

NEITCLEM PROPERTY REVIEW

Address-Driven Property Intelligence Platform for Underwriting Risk Assessment

Document Control | NI-2026-PROJ02 | Rev 1.0

DOCUMENT REF	NI-2026-PROJ02
PROJECT TITLE	NeitClem Property Review (Address-Driven Property Intelligence Platform)
TARGET TECH STACK	React (Vite), Node.js (Express), MySQL, Google Maps API, Various Data APIs
PRODUCTION URL	https://property-review.neitclem.com (Proposed)
PREPARED BY	Jan Piere Mindermann, Senior Developer
LEAD DEVELOPER	Jan Piere Mindermann
DOCUMENT VERSION	Rev 1.0 — Initial scoping: Objectives, Features, Context, Tech Stack
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1. Executive Summary & Project Description

1.1 What NeitClem Property Review Is

NeitClem Property Review is a web-based property intelligence platform purpose-built for NeitClem Wholesale Insurance Brokerage. When a retail agent or underwriter enters the street address of a prospective insured's property, the platform immediately assembles a comprehensive risk profile of that location — pulling satellite and street-level imagery, fire protection data, wildfire and natural-hazard exposure, neighborhood crime statistics, public sentiment from review platforms, and supplementary property records — all presented in a single, print-ready underwriting report.

The platform is not a generic mapping tool. It is a focused pre-underwriting due-diligence layer that gives NeitClem brokers faster, richer context on a risk before a formal submission is evaluated. Every data point surfaced by the platform is selected specifically because it is material to property insurance underwriting: fire suppression distance, crime severity index, wildfire Interface Zone classification, flood zone designation, and public reputational signals from business review aggregators.

The platform integrates with the NeitClem Nexus Platform (NI-2026-PROJ01) by allowing brokers and agents to generate a property intelligence report and attach it directly to an active risk submission inside Nexus — creating a seamless pre-submission research workflow.

1.2 The Core User Flow

- User enters a full property address into the search bar.
- The platform geocodes the address, pins it on an interactive map, and begins fetching intelligence from multiple data APIs in parallel.
- A structured property report renders progressively: satellite view, street-level photo, proximity scores, hazard flags, crime index, and public reviews.

- The broker or agent reviews the assembled intelligence and, if the risk is viable, exports a formatted PDF report to attach to their Nexus submission.
- The system caches results per address for 24 hours to reduce redundant API calls and control operating costs.

2. Project Objectives

2.1 Business Objectives

- Reduce the time brokers and agents spend manually researching a property address from external sources prior to submission evaluation.
- Surface material underwriting risk signals — fire protection class, wildfire exposure, flood zone, crime rate — in a single, consolidated pre-underwriting view.
- Provide a printable PDF property intelligence report that can be attached directly to NeitClem Nexus risk submissions.
- Improve quote accuracy and decline efficiency by equipping underwriters with richer location intelligence before formal submission intake.
- Position NeitClem as a technologically differentiated wholesale brokerage by offering agents a value-added research tool that competitors do not provide.

2.2 Engineering Objectives

- Design a scalable, API-orchestration backend that fans out multiple third-party data requests in parallel and assembles a normalized property record.
- Implement intelligent response caching to manage third-party API rate limits and control per-query costs.
- Build a responsive, print-optimized React frontend that renders complex multi-source data cleanly and exports to PDF on demand.
- Architect the platform for eventual integration with NeitClem Nexus, allowing report attachments to flow directly into the Nexus submission pipeline.
- Evaluate junior developers' competency in third-party API integration, parallel asynchronous data fetching, and data normalization.

3. Project Features

3.1 Core Intelligence Modules

 Address Geocoding & Interactive Map User enters any US property address. The platform geocodes it via Google Maps Geocoding API and renders an interactive map pinpointing the property with zoom and satellite/street toggle controls.	 Satellite & Aerial Property Imagery Google Maps Static API or Mapbox delivers a high-resolution satellite/aerial view of the property footprint and immediate surroundings — the closest equivalent to a flyover photo available without drone or third-party image subscription.
 Street-Level Photo (Street View)	 Fire Station Proximity

Google Street View Static API returns a street-level photograph of the property frontage and neighborhood context, giving underwriters a visual impression of building condition and occupancy without visiting the site.	Using Google Places Nearby Search, the platform identifies the nearest fire station(s) to the property and calculates driving distance and estimated response time — a direct input to ISO Protection Class assessment.
 Fire Hydrant Proximity OpenStreetMap Overpass API queries for fire hydrant nodes within a configurable radius of the property. Hydrant count and nearest hydrant distance are surfaced as underwriting data points relevant to fire suppression capacity.	 Wildfire & Brush Fire Risk National Interagency Fire Center (NIFC) data and USFS Wildland-Urban Interface (WUI) datasets flag whether the property falls within a designated fire hazard severity zone. Properties in WUI zones are tagged with a risk tier (Low / Moderate / High / Very High / State Responsibility Area).
 Flood Zone Classification FEMA National Flood Hazard Layer (NFHL) API returns the property's official flood zone designation (Zone A, AE, X, VE, etc.) and FIRM panel reference — critical for NFIP eligibility assessment and surplus lines pricing.	 Additional Natural Hazard Signals First Street Foundation API provides property-level risk scores for flood, fire, wind, and heat — forward-looking 30-year climate-adjusted risk projections increasingly used by E&S carriers for pricing and eligibility decisions.
 Neighborhood Crime Index SpotCrime or CrimeGrade.org API returns local crime statistics for the census tract or ZIP code containing the property: overall crime grade, violent crime rate, property crime rate, and comparison to city/national average — relevant for commercial property and habitational risks.	 Public Reviews & Reputation Signals Google Places Details API returns business name, category, aggregate star rating, and recent review snippets for any commercial property at the address. For residential/apartment properties, Yelp Fusion API supplements with tenant and neighborhood reviews. Review signals help flag reputational or habitability concerns before submission.
 Property & Parcel Records Regrid or Precisely (Loveland) parcel data API returns owner name, parcel APN, land use classification, building square footage, year built, assessed value, and recent sale history — foundational property data for underwriting eligibility checks.	 PDF Report Export A single-click 'Export Report' action generates a formatted, NeitClem-branded PDF summary of all assembled intelligence. The report is suitable for direct attachment to a Nexus risk submission or for sharing with a carrier market.

3.2 Platform & UX Features

 Parallel API Orchestration All data sources are fetched concurrently on the backend using Promise.allSettled(), so the full report assembles in the time of the slowest single API call rather than the sum of all calls.	 Progressive Report Rendering The React frontend renders each intelligence module as its data arrives, so users see results loading section-by-section rather than waiting for a full-page load — improving perceived performance significantly.
 24-Hour Address Result Cache All assembled property intelligence is cached in MySQL by normalized address for 24 hours. Repeat lookups for the same address within the	 NeitClem Nexus Integration (Phase 2) A 'Attach to Submission' action inside Nexus will pre-populate the property address field and trigger a Property Review lookup, attaching the

cache window are served instantly and consume zero additional API quota.	resulting PDF report directly to the submission record without leaving the Nexus interface.
 Risk Score Summary Card A top-of-report summary card distills all intelligence signals into a clean at-a-glance Risk Profile: Fire Protection Class indicator, Flood Zone badge, Wildfire Exposure tier, Crime Grade letter, and an aggregate Underwriting Attention flag if any high-risk signals are detected.	 Responsive Design The platform is fully responsive for tablet and desktop use. The report layout shifts from a two-column grid on desktop to a single-column stack on tablet, maintaining readability across device sizes.

4. Summary of Context

4.1 Business Context — Why This Tool Is Needed

NeitClem operates as a wholesale insurance brokerage in the Excess & Surplus (E&S) property-casualty space. Unlike standard admitted carriers, E&S underwriters routinely accept non-standard risks — properties with above-average fire exposure, habitational buildings in high-crime areas, commercial properties in coastal or wildfire-prone zones. For these risks, location intelligence is not a convenience: it is a prerequisite for sound underwriting.

Currently, NeitClem brokers who want to research a property address must manually navigate Google Maps, county parcel databases, FEMA flood map service, state fire hazard severity zone maps, and crime statistics sites — sometimes five to eight separate browser tabs for a single address. This creates inconsistent research quality across brokers, adds friction to the submission evaluation process, and means that junior brokers may skip location research entirely when under time pressure.

NeitClem Property Review eliminates this friction by automating the multi-source research workflow into a single address lookup — one input, one report, one click to export.

4.2 Competitive Context

Several commercial property intelligence platforms exist in the insurtech space — Cape Analytics, Verisk's Location Intelligence, CoreLogic's RiskMeter — but these are enterprise-tier products priced for large carriers, not accessible to wholesale brokerages at a per-lookup cost that makes sense for submission-volume workflows. NeitClem Property Review is architected specifically to use cost-accessible public and freemium-tier APIs to deliver comparable core intelligence at a fraction of the enterprise cost.

KEY DESIGN PRINCIPLE: Every API integration in this platform is selected by the following criteria: (1) data is material to property insurance underwriting, (2) the API has a free tier or low per-call cost viable for 50–200 daily lookups, and (3) a fallback data source exists if the primary source is unavailable or rate-limited.

4.3 Data API Landscape & Viability Assessment

The table below documents the primary data source selected for each intelligence module, the key fields returned, and the tier/cost model — confirming the platform is buildable within a realistic API budget:

Data Category	Primary API / Source	Key Fields Returned	Tier / Cost
Address & Geocoding	Google Maps Geocoding API	lat/lng, formatted address, place_id, address components	Free: 0–40K req/mo; \$5/1000 after
Satellite / Aerial View	Google Maps Static API	Static map image (satellite type), configurable zoom & size	Free: 0–100K req/mo
Street-Level Photo	Google Street View Static API	Panoramic street photo at coordinates, heading, pitch	Free: 0–25K req/mo
Nearby Fire Stations	Google Places Nearby Search	Place name, address, lat/lng, distance, open status	\$32/1000 requests
Fire Hydrants	OpenStreetMap Overpass API	Node lat/lng tagged amenity=fire_hydrant within radius	Free (open data)
Wildfire / WUI Zone	NIFC / USFS WUI Dataset (GeoJSON)	WUI zone tier, fire hazard severity classification	Free (public data)
Flood Zone	FEMA NFHL REST API	Flood zone designation (A/AE/X/VE), FIRM panel ID	Free (public data)
Climate Risk Score	First Street Foundation API	Flood/fire/wind risk score, 30-yr projection, risk tier	Developer: \$0.01/call
Crime Statistics	CrimeGrade.org / SpotCrime API	Crime grade (A–F), crime rate per 1000, crime type breakdown	Freemium; ~\$0.01–0.05/call
Business Reviews	Google Places Details API	Rating, review count, review snippets, business category	\$17/1000 requests
Residential Reviews	Yelp Fusion API	Star rating, review snippets, neighborhood sentiment	Free: 500 calls/day
Parcel / Property Data	Regrid Parcels API	Owner, APN, land use, sq ft, year built, assessed value, sale history	Starter: \$99/mo flat or pay-per-call

5. Target Technology Stack

5.1 Stack Overview

Layer	Technology	Purpose / Notes
Frontend	React 18 + Vite	SPA architecture; fast HMR in dev; optimized production build
UI Framework	Tailwind CSS	Utility-first styling; matches NeitClem Nexus visual language
Mapping	Google Maps JavaScript API	Interactive property map, satellite/street layer toggle, marker placement

State Management	React Context + useReducer	Manages report assembly state as parallel API results arrive progressively
Backend	Node.js + Express	REST API server; fans out all third-party data requests in parallel
Database	MySQL 8	Stores address lookup cache, user search history, exported reports metadata
ORM / Query	mysql2 (raw queries)	Consistent with NeitClem Nexus stack; no ORM overhead for simple caching queries
Auth	JWT (JSON Web Tokens)	Restricts access to NeitClem staff; consistent auth model with Nexus
PDF Export	Puppeteer (headless Chrome)	Renders the React report view to a pixel-perfect PDF for attachment to Nexus submissions
API Client	Axios	Handles all outbound third-party API calls from the Node.js backend
Caching Layer	MySQL (TTL column)	24-hour address-keyed result cache; prevents redundant third-party API calls
Env / Config	dotenv	Manages all API keys and service credentials securely outside version control
Hosting	Hostinger VPS (Ubuntu + Nginx + PM2)	Consistent with existing NeitClem infrastructure; Nginx reverse proxy, PM2 process manager
Repository	GitHub Private	Gitflow branching; mandatory PR reviews; consistent with Nexus repository standards

5.2 Architecture Pattern: Backend-for-Frontend (BFF)

All third-party API keys are held exclusively on the Node.js backend — never exposed to the React client. The frontend sends a single POST `/api/property-review` request with the address string. The backend geocodes the address, fans out all intelligence queries in parallel (`Promise.allSettled`), assembles a normalized `PropertyReport` object, caches the result in MySQL, and returns the full assembled report to the client in a single response.

This BFF pattern has three advantages for this use case: API keys are never client-side, parallel fan-out is faster than sequential frontend fetches, and the cache layer is centralized — one backend cache serves all concurrent users rather than each browser managing its own TTL logic.

INTEGRATION NOTE: Phase 2 will expose a GET `/api/property-review/:address` endpoint for the NeitClem Nexus Platform to call directly, enabling Nexus to trigger a property lookup and receive a report object to attach to any active submission record — without the broker leaving the Nexus interface.

6. Sample Dashboard Mockup

6.1 Property Report View

The following mockup illustrates the full property intelligence report as it would appear to a broker or agent after entering an insured's property address. The layout follows a two-column structure: the left column presents the interactive map views, fire protection detail, and public reviews; the right column surfaces the property record, crime index, climate risk scores, and report export actions. The top navigation bar contains the address search input that triggers the full backend intelligence lookup.

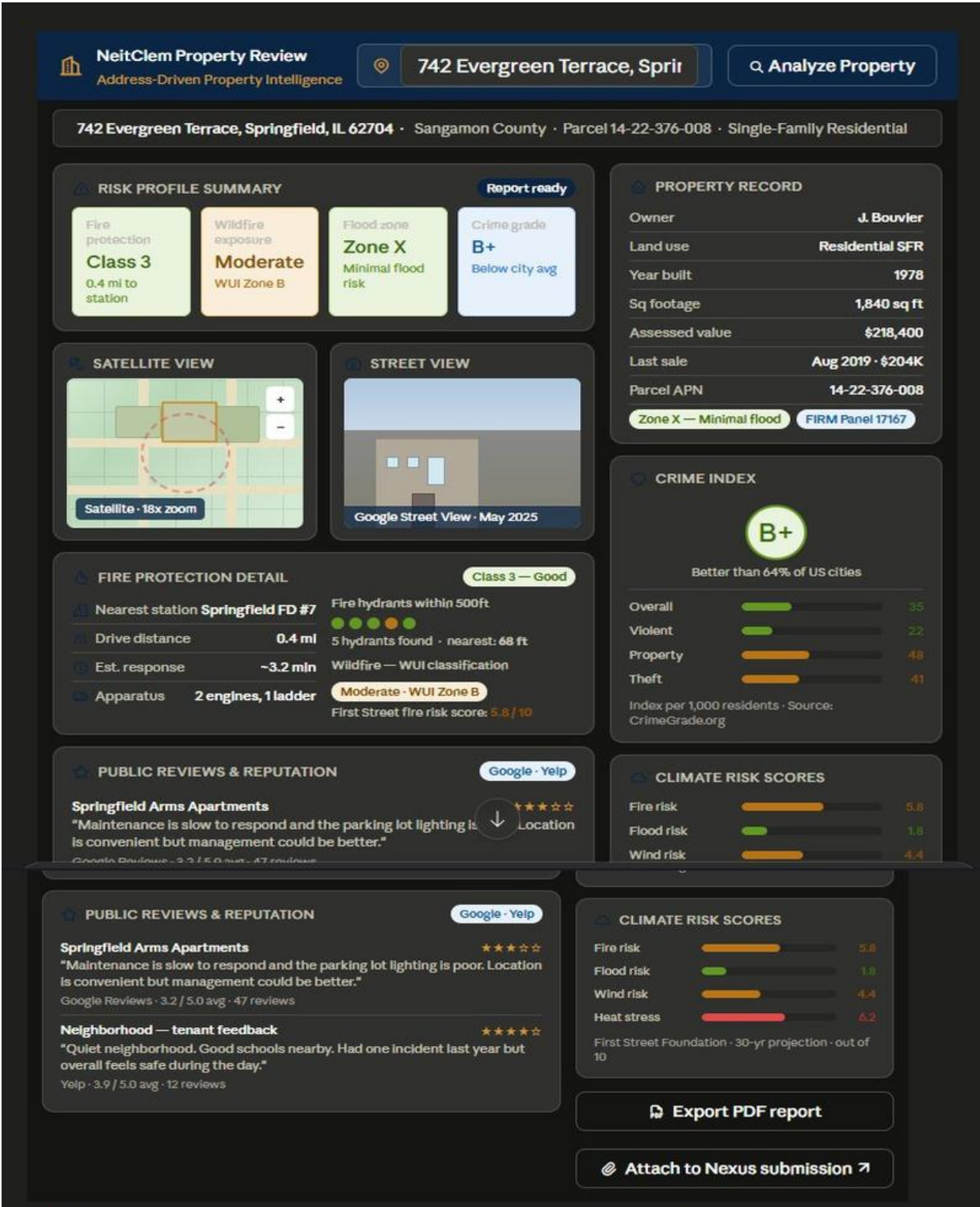


Figure 6.1 — NeitClem Property Review Dashboard

Actual UI mockup rendered from the platform prototype — sample report for 742 Evergreen Terrace, Springfield, IL 62704. Displays the Risk Profile Summary (top), Satellite & Street View panels, Fire Protection Detail, Public Reviews (left column), and Property Record, Crime Index, Climate Risk Scores, and Export Actions (right column). All data is assembled by the backend API orchestration layer and rendered progressively by the React frontend.

6.2 Key UI Zones

① Top Navigation Bar Address search input, brand identity, and 'Analyze Property' trigger button. The search bar accepts any US street address and fires a single POST to the backend API orchestration layer.	② Risk Profile Summary Four at-a-glance risk cards rendered immediately after geocoding: Fire Protection Class, Wildfire Exposure tier, FEMA Flood Zone, and Crime Grade. Color-coded green/amber/red to signal underwriting attention level.
③ Satellite & Street View Side-by-side imagery panels — Google Maps Static API for aerial view and Google Street View Static API for frontage photo. Both render as static image calls using the geocoded coordinates.	④ Fire Protection Detail Nearest fire station with drive distance and estimated response time, hydrant count and proximity from OpenStreetMap, and Wildfire WUI zone classification from NIFC/USFS datasets.
⑤ Property Record (Right Panel) Parcel data from Regrid: owner, land use, year built, square footage, assessed value, last sale, APN, and FEMA flood zone badge — all retrieved in a single parcel API call.	⑥ Crime Index & Climate Scores CrimeGrade.org letter grade with per-category bar charts. First Street Foundation 30-year projected risk scores for fire, flood, wind, and heat — rendered as proportional fill bars with color-coded severity.
⑦ Public Reviews Google Places Details and Yelp Fusion review snippets for the property or nearest business entity — surfacing habitability or reputational signals relevant to commercial property and habitational underwriting.	⑧ Export & Nexus Integration 'Export PDF Report' generates a Puppeteer-rendered PDF of the full report view. 'Attach to Nexus Submission' is the Phase 2 integration hook — sending the report directly to an active Nexus risk submission record.

7. Pre-Build Implementation Gaps & Resolution Matrix

The following gaps were identified during the initial feasibility review of the NeitClem Property Review platform. Each item below represents a missing requirement, unresolved dependency, or implementation risk that must be addressed before or during the early phases of development. Left unresolved, any one of these gaps could block a feature at launch, cause silent failures in production, or result in unexpected API cost overruns.

GAP-01 — Google Maps API Billing Not Activated Impact: Critical — no map imagery, geocoding, street view, or places data will function without an active billing account. Detail: All Google Maps Platform APIs (Geocoding, Static Maps, Street View Static, Places Nearby) require a Google Cloud project with billing enabled. Without a payment method attached, all requests return HTTP 403 after the free monthly credit is exhausted. Resolution: Create a Google Cloud project, enable Maps Platform APIs, attach billing, and generate a restricted API key (HTTP referrer + server IP restrictions). Estimated monthly cost at 50–100 lookups/day: \$50–\$150.
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When to resolve: Week 1 — before any frontend or backend development begins.

GAP-02 — Street View Coverage Gaps: No Fallback State Defined

Impact: High — the street view panel will fail silently for rural properties, new subdivisions, and industrial zones — exactly the non-standard risk profiles NeitClem underwrites most.

Detail: Google Street View coverage is strong in urban and suburban US but unreliable for rural parcels, gated communities, and properties built after the last Street View capture date. An uncaught unavailable response from the Street View API leaves the panel blank with no explanation to the user.

Resolution: Before calling the Street View Static API, query the Street View Metadata endpoint to check availability. If unavailable, render a fallback panel showing a wider aerial zoom from the Static Maps API with a clear 'Street View unavailable for this address' label.

When to resolve: Week 2–3 — during Street View module development.

GAP-03 — User Authentication Scope Undefined

Impact: High — the access model determines the entire registration flow, database schema, and JWT role structure before a single route is written.

Detail: The current spec references JWT authentication but does not define whether the platform is NeitClem-staff-only or also accessible to retail agents. These are architecturally different: staff-only requires no public registration flow; agent access requires an approval workflow, role-based views, and audit controls on who can run lookups.

Resolution: A product decision from NeitClem management is required before development begins. Recommended default: NeitClem-staff-only at launch, with retail agent access added in Phase 2 once usage patterns are established.

When to resolve: Week 1 — must be decided before database schema design.

GAP-04 — No Saved Reports / Search History

Impact: Medium-High — without persistent report history, brokers will re-run the same address repeatedly, consuming API quota unnecessarily and degrading the user experience.

Detail: The current spec implements a 24-hour address cache for API efficiency, but this is invisible to the user. Brokers need to retrieve a report they ran last week, share a report link with a colleague, or attach a previously run report to a Nexus submission. None of this is possible without a saved reports table keyed to the user account.

Resolution: Add a `property_reports` table to the MySQL schema (`report_id`, `user_id`, `address`, `geocoded_lat`, `geocoded_lng`, `report_json`, `created_at`). Add a 'My Reports' sidebar panel listing the 20 most recent lookups per user with a one-click re-open.

When to resolve: Week 3–4 — include in initial database schema design, not as a later addition.

GAP-05 — No API Rate Limiting or Request Queue

Impact: Medium-High — concurrent lookups from multiple users will simultaneously fan out 8+ parallel API calls each, risking Google QPS limit violations and cascading 429 errors mid-report.

Detail: A single property lookup triggers approximately 8 parallel outbound API calls (Geocoding, Static Map, Street View, Places, Overpass, FEMA, CrimeGrade, Regrid). At 10 concurrent users, this is 80 simultaneous external requests. Google Maps APIs enforce per-second query limits that will be exceeded under this load without a queue layer.

Resolution: Implement BullMQ with a Redis instance on the VPS to queue lookup jobs with a configurable concurrency limit (recommended: 3 concurrent lookups). Add per-user rate limiting at the Express middleware layer (max 10 lookups per user per hour) using express-rate-limit.

When to resolve: Week 4–5 — before the backend API orchestration layer is finalized.

GAP-06 — No US-Only Scope Enforcement

Impact: Medium — all data sources (FEMA, NIFC/WUI, CrimeGrade, Regrid) are US-only. An international address will geocode successfully but silently return empty or broken data for every downstream module.

Detail: Google Geocoding API returns a country_code component in every result. If this is not checked, a broker entering a property address in Canada, the Philippines, or the UK will receive a partially rendered report with no indication that the data sources do not cover that region — creating false confidence in the results.

Resolution: After geocoding, inspect the country_code field. If the value is not 'US', immediately return a clear error state: 'NeitClem Property Review currently supports US properties only.' Block all downstream API calls for non-US addresses.

When to resolve: Week 2 — add to the geocoding validation layer before any intelligence modules are built.

GAP-07 — Regrid Parcel API Contract Not Initiated

Impact: Medium — parcel data (owner, APN, land use, year built, assessed value, sale history) is unavailable until a Regrid subscription is active. This is not a same-day sign-up.

Detail: Regrid requires account creation, use case review, and a paid subscription agreement before API credentials are issued. The process typically takes 5–10 business days. If initiated after development has started, the property record module will have no data source and must be built with placeholder states.

Resolution: Initiate the Regrid account registration and subscription request in Week 1, in parallel with development setup. In the interim, build the Property Record module UI against a mock data schema so it is ready to connect the moment credentials arrive.

When to resolve: Week 1 — initiate immediately. Do not wait until the module is being built.

GAP-08 — First Street Foundation API Access Not Requested

Impact: Medium — the climate risk scores module (30-year fire/flood/wind/heat projections) has no data source until First Street access is granted.

Detail: First Street Foundation's Risk Factor API is not fully self-serve. Access requires submitting a use case description and awaiting approval, which may take 1–3 weeks. This API powers the forward-looking climate risk scores increasingly referenced by E&S carriers for eligibility and pricing decisions.

Resolution: Submit the API access request to First Street Foundation in Week 1. If access is delayed, build the Climate Risk Scores module UI against FEMA + NIFC data as a temporary data source and upgrade to First Street once credentials arrive (Phase 1.5).

When to resolve: Week 1 — submit access request immediately alongside Regrid.

GAP-09 — Tablet/Mobile Responsive Breakpoints Undefined

Impact: Low-Medium — brokers reviewing property reports on iPads during client meetings or site visits will encounter a broken two-column layout if breakpoints are not explicitly designed.

Detail: The dashboard uses a two-column grid (main content + right sidebar) that collapses unpredictably on screens narrower than 900px without explicit Tailwind breakpoint rules. The satellite and street view panels in the left column also require minimum widths to remain usable.

Resolution: Define three explicit layout breakpoints: desktop (>1024px) — two-column grid; tablet (768–1024px) — two-column compressed with reduced sidebar; mobile (<768px) — single column stack. Design these before frontend development begins.

When to resolve: Week 3 — define breakpoints during UI component architecture phase.

GAP-10 — Per-Module Error & Empty States Not Specified

Impact: Low-Medium — if any single API is down or returns no data, the entire report page fails or displays blank panels with no explanation, making the platform appear broken rather than gracefully degraded.

Detail: The backend uses Promise.allSettled() to fan out API calls in parallel, which correctly prevents one failure from blocking others. However, the frontend currently has no defined behavior for a module that receives a rejected or empty result — it will render nothing. Each of the eight intelligence modules needs three explicit UI states: loading (skeleton), populated (data), and failed/empty (fallback message).

Resolution: Define a standard module state schema: { status: 'loading' | 'success' | 'empty' | 'error', data: any, message: string }. Every React intelligence card component must handle all four states before it is considered complete. Error messages must be human-readable: 'Crime data unavailable for this ZIP code' — not raw API error codes.

When to resolve: Week 3 — define the module state schema before any intelligence card component is built.

RECOMMENDED FEATURE ADDITION: Flag for Underwriter Review — A single-click action on the property report that marks the address as requiring attention and pushes a flagged note directly into the linked NeitClem Nexus submission record. This closes the loop between the research tool and the underwriting workflow, and is the feature most likely to drive daily habitual use of the platform by NeitClem brokers.

7.1 Gap Resolution Priority Summary

Ref	Gap	Severity	Owner	Resolve By
GAP-01	Google Maps API billing not activated	Critical	Jan Piere	Week 1
GAP-02	Street View gap fallback not defined	High	Jan Piere	Week 2–3
GAP-03	Authentication scope undefined	High	Management	Week 1
GAP-04	No saved reports / search history	Medium-High	Jan Piere	Week 3–4
GAP-05	No API rate limiting or request queue	Medium-High	Jan Piere	Week 4–5

GAP-06	No US-only scope enforcement	Medium	Jan Piere	Week 2
GAP-07	Regrid parcel API contract not initiated	Medium	Management	Week 1
GAP-08	First Street API access not requested	Medium	Management	Week 1
GAP-09	Tablet/mobile breakpoints undefined	Low-Medium	Jan Piere	Week 3
GAP-10	Per-module error/empty states not specified	Low-Medium	Jan Piere	Week 3

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