>
Duplicate-send guard	Guard checked: (user_id, test_session_id, day_30). Job skips if session.status IN (cancelled, expired, complete) at dispatch time.
Notes	Do not send if session is complete (result already entered). Do not send for real_estate_short kit type (test is over in 4 days).

2.4 EMAIL-4 — Day 60 Check-In

EMAIL-4 — Day 60 Check-In	
Trigger: test_session.activated_at set — scheduled_at = activated_at + 60 days	
From address	no-reply@clearpathrd.com — "ClearPath RD" display name
Subject line	Two months in – a few things worth knowing before your results
Send timing	Queued at activation. Dispatched by emailQueue job. Same status check as Day 30.
Persona / register	Register A (warm peer), practical lean. Tone: informative, preparatory. The user is approaching the final third of the test. This email begins to prepare them for what the result might look like and what it means.
Goal	Continue engagement, deliver practical content, begin setting expectations for the results experience so the result screen is not their first encounter with the zone framework.
Content structure	<ul style="list-style-type: none"> Opening: acknowledge two months elapsed, confirm no action needed yet. ("Two months down. Your test is in its final stretch — here's what's worth knowing before you get your results.") Educational content block 1 — Understanding your result: brief introduction to the Health Canada guideline of 200 Bq/m³. Explain it as the level at which action is recommended, not a danger threshold. Use the ClearPath voice: translate, do not alarm. Educational content block 2 — What the four zones mean: brief preview of below_guideline, caution, action_required, urgent_action zones in plain language. One sentence per zone. Frame positively: most Canadian homes test below the guideline. Practical guidance: remind the user not to move the detector and not to do major renovations near the detector room during the test period. Preview of what happens after retrieval: "When the test ends, you'll retrieve the detector, mail it to the lab, and enter your result in the app. We'll walk you through each step." Progress indicator: "[60] days elapsed. [31] days remaining." Approximate — calculated at send time. CTA: "Review your test details" → session dashboard.
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{days_elapsed}}</code> — 60 (static) <code>{{days_remaining}}</code> — <code>expected_completion_date - send_date</code> <code>{{expected_completion_date}}</code> — <code>test_sessions.expected_completion_date</code> <code>{{session_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id</code>
Duplicate-send guard	Guard checked: (user_id, test_session_id, day_60). Job skips if session.status IN (cancelled, expired, complete).
Notes	Do not send for real_estate_short kit type.

2.5 EMAIL-5 — Day 80 Heads-Up

EMAIL-5 — Day 80 Heads-Up	
Trigger: test_session.activated_at set — scheduled_at = activated_at + 80 days	
From address	no-reply@clearpathrd.com — "ClearPath RD" display name
Subject line	Your radon test ends in about 11 days – here's what to prepare
Send timing	Queued at activation. Dispatched by emailQueue job.
Persona / register	Transitioning from Register A toward Register B on practical instructions. Tone: calm, clear, preparatory. The test is nearly complete. This email is a warm heads-up, not a nagging reminder.
Goal	Prepare the user for retrieval without creating urgency. Give them everything they need to act confidently when the retrieval date arrives.
Content structure	<ul style="list-style-type: none"> Opening: acknowledge the test is nearly complete. ("Your radon test is in its final stretch — about 11 days until retrieval. Here's what you need to do when the time comes.") Retrieval instructions preview: step-by-step walkthrough of what retrieval involves. (1) Remove detector from placement. (2) Seal it in the return envelope included with the kit. (3) Drop it in any Canada Post mailbox. Return envelope reminder: confirm the prepaid return envelope was included in the kit. If it was lost, provide the lab address and instructions. Lab processing time: "After mailing, the lab typically takes 2–4 weeks to process your sample. We'll send you a prompt when it's time to enter your result." CTA: "View your test details" → session dashboard, showing the expected_completion_date and retrieval_due_at. Note the next email: "We'll send you a retrieval reminder in a few days with the exact date."
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — users.first_name <code>{{expected_completion_date}}</code> — test_sessions.expected_completion_date (formatted) <code>{{retrieval_due_date}}</code> — test_sessions.retrieval_due_at (formatted) <code>{{session_url}}</code> — APP_BASE_URL + /dashboard/sessions/:id <code>{{lab_return_address}}</code> — static config value (lab partner mailing address)
Duplicate-send guard	Guard checked: (user_id, test_session_id, day_80). Job skips if session.status IN (cancelled, expired, complete).
Notes	Do not send for real_estate_short kit type.

2.6 EMAIL-6 — Day 88 Retrieval Reminder

EMAIL-6 — Retrieval Reminder
Trigger: test_session.activated_at set — scheduled_at = activated_at + 88 days (3 days before expected_completion_date)

From address	no-reply@clearpathrd.com — "ClearPath RD" display name
Subject line	Time to retrieve your radon detector — here's how
Send timing	Queued at activation. Dispatched by emailQueue job. This is the most action-critical email in the sequence.
Persona / register	Register B (confident professional) for the instruction steps, Register A warmth in the opening and closing. Tone: clear, direct, zero ambiguity on the steps. The user must complete three physical actions. Make each one impossible to misunderstand.
Goal	Drive the user to complete retrieval and mailing. This email converts passive waiting into active completion. Clear > warm at this stage.
Content structure	<ul style="list-style-type: none"> Opening: direct but not alarming. ("Your 91-day test period is nearly complete. It's time to retrieve your detector and mail it to the lab.") Step-by-step retrieval instructions — numbered, imperative, specific: Step 1: Go to [placement_room] and retrieve the white/beige detector. Step 2: Place it in the prepaid return envelope included in your kit. Step 3: Seal the envelope and drop it at any Canada Post location or mailbox. Step 4: Log in to the ClearPath app and mark your kit as retrieved and mailed. Retrieval deadline: state expected_completion_date explicitly as the target retrieval date. Note that retrieval up to 7 days late is acceptable but earlier is better. Lost the return envelope: provide the lab address in plain text for manual addressing. CTA: "Mark as retrieved in the app" → deeplink to the session retrieve action. Reassurance close: "Once the lab receives your sample, we'll keep you updated by email."
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{placement_room}}</code> — <code>test_sessions.placement_room</code> <code>{{expected_completion_date}}</code> — <code>test_sessions.expected_completion_date</code> <code>{{session_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id</code> <code>{{retrieve_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id/retrieve (deeplink)</code> <code>{{lab_return_address}}</code> — static config (lab mailing address)
Duplicate-send guard	Guard checked: (user_id, test_session_id, day_88). Job skips if session.status IN (mailed, results_pending, complete, cancelled, expired) — i.e. if the user already mailed the kit, do not send.

2.7 EMAIL-7 — Results Prompt

EMAIL-7 — Results Prompt	
Trigger: test_session.mailed_at set — scheduled_at = mailed_at + 10 days	
From address	hello@clearpathrd.com — "ClearPath RD" display name
Subject line	Have your lab results? Here's how to enter them
Send timing	Queued when user confirms mailing (POST /sessions/:id/mail). Dispatched by emailQueue job 10 days later.
Persona / register	Register A (warm peer). Tone: helpful prompt, not a nag. The user is waiting on the lab. This email checks in and gives them the tools to act if they have received their results.
Goal	Prompt the user to enter their result if they have received it from the lab. Explain how to find the result if they are unsure.
Content structure	<ul style="list-style-type: none"> Opening: acknowledge where they are in the process. ("Your radon detector has been with the lab for about 10 days. Many labs have results ready by now — here's how to check and enter yours.") How to get your result: brief description of how the lab delivers results (typically by email or an online portal). Remind the user to check their spam folder if they haven't heard from the lab. What to look for: the result will be a number in Bq/m³. Some labs use pCi/L — note the conversion (1 pCi/L = 37 Bq/m³). CTA (primary): "Enter your result" → deeplink to the result entry screen for this session. If they haven't received results: "No result yet? No problem. Labs can take up to 4 weeks. We'll check in again if you haven't entered a result within 3 weeks." (Note: the expired job handles sessions that never get a result — this is a softer reassurance.)
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> — <code>users.first_name</code> <code>{{mailed_at}}</code> — <code>test_sessions.mailed_at</code> (formatted) <code>{{result_entry_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id/result</code> <code>{{session_url}}</code> — <code>APP_BASE_URL + /dashboard/sessions/:id</code>
Duplicate-send guard	Guard checked: (user_id, test_session_id, results_prompt). Job skips if session.status = complete (result already entered) or cancelled or expired.
Notes	The pCi/L to Bq/m³ conversion note is important for cross-border or US-based lab reports. Include it.

2.8 EMAIL-8 — Certificate Ready

EMAIL-8 — Certificate Ready	
Trigger: certificate.status = valid (certificate generation job completes)	
From address	hello@clearpathrd.com — "ClearPath RD" display name
Subject line	Your ClearPath RD Certificate is ready
Send timing	Immediate. Sent synchronously after certificate generation completes and PDF is

	stored in Supabase Storage. Not queued.
Persona / register	Register A (warm peer), with a moment of celebration. Tone: positive milestone, warm completion. This is the end of the journey. It should feel like an arrival, not a form letter.
Goal	Celebrate the completion of the test. Deliver the certificate. Give clear next steps based on the result zone. For elevated results, provide contractor referral context without alarm.
Content structure	<ul style="list-style-type: none"> Opening: acknowledge the journey is complete. Vary by zone: below_guideline / caution: warm positive open. "Your radon test is complete, and your certificate is ready." action_required / urgent_action: normalise first, then fact, then action. "Your test is complete. Your result is above the Health Canada guideline — here's what that means and what to do next." Result summary: state the zone in plain language. Include the Bq/m³ value. For caution and above, include the Health Canada 200 Bq/m³ reference. Certificate CTA (primary): "View and download your certificate" → links to the certificate detail page in the vault. Zone-specific next steps: <ul style="list-style-type: none"> below_guideline: recommend re-testing in 5 years, note that the certificate is valid for 5 years. caution: note that the level is below the action guideline but above the WHO reference level. Mitigation is optional. Re-test in 2–3 years. action_required / urgent_action: recommended next step is mitigation. Introduce the contractor directory. "We've identified certified mitigation professionals in your area." CTA: "Find a certified mitigation professional". Certificate validity note: "Your certificate is valid until [valid_until]. You can share the verification link or QR code with anyone — no login required." CASL compliance: unsubscribe link in footer.
Template variables	<ul style="list-style-type: none"> <code>{{first_name}}</code> – users.first_name <code>{{result_zone}}</code> – results.zone <code>{{result_value}}</code> – results.value_bqm3 (formatted with unit: e.g. "87 Bq/m³") <code>{{certificate_number}}</code> – certificates.certificate_number <code>{{certificate_url}}</code> – APP_BASE_URL + /dashboard/certificates/:id <code>{{verification_url}}</code> – certificates.verification_url <code>{{valid_until}}</code> – certificates.valid_until (formatted) <code>{{contractor_url}}</code> – APP_BASE_URL + /contractors?fsa={{fsa}} (for elevated results) <code>{{fsa}}</code> – homes.fsa
Duplicate-send guard	Guard checked: (user_id, test_session_id, certificate_ready). One per session. The result is immutable by the time this email fires.
Notes	This email has four zone-specific content variants (below_guideline, caution, action_required, urgent_action). These are implemented as conditional blocks in the React Email template, not as four separate templates.

3. React Email Template Architecture

All email templates live in the clearpath-web repository under `/emails/`. They are React components rendered server-side by React Email and sent via the Resend SDK from the clearpath-api service.

Templates live in clearpath-web (for design cohesion and preview capability) but are rendered and sent from clearpath-api. At build time, clearpath-api imports compiled template functions from clearpath-web via a shared npm package (clearpath-emails) or by co-locating the /emails directory in clearpath-api. Decision: co-locate in clearpath-api for MVP simplicity. Move to a shared package in v2.

3.1 File Structure

<code>emails/</code>	Root directory for all React Email templates
<code>emails/components/</code>	Shared layout components: EmailLayout, EmailHeader, EmailFooter,
<code>ResultZoneBadge, StepList, CTAButton</code>	
<code>emails/order-confirm.tsx</code>	EMAIL-1: OrderConfirmEmail component
<code>emails/activation.tsx</code>	EMAIL-2: ActivationEmail component
<code>emails/day-30.tsx</code>	EMAIL-3: Day30Email component
<code>emails/day-60.tsx</code>	EMAIL-4: Day60Email component
<code>emails/day-80.tsx</code>	EMAIL-5: Day80Email component
<code>emails/day-88.tsx</code>	EMAIL-6: Day88Email component
<code>emails/results-prompt.tsx</code>	EMAIL-7: ResultsPromptEmail component
<code>emails/certificate-ready.tsx</code>	EMAIL-8: CertificateReadyEmail component (zone-variant)
<code>emails/preview.tsx</code>	Local preview entry point for React Email dev server

3.2 Shared Components

- EmailLayout: full-width wrapper with white card (600px max), ClearPath Teal header band, footer. All 8 templates use this.
- EmailHeader: ClearPath RD wordmark and optional session/order context line.
- EmailFooter: clearpathrd.com link, support email, CASL unsubscribe link, mailing address (required by CASL for commercial messages).
- CTAButton: Teal primary button with 14px Arial text. Accepts href and label props.
- ResultZoneBadge: coloured zone indicator (teal/amber/red/dark red) for use in the certificate_ready email.
- StepList: numbered step list component for instruction-heavy emails (day_88 retrieval steps).

3.3 Resend SDK Call Pattern

The send function in `src/services/email.ts` follows this pattern for all 8 email types:

```
import { Resend } from 'resend';
import { render } from '@react-email/render';
import { OrderConfirmEmail } from '../emails/order-confirm';

async function sendOrderConfirm(order: KitOrder, user: User) {
  // 1. Check email_log for duplicate
  const existing = await prisma.emailLog.findFirst({
```

```
    where: { userId: user.id, emailType: 'order_confirm', status: { not: 'failed' } }
  });
  if (existing) return; // Duplicate guard

  // 2. Create email_log row with status = queued
  const log = await prisma.emailLog.create({
    data: { userId: user.id, emailType: 'order_confirm', status: 'queued',
  scheduledAt: new Date() }
  });

  // 3. Render template and send via Resend
  const html = render(<OrderConfirmEmail firstName={user.firstName} ... />);
  const { data, error } = await resend.emails.send({
    from: 'ClearPath RD <hello@clearpathrd.com>',
    to: user.email,
    subject: 'Your ClearPath RD kit is on its way',
    html,
  });

  // 4. Update email_log with Resend message ID and status
  await prisma.emailLog.update({
    where: { id: log.id },
    data: { status: 'sent', sentAt: new Date(), providerMessageId: data?.id }
  });
}
```

4. Edge Cases & Scheduling Rules

4.1 Real Estate Short-Term Kit

The real_estate_short kit type has a 48–96 hour test period. The 91-day email sequence does not apply. Only the following emails are sent for real_estate_short sessions:

- EMAIL-1 (order_confirm): sent as normal on payment.
- EMAIL-2 (activation): sent as normal on activation. Copy variant: expected_completion_date is 4 days out, not 91.
- EMAIL-6 (day_88): NOT sent. At 4 days, there is no room for a day_88 reminder.
- EMAIL-3, 4, 5 (day_30, day_60, day_80): NOT sent.
- EMAIL-7 (results_prompt): sent 10 days after mailing, same as long-term.
- EMAIL-8 (certificate_ready): sent on certificate generation, same as long-term.

Implementation: when scheduling emails at activation time, check kit_type. If real_estate_short, only create email_log rows for activation, results_prompt (scheduled at mailed_at + 10 days), and certificate_ready.

4.2 Twin Pack Orders

A twin_pack order creates two TestSession records, each with their own kit_serial_number and placement. Each session has its own email sequence. The order_confirm email is sent once for the order, not once per session.

- EMAIL-1 (order_confirm): one email per order. References both kits.
- EMAIL-2 through EMAIL-8: one per session. Two sessions means two full sequences running in parallel.
- If both sessions are activated on the same day, the user receives two activation emails. This is intentional — each email contains session-specific information (placement room, serial number, completion date).

4.3 Session Cancelled Before Email Send

The emailQueue job checks session.status before dispatching any queued email. If status is cancelled or expired, the email is not sent and the email_log row is updated to status = failed with a note.

If a session is cancelled after EMAIL-6 (day_88) has been sent but before the user retrieves the kit, no further emails are sent. The email_log rows for results_prompt and certificate_ready are never created until those events actually occur.

4.4 Session Completes Early

If the user retrieves and mails the kit before day 88 (e.g., at day 95 they decide to retrieve early), the queued day_88 email must be cancelled. Implementation: when test_session.mailed_at is set, cancel any email_log rows with status = queued for this session where email_type = day_88.

Similarly, if a result is entered before the results_prompt scheduled_at, the queued results_prompt email is cancelled at the time the result is submitted.

4.5 User Enters Result Very Late

The expired job sets test_session.status = expired for sessions where expected_completion_date + 120 days have passed with no result. When a session is set to expired, all queued email_log rows for that session are cancelled (status = failed). No further emails are sent for an expired session.

4.6 Bounce and Complaint Handling

The Resend webhook handler updates email_log.status to bounced for bounced emails. The emailQueue job does not retry bounced emails automatically. After 3 consecutive bounces to the same email address (checked across all email_log rows for a user), the users row is flagged for admin review by setting a notional bounced_at timestamp. Admin can investigate and update the email address.

5. CASL Compliance Notes

All 8 emails are transactional in nature — they are sent in direct response to a user action or the completion of a service the user purchased. Under CASL, transactional emails do not require express consent. However, they must still include: sender identification, a mailing address, and an unsubscribe mechanism.

- Sender identification: both from addresses (hello@ and no-reply@) include "ClearPath RD" as the display name. The footer includes the company name and mailing address.
- Mailing address: a physical Canadian mailing address must appear in the footer of every email. Include this in EmailFooter component even before a formal office address is established (a registered agent address is acceptable).
- Unsubscribe mechanism: every email includes an unsubscribe link in the footer. For transactional emails, unsubscribing removes the user from future marketing emails (if any are introduced) but does not block transactional emails required to fulfil the service. This distinction must be clear in the unsubscribe flow.
- Marketing consent: users who opt in to marketing_consent = true may receive promotional emails in the future. The marketing email list is managed separately. No marketing emails are included in this spec.

6. Implementation Checklist

Complete before deploying the email sequence to production.

Domain and sender verification

- Add clearpathrd.com to Resend and verify domain (requires TXT and DKIM DNS records)
- Confirm hello@clearpathrd.com and no-reply@clearpathrd.com are verified senders in Resend
- Send test email from each address and confirm DKIM passes (check email headers)

Template implementation

- Build EmailLayout, EmailHeader, EmailFooter, CTAButton shared components
- Implement all 8 email templates as React Email components
- Preview each template locally using React Email dev server (npx email dev)
- Test rendered HTML in Gmail, Apple Mail, and Outlook (use Litmus or Email on Acid, or manual testing)
- Confirm all template variables render correctly with real data
- Confirm zone-variant logic in certificate_ready template works for all 4 zones

Sending logic

- Implement email_log duplicate guard in src/services/email.ts
- Implement immediate send for: order_confirm, activation, certificate_ready
- Implement queue scheduling for: day_30, day_60, day_80, day_88, results_prompt
- Implement emailQueue cron job (every 15 minutes, dispatches due emails)

- Implement session status check in queue job (skip cancelled/expired sessions)
- Implement cancellation logic: cancel queued day_88 when mailed_at is set
- Implement cancellation logic: cancel queued results_prompt when result is submitted
- Implement real_estate_short email filter (skip day_30/60/80/88 for short-term kit)

Resend webhook

- Register Resend webhook endpoint in Resend dashboard
- Implement /api/v1/webhooks/resend handler: update email_log.status on delivered/bounced/complained
- Implement bounce counter: flag user after 3 consecutive bounces

End-to-end test

- Order a kit in test mode, confirm order_confirm email arrives within 30 seconds
- Activate the session, confirm activation email arrives within 30 seconds
- Manually trigger day_30 by setting activated_at = NOW() - 30 days and running the queue job
- Confirm day_88 is cancelled when mailed_at is set before scheduled_at
- Submit a result, confirm certificate_ready email arrives and contains the correct zone content

— *End of Email Sequence Specification* —
ClearPath RD | clearpathrd.com | Version 1.0 | February 2026