# LotAnalyzer – Address‑Based Lookup Implementation Spec

*Version 0.9 (2025‑06‑10)*

## 1  Project Goal

Convert LotAnalyzer from a bulk‑CSV workflow to an **address (or Redfin/Zillow URL) search experience** that instantly tells us whether a given Austin property can be split and, if so, estimates the maximum buildable square footage for the new lot(s).

## 2  High‑Level Architecture

┌─────────────┐ GET /api/lookup?addr=… ┌──────────────────┐  
│ React Front │ ───────────────────────────────▶ │ Edge Function │  
│ (Next.js) │ │ (Node 18) │  
└─────────────┘ ◀─────────────────────────────── │ • caching (KV) │  
 ▲ JSON payload └─────────┬────────┘  
 │ │  
 │ Fan‑out to APIs │  
 │ ▼  
 │ ┌─────────────┬─────────────┬─────────────┬─────────────┐  
 └─────────▶│ Google Maps │ Travis CAD │ Austin GIS │ Listing API│  
 │ Geocode │ parcel │ zoning │ (Redfin/… ) │  
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## 3  External Services & Keys

| Service | Purpose | Free‑tier limits | Env Var |
| --- | --- | --- | --- |
| **Google Places API** | Autocomplete & geocode → lat/lng | 40 000 req/mo | GOOGLE\_MAPS\_KEY |
| **Travis CAD JSON** | Parcel data (lot sq ft, legal lot, year built) | Unofficial, no key | n/a |
| **Austin AGOL GIS** | Zoning layer + overlays | 50 000 req/day | n/a |
| **Redfin Scraper API** (ZenRows) | Current listing meta (optional) | 100 req/day | ZENROWS\_KEY |
| **KV / Redis** | 24 h caching of API responses | 1 GB free | KV\_URL |

**TODO:** Replace ZenRows with official MLS feed once licensed.

## 4  Backend (Edge Function) – Step‑by‑Step

1. **Input validation & normalization**
   * Accept addr (string) or url (Redfin/Zillow) query param.
   * Strip extra whitespace; lowercase URL host for matching.
2. **Parse property URL → address (if needed)**
   * Regex for redfin.com & zillow.com to pull the address slug.
3. **Geocode**
   * GET https://maps.googleapis.com/maps/api/geocode/json?address={addr}
   * Reject if precision < ROOFTOP.
4. **Parcel lookup**
   * GET https://propertyapi.traviscad.org/property/{propId}
     + Find PROP\_ID by hitting Austin GIS PropertyProfile search with lat/lng.
   * Extract lot\_sqft, lot\_width\_ft, year\_built.
5. **Zoning lookup**
   * Hit Austin AGOL zoning layer (FeatureServer/0/query) with point geometry.
   * Return ZONING\_CLASS (e.g., SF‑3‑NP).
6. **Split‑eligibility logic**

* const rules = zoning[zoneClass];  
  const canSplit = lotSqFt >= 2 \* rules.min\_lot\_sqft &&  
   lotWidthFt >= 2 \* rules.min\_width\_ft;

1. **Envelope & FAR calculations**
   * For each hypothetical half‑lot: compute max\_buildable\_sqft = FAR × lot\_sqft.
2. **Listing metadata (optional)**
   * If url provided or Redfin zpid discovered, call ZenRows → list price, DOM.
3. **Cache results**
   * Serialize JSON ↔ KV with key addr:{sha256(address)} exp=24 h.
4. **Respond** json { "address": "2814 Windsor Rd, Austin, TX 78703", "zone": "SF-3-NP", "lotSqFt": 12250, "canSplit": true, "halfLotMaxSqFt": 2756, "setbacks": {"front":25,"side":5,"rear":10}, "listing": {"price": 1495000, "url":"…"} }

## 5  Front‑End Tasks

1. **Search Bar Component**
   * Google Places Autocomplete → writes selected address to state.
2. **/api/lookup Fetch Hook**
   * Handle loading / error; push result to context.
3. **Parcel Map Overlay**
   * Mapbox GL JS 0.7; draw polygon returned by GIS.
4. **Result Panel**
   * Verdict chips: *✓ lot big enough*, *✓ zone split‑friendly*, *✗ historic overlay*.
   * Collapsible section: Setback & FAR table.
5. **Save Candidate Button**
   * Persists to Supabase favorites table.

## 6  Local Dev Setup

pnpm i  
cp .env.sample .env.local # fill keys  
npx supabase start # local Postgres  
pnpm dev # next dev & functions

## 7  Acceptance Criteria (MVP)

## 8  Future Enhancements

* **Batch mode** – accept CSV of addresses, stream progress.
* **Comps module** – pull $/sq ft comps to price new build.
* **Subdivision fee calculator** – estimate platting & utility costs.
* **National support** – swap GIS layer + zoning table per city.

## 9  Reference Links

* Austin GIS zoning FeatureServer: [https://services7.arcgis.com/…/FeatureServer/0](https://services7.arcgis.com/.../FeatureServer/0)
* Travis CAD property API (unofficial): <https://propertyapi.traviscad.org/property/123456>
* Austin zoning code PDF (Table 3‑1): internal zoning\_rules.json build script.
* ZenRows Redfin doc: <https://www.zenrows.com/documentation/redfin-api>

*Prepared by ChatGPT • 2025‑06‑10*