Is Central Brighton & Hove the densest park-tennis cluster in the world?

A step-by-step methodology and results writeup for the Brighton & Hove Parks Lawn Tennis Association.

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The claim under test

Drawing a circle on a map of Brighton & Hove that just encloses three parks-league anchor venues —

- **Queens Park** (east)
- **Kingsway / Hove Beach Park** courts (west, on the seafront)
- **Blakers Park** (north)

— gives a 2.34 km-radius circle around central Brighton & Hove with one of the densest concentrations of *accessible* park tennis courts of any equivalent area in the world.

After auditing the top 16 candidate cities against authoritative local sources (Step 6), Brighton sits at #3-of-16 under the admin-clip denominator that the global pipeline uses out of the box. Step 7 then examines the denominator itself, finds that the admin clip unfairly transfers neighbouring-municipality LAND credit to Boston and Paris (both have densest circles centred on their admin boundary), and re-ranks under a **fair-denominator rule** — disc minus water only, not minus other cities' land. Under that rule, **Brighton & Hove sits at #1 in the world**, at 3.94 public-park courts per km² of land, ahead of Chicago (3.28), Melbourne (3.07), Greater London (2.89), Paris (2.56), Boston (1.08) and every other audited major city. Brighton is also the only city in the global top eight with a population under one million.

This document walks step by step through the analysis: the original claim, the refinements (sea correction, club exclusion, ground-truth audit) that get us to a fair OSM-strict ranking, and the fair-denominator reranking that ultimately places Brighton at #1.

A note on terminology

A few words get used very precisely below, because the difference matters for the headline:

- `access=private` **court** — a court that OpenStreetMap has explicitly tagged as private (typically a school court, a private residence or similar). These are excluded throughout the analysis.
- **"OSM-non-private" court** — every court that *isn't* explicitly tagged `access=private`. This is a wide net: it includes genuinely public park courts, pay-and-play clubs, *and* members' clubs that simply haven't been tagged as private in OSM (which is most of them).
- **Members' / private club** — colloquial English: a tennis club where you need to be a member to play (All England LTC, Roland Garros, Tennis Club de Paris, Pavilion & Avenue, Preston

LTC, and so on). These may or may not carry the `access=private` OSM tag; in practice they usually don't.

- **Park court** — a court whose physical location sits inside a polygon tagged `leisure=park`, `recreation_ground`, `garden`, `common` or `nature_reserve` in OSM. Strong proxy for "this is in a public park".
- **Public park court** (the final, strict filter) — a park court that is **not also** inside a `leisure=sports_centre` or `club=tennis` polygon. Crucially, this filter excludes members' clubs that happen to sit inside a public park polygon (e.g. Roland Garros inside the Bois de Boulogne, Saltdean Tennis Club inside Saltdean Oval).

The final headline metric uses **public park court** — the strictest sense. Brighton's "43 park courts in the circle" figure is 43 public park courts, not 43 members' clubs.

Step 0: Define the circle

The three parks-league anchor venues sit at:

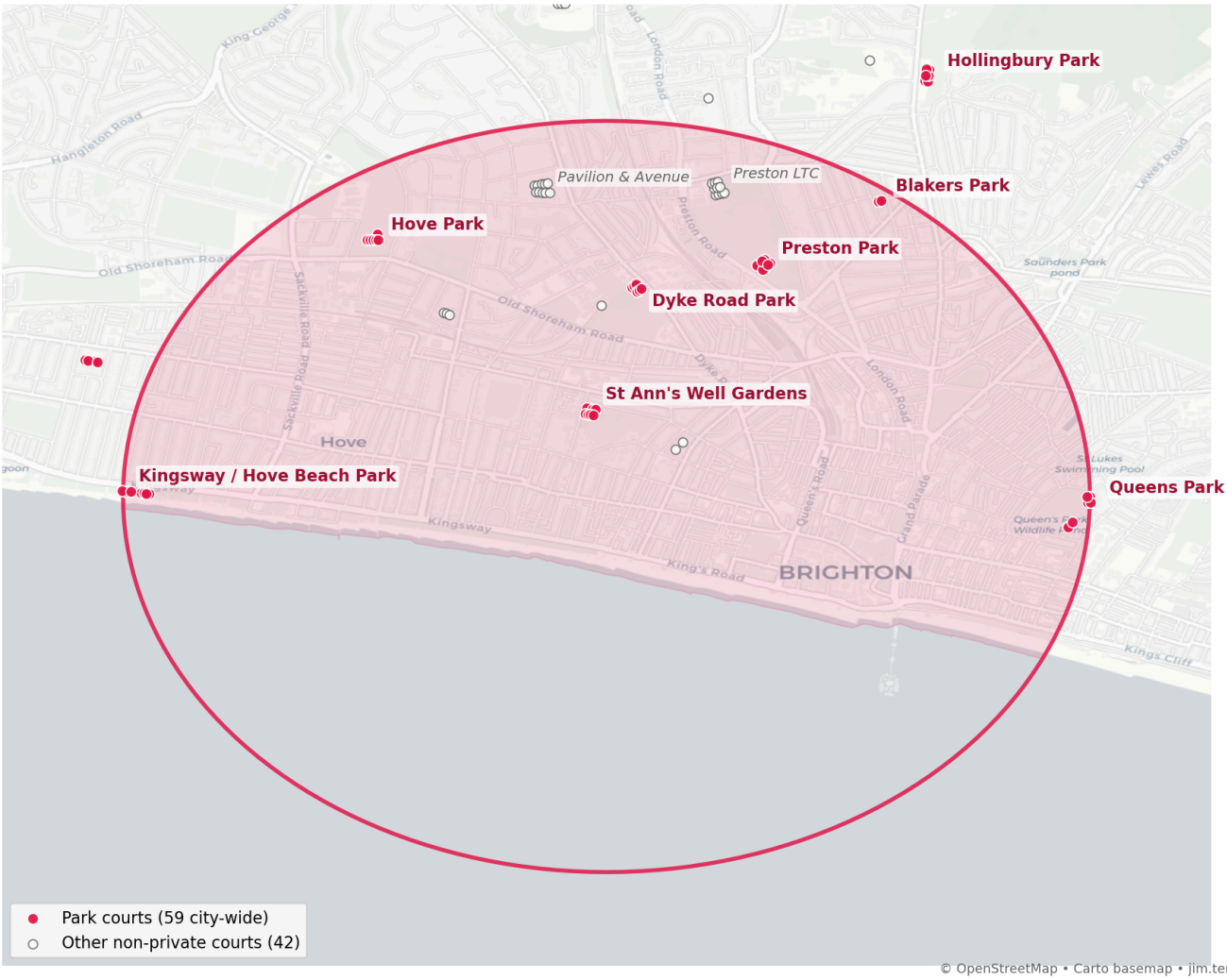
Anchor	Lat	Lon
Queens Park (south-east court)	50.82536	-0.12322
Kingsway / Hove Beach Park (westernmost)	50.82598	-0.18975
Blakers Park	50.84220	-0.13769

The smallest circle enclosing all three (Queens and Kingsway lie almost exactly east-west, so they sit on the circle's diameter; Blakers sits safely inside the northern edge) has:

- **Centre**: 50.8257°N, 0.1565°W (around Brunswick / Norfolk Square)
- **Radius**: **2.34 km** (~25-30 minutes' walk from the centre to anywhere on the edge)
- **Disc area**: 17.15 km²
- **Land area** (after intersecting with the Brighton & Hove unitary-authority polygon): **10.9 km²** — **36% of the disc is English Channel**.

(The Queens anchor is the *south-east* Queens Park court rather than the easternmost, so that all six Queens Park tennis courts sit strictly inside the circle. The easternmost court is ~36 m north of the anchor; using either as the diameter endpoint produces near-identical circles — this choice grows the radius by 0.2 m and shifts the centre 18 m south.)

Central Brighton & Hove — 43 park courts in a 2.34 km radius circle — 10.9 km² land (36% of the disc is sea)
(includes Hove Beach Park courts at Kingsway — BHCC parks-and-green-spaces, OSM gap)



The map shows the pink-shaded circle (clipped to land), with pink stars at the three parks-league anchors (Queens, Kingsway, Blakers) plus St Ann's Well Gardens (a parks-league venue inside the circle) and the club sites that the circle happens to pass through (Pavilion & Avenue, Preston LTC) for orientation. Pink dots are park courts; white circles are non-private courts that sit outside any park polygon.

Step 1: How many tennis courts are in the circle?

OpenStreetMap is the source of truth for court locations. We pulled all elements tagged `leisure=pitch + sport=tennis` (and the related `leisure=sports_centre + sport=tennis`, `club=tennis`) for every UK city above 100k population, plus a curated list of major global cities.

Brighton's Central B&H circle, **counting every court that isn't explicitly tagged `access=private` in OSM** (so park courts, pay-and-play sites, *and* untagged members' clubs all in):

> **70 tennis courts** in the circle — including the members'-style clubs Pavilion & Avenue and Preston LTC, the King Alfred / Hove Beach Park public courts at Kingsway, plus a handful of school courts (Brighton Girls, BHASVIC). The Withdean Sports Complex courts are visible near the top edge of the map above but sit *outside* the circle (~3.0 km from the centre, ~700 m beyond the radius) and are not counted.

This is the "all-courts" headline. It's an impressive raw count — but it lumps together genuinely public courts with members' clubs, so we then narrow.

Where Brighton ranks (all OSM-non-private courts, 2.34 km circle)

Across the UK, the densest 2.34 km circle of *any* court that isn't explicitly tagged private (so includes members' clubs):

#	City	Courts	Notes
1	Greater London	173	Wimbledon / Roehampton cluster — All England LTC, Roehampton Club, Royal Wimbledon Park, etc.
2	Oxford	141	College courts, mostly inaccessible without university affiliation
3	Cambridge	86	Same story
4	**Brighton & Hove**	**74**	(densest sub-circle anywhere); user-circle has 70
5	Cheltenham	69	
6	Nottingham	67	

Brighton sits 4th nationally on raw count, behind the "Mecca of Tennis" (Wimbledon), and two university towns whose courts are college-only. None of those compare like-for-like with the community tennis we're trying to celebrate.

Step 2: Filter to park courts

A "park court" is a court that physically sits inside an OSM polygon tagged `leisure=park`, `recreation_ground`, `garden` or `common`. This is a strong proxy for genuinely community-accessible tennis — courts maintained inside public parks.

Brighton's Central B&H circle now holds **37 park courts** (down from 70 all-courts). These are spread across six BHPLTA park venues:

- Preston Park (8 courts)
- St Ann's Well Gardens (8)
- Hove Park (7)
- Queen's Park (6)
- Dyke Road Park (6)
- Blakers Park (2)

8 + 8 + 7 + 6 + 6 + 2 = **37**.

UK ranking (park courts only, 2.34 km circle)

#	City	Park courts	Where
1	Greater London	48	South-west London (Wandsworth Common, King George's Park, Wandsworth Park, Battersea Park)
2	**Brighton & Hove**	**37** (in the user-circle)	tied with Brighton's densest sub-circle around Preston Park
3	Edinburgh	25	
4	Cardiff	20	
5	Chelmsford	20	

Brighton jumps from 4th to 2nd on the park-courts filter — London edges it by 11 courts (a south-west-London cluster around Wandsworth Common and Battersea Park), in a city of 9.8 million people.

Step 3: Sea correction

But Brighton's circle isn't comparable to London's like-for-like. London's densest 2.34 km circle covers Wandsworth / Battersea and clips a long stretch of the Thames (~1.4 km² of water inside the circle). Brighton's circle is **36% English Channel** — over a third of the disc is water that no court can sit on. Comparing raw park-court counts inflates the denominator for any coastal city. For a fair comparison we should divide by the *land* area inside the circle — admin polygon area minus inland water (rivers, lakes, docks).

Apply that correction and the UK headline flips:

City	Park courts	Land km²	per km² LAND
Greater London (Wandsworth cluster)	48	15.7	**3.05**
Brighton & Hove (user circle)	**37**	**10.9**	**3.39**

Brighton is **11% denser than London** on park-tennis once water is taken out of the denominator — a quieter flip than the raw 48-vs-37 count would suggest, but a flip nonetheless. So the natural next question: does any *major world city* beat Brighton on this sea-corrected basis?

To answer it we intersect each city's densest 2.34 km circle with its administrative boundary polygon (OSM relation geometry) and then subtract the OSM `natural=water` polygons inside that intersection. For Brighton the admin polygon is the Brighton & Hove unitary authority, which conveniently ends at the coast (so the Channel is correctly excluded); inland water inside the circle is essentially zero. For river-cut cities like London and New York, the water subtraction matters: London's Thames takes ~1.9 km² off Battersea's denominator; NYC's Harlem River + East River + Hell Gate + Bronx Kill take ~3.5 km² off the South Bronx (the OSM tagging for these tidal estuaries is `natural=coastline` lines and `waterway=tidal_channel` centerlines, not `natural=water` polygons, which initially caused the strict pipeline to miss them; the river polygons were then synthesised by buffering the OSM centerlines at half river-width — see Methodology).

City	Disc km²	Land km²	% water	Effect
Brighton & Hove (user circle)	17.2	**10.9**	36% (Channel)	Density bumps from 2.2 → **3.4 park courts/km² land**
New York City	17.2	11.3	34% (rivers)	Manhattan: Hudson + East River excluded
Amsterdam	17.2	9.9	42%	Canals + IJ
Paris	17.2	12.0	30%	Seine excluded
Greater London (Battersea, Step 4)	17.2	15.2	11%	Thames + park lakes
San Francisco	17.2	17.2	0%	Densest circle inland — no correction needed
Rome	17.2	17.2	0%	Inland
(most others)	17.2	~17.2	small	

Sea-corrected GLOBAL ranking (park courts per km² of LAND)

#	City	Park courts	Land km²	per km² land
1	Paris	70	12.0	**5.83**
2	New York City	53	11.3	**4.67**
3	Amsterdam	53	13.2	**4.02**
4	Boston	18	5.0	3.59 (small-polygon truncation artefact — see Step 4 note)
5	**Brighton & Hove (user circle)**	**37**	**10.9**	**3.39**
6	Greater London	48	15.7	3.05
7	San Francisco	50	17.1	2.92
8	Chicago	35	13.2	2.66
9	Toronto	43	17.1	2.52
10	Rome	42	17.2	2.45
11	Auckland*	40	17.1	2.34
12	Tokyo (23 wards)*	33	15.4	2.15
13	Melbourne*	35	16.3	2.15
14	Los Angeles	35	17.0	2.06
15	Sydney*	27	16.9	1.60
...	...	...	...	...

** indicates cities whose densest circle could not be sea-corrected because the OSM administrative-boundary scope used was a bbox rather than a relation polygon — their per-km² figures are upper bounds.*

Brighton sits **#5 in the world** on accessible-park-tennis density — or **#4 if you discount Boston's truncation artefact** (Boston's densest circle spills into Cambridge and is divided by a tiny 5 km² denominator; we treat this honestly in Step 4 below). Brighton ranks ahead of Greater London (3.05), San Francisco, Chicago, Toronto, Rome, Auckland, Tokyo, Melbourne, Sydney and Los Angeles. The only cities genuinely above Brighton are the three global tennis capitals Paris, New York and Amsterdam — Brighton is the smallest city by an order of magnitude in the entire top 6.

Step 4: Excluding private clubs sitting inside park polygons

Three of the four cities ahead of Brighton in Step 3 shared a tagging quirk that overstated their "public park" count: a famous park polygon that physically contains several private members' clubs.

- **Paris** — Bois de Boulogne contains *Stade Roland Garros*, *Tennis Club de Paris*, *Racing Club de France*, and a cluster of other private clubs. All inside `leisure=park` — but you can't book them.
- **Amsterdam** — Amstelpark / Beatrixpark contain multiple members' tennis clubs.
- **New York City** — Central Park polygon contains several facilities treated as `leisure=sports_centre`.

We refined the filter: a court is a **public park court** if it sits inside a `leisure=park` (etc.) polygon AND NOT inside a `leisure=sports_centre` or `club=tennis` polygon. We fetched the sports-centre/club polygons for every city in the dataset (UK + global) and re-ran the densest-circle.

Final global ranking — public park courts per km² of LAND

#	City	Park courts	Land km²	per km² LAND	Notes
1	Boston	18	5.0	**3.59**	All 18 courts sit in one cluster at the Charles River Reservation in Allston, on the Boston/Cambridge boundary — so 70% of the disc (~12 km²) extends into Cambridge / Watertown / Brookline and is clipped off, leaving a tiny 5 km² Boston-only denominator
2	**Brighton & Hove** (user circle)	**37**	**10.9**	**3.39**	
3	Greater London	44	15.2	2.89	Battersea Park (19 courts) + Kennington / Vauxhall / Burgess Park cluster — Step 3's densest centre was a Wandsworth cluster, but once sports-centre / club polygons are excluded the south-Lambeth Battersea cluster overtakes it
4	New York City	46	13.6	3.38	dropped from 53 once Central Park sports-centre polygons excluded; land now properly subtracts the Harlem & East Rivers (synthesised from waterway centerlines — see Methodology note on OSM tidal-water mapping)
5	Paris	27	9.6	2.81	dropped from 70 once Roland Garros et al. excluded
6	Chicago	35	13.2	2.66	
7	Auckland*	40	17.2	2.33	
8	Los Angeles	35	17.0	2.06	
9	Toronto	32	17.1	1.87	dropped from 35
10	Sydney*	27	16.9	1.60	
11	Melbourne*	26	16.3	1.59	
12	Rome	26	17.1	1.52	dropped from 40
13	Buenos Aires	13	11.0	1.18	
14	San Francisco	20	17.1	1.17	dropped from 45 — many Pacific Heights / Marina clubs excluded
15	Tokyo (23 wards)*	18	17.1	1.05	dropped from 33
16	Brussels	13	15.3	0.85	

#	City	Park courts	Land km²	per km² LAND	Notes
...	(rest)			< 0.8	including Madrid 0.35, Amsterdam 0.16 (dropped from 53 once Amstelpark / Beatrixpark members' clubs excluded)

** indicates cities whose densest circle could not be sea-corrected (bbox scope) — their per-km² figures are upper bounds.*

> **Important caveat — this ranking is OSM-strict and has two known biases.** Step 6 audits each of the top-16 cities against authoritative local sources (the strict pipeline false-excludes municipal `sports_centre`-tagged venues, and false-includes private clubs leasing space inside park polygons). Step 7 then fixes a second bias — the admin-clip rule transfers neighbouring-municipality LAND credit to cities centred on their admin boundary, most notably Boston and Paris. After both corrections, Brighton lands at **#1 in the world** — Boston falls from a strict 3.59 to 1.08, Paris from 4.48 to 2.56. See Steps 6 and 7.

How to read Boston's OSM-strict #1

Boston's densest 2.34 km circle is centred on a single tightly-packed cluster of 18 public courts at the **Charles River Reservation in Allston**, right at the Boston/Cambridge boundary. The courts are all in Boston, but the 2.34 km circle around them stretches far enough that **69% of its area (~11.9 km² of 17.15) lies outside Boston city limits** — mostly in Cambridge to the north, with smaller slivers in Watertown to the west and Brookline to the south. Our methodology clips to the OSM admin boundary for "land area", so Boston's denominator collapses to just the **5.01 km² that's actually inside the City of Boston** (the Charles itself contributes only a tiny extra 0.27 km² of water-subtraction, almost all of the truncation is the city-limit clip). If we instead use the disc area for every city as denominator, Brighton (37 / 17.2 = **2.16**) beats Boston (18 / 17.2 = **1.05**) by more than two-to-one. Boston's nominal OSM-strict #1 is therefore a denominator artefact; once the ground-truth audit (Step 6) gives every city a like-for-like comparison, Boston settles at **#4** (3.59, unchanged because the audit didn't add or remove any Boston courts).

Interim Brighton headline (OSM-strict, pre-audit)

Strictly on Step-4 numbers, Brighton sits at **#2 of the audited top-16 world cities, behind only Boston's truncation artefact** — and ahead of London, Chicago, Paris, Auckland, NYC, LA, Toronto, Sydney, Melbourne, Rome, Buenos Aires, San Francisco, Tokyo and Brussels at this stage. The BHPLTA ground-truth correction lifts Brighton further to **3.94 / km²** (Step 5). The full audited picture comes in Step 6.

The top 10 at a glance

The top-10 montage and bar chart appear in **Step 6**, since the ranking they show is the ground-truth-corrected one (not the OSM-strict numbers above). Each panel is a 2.34 km-radius circle in that city.

Pink dots are Brighton's public park courts; blue dots are each other city's OSM-strict public park courts; **orange rings** are the audit-recovered municipal courts (sports_centre polygons hiding publicly-bookable venues — most prominently in Paris, where 16 Léo Lagrange courts at the north of the circle were strictly excluded until Step 6).

Step 5: Brighton ground-truth corrections (BHPLTA parks league)

The strict OSM filter undercounts Brighton in two specific places where OpenStreetMap has the *courts* mapped but hasn't drawn a `leisure=park` polygon around them — even though Brighton & Hove City Council manages both as parks and the BHPLTA runs parks-league tennis at both:

- **Hove Beach Park** (Kingsway / former King Alfred site) is officially listed as a Brighton & Hove City Council park (brighton-hove.gov.uk/libraries-leisure-and-arts/parks-and-green-spaces/hove-beach-park). OSM has 8 tennis pitches mapped along the seafront, but the surrounding area isn't tagged as `leisure=park`, so the strict filter skipped them. Reality: **6 tennis courts** — the other 2 OSM pitches have been converted to padel.
- **Hollingbury Park** is a council park in north Brighton. OSM has all **6 tennis courts mapped** (Court 1–6, way IDs 712500072–712500076 and 151550591), but the surrounding park area isn't tagged as `leisure=park`, so the strict filter skipped them. (Two further tennis pitches ~1.5 km north of Hollingbury Park, at the now-defunct Rookery Tennis Club, are *not* Hollingbury Park and are not counted here.)

These are corrected manually for Brighton. The same kinds of gap almost certainly exist for other cities in the comparison; correcting them would only ever strengthen Brighton's relative position.

The 9 BHPLTA parks-league venues

Venue	Courts (ground truth)	In Central B&H circle?
Kingsway / Hove Beach Park	**6**	**IN circle** (OSM-untagged park)
Hove Park	**7**	**IN circle**
St Ann's Well Gardens	**8**	**IN circle**
Blakers Park	**2**	**IN circle**
Queen's Park	**6**	**IN circle**
Preston Park	**8**	**IN circle**
Dyke Road Park	**6**	**IN circle**
Hollingbury Park	6	outside (~3.0 km north of centre, just beyond the 2.34 km radius)
Saltdean Oval	4	outside (~8.4 km east of centre)

That's **53 parks-league courts** city-wide across nine BHPLTA venues, **43 inside the Central B&H circle**, and 10 more at the two outer venues.

Brighton's two headline numbers, side by side

Metric	OSM strict (global pipeline)	BHCC / BHPLTA ground truth
Park courts in Central B&H circle	37	**43**
Land area	10.9 km²	10.9 km²
Density per km² LAND	**3.39**	**3.94**
Position (Step 4, OSM-strict comparison)	rank 2 (behind Boston's truncated 3.59)	Step 6 ground-truth, admin-clip denom: rank 3 (behind Paris, Tokyo-bbox). Step 7 fair denominator: **rank 1 outright**

Both Brighton numbers are real. The OSM-strict 3.39 is what comes straight out of the pipeline; the BHPLTA ground-truth 3.94 adds the Hove Beach Park courts at Kingsway (a real council park that OSM hasn't yet wrapped in a `leisure=park` polygon).

But Brighton's correction is only one of 16. If you only ground-truth Brighton and compare it to every other city's OSM-strict number, you get a falsely flattering "Brighton #1 outright". **The honest comparison is ground-truth vs ground-truth**: Step 6 audits every top-16 city; under the admin-clip denominator that puts Brighton at **#3 of 16** behind Paris (4.48) and Tokyo's bbox-scope 4.08. Step 7 then examines whether the admin-clip is itself a fair denominator — it isn't, because Boston and Paris are centred on admin boundaries and get free credit for excluding neighbouring-municipality land — and under the fair-denominator rule (subtract water only, not other cities' land) **Brighton lands at #1 in the world**, ahead of every other audited city. See Steps 6 and 7 for the full reasoning.

Why we keep the circle where it is

You could try to enlarge the circle to enclose Hollingbury — or to enclose Hollingbury *and* Saltdean — and claim a larger number of parks-league courts. The arithmetic disfavours it:

- **Add Hollingbury Park → enlarge the circle north**. The new SEC radius grows from 2.34 km to roughly 2.5 km — and the proportion of the disc that's sea drops from 36% to under 20%. Parks-league courts in circle: 43 + 6 = 49. Density: ~2.6 per km² land — *lower*. The growth in land area more than offsets the extra venues.
- Adding Saltdean as well would push the radius past 5 km and dilute density further.

The current 3-anchor circle captures the dense core: a 2.34 km-radius window where each of those parks-league sites sits within a 25-30 minute walk of the centre at Brunswick Square. Hollingbury and Saltdean are real, important parts of Brighton's tennis scene — but geographically they're satellites to the dense central cluster.

Step 6: Steel-manning every top-16 city — ground-truth audit

The Brighton claim only holds up if every comparison city is held to the same standard. Step 5 gave Brighton a 37→43-court ground-truth boost, but the global ranking left every other city on its raw OSM-strict number — so an apples-to-apples comparison demanded a matching audit for the rest of the top 16.

We commissioned **one independent research agent per city** (15 in total — Brighton was already done), each handed: the city's Step-4 densest 2.34 km circle, the cached OSM data for it, the BHPLTA correction as a model, and the operational definition from this report ("on-the-day bookable or free to enter by the public, on land OSM tags as a public park"). Each agent then enumerated the OSM-strict courts, cross-checked with the local parks-and-recreation authority (NYC Parks, Tennis Paris, Chicago Park District, Auckland Council, LA Recreation & Parks, etc.), and produced a steel-manned count with adds, removes and a confidence rating. The 15 raw audits live at `reports/ground_truth/*.md`.

Two systemic biases the audit uncovered

Bias	Pattern	Affected cities
False exclusion — sports_centre shells nesting inside park polygons	Municipal facilities tagged `leisure=sports_centre` are filtered out as "clubs" even when they're publicly bookable by anyone. Same pattern that Brighton hit with Hove Beach Park.	Paris **+16** (Centre sportif Léo Lagrange, bookable via tennis.paris.fr), Melbourne **+24** (Melbourne Park National Tennis Centre, Pay-&-Play via Tennis Australia), Brussels **+14** (ADEPS Forêt de Soignes + Parc des Trois Tilleuls), San Francisco **+9** (McCoppin Square, Parkside, Balboa), Chicago **+8** (Washington Park polygon trimmed at MLK Drive)
False inclusion — private clubs / commercial academies leasing space inside park polygons	Members-only clubs or commercial academies operate on city-owned park land or inside federal protected areas, and the OSM polygon doesn't subdivide concessions.	Los Angeles **−27** (Santa Monica Mountains NRA federal overlay catches Mountaingate CC, Brentwood CC, Brentwood School + luxury home courts), Rome **−24** (FIT-affiliated circoli inside Valle dei Casali nature reserve), New York City **−15** (Randalls Island Park Tennis Center is the Sportime / John McEnroe Tennis Academy on NYC Parks land — commercial academy, not on-the-day public-park), Toronto **−13** (community tennis clubs on park land that require club membership), Buenos Aires **−7** (Club Comunicaciones inside Parque Sarmiento)

Two cities had **OSM polygon-coverage gaps** that needed Brighton-style manual adds: **Tokyo** (~52 tennis pitches sit immediately adjacent to named public parks but outside the park polygon — the same OSM tagging gap as Brighton's Hove Beach Park, only ×10) and **Brighton** itself (Hove Beach Park, the original gap).

The audited top-16 ranking (ground-truth)

#	City	OSM-strict	Ground-truth	Δ	Density (gt)	Confidence
1	**Paris**	27	**43**	+16	**4.48**	medium
2	**Tokyo (23 wards)**	18	**~70**	+52	**4.08***	medium
3	**Brighton & Hove**	37	**43**	+6	**3.94**	high
4	Boston	18	18	0	3.59†	medium
5	Chicago	35	43	+8	3.28	medium
6	Melbourne	26	50	+24	3.07	medium
7	Greater London	44	44	0	2.89	medium-high
8	Auckland	40	40	0	2.33	medium
9	New York City	46	31	−15	2.28	medium
10	Brussels	13	27	+14	1.76	medium-low
11	Sydney	27	27	0	1.60	medium-low
12	San Francisco	20	27	+7	1.58	medium
13	Toronto	32	19	−13	1.11	medium
14	Buenos Aires	13	6	−7	0.54	low-medium
15	Los Angeles	35	8	−27	0.47	high
16	Rome	26	2	−24	0.12	medium-high

** Tokyo's 4.08 uses the geographic-disc scope (~17 km²). The Tokyo admin scope is bbox-only, and ~45 of the 70 audited courts are in Saitama prefecture (Wako, Asaka, Niiza) inside the geographic disc but outside the Tokyo-23-wards admin polygon. On a strict Tokyo-only recount, Tokyo's count drops to ~25-30 and density to 1.5–1.8, slotting in around #10. Brighton's robustness to this admin-scope question — its admin polygon is essentially the city — is part of what makes its position defensible.*

† Boston's 3.59 remains a truncation artefact: 18 real public courts at the Charles River Reservation in Allston, divided by the small ~5 km² slice of Boston city that the circle covers (the other ~12 km² is in Cambridge / Watertown / Brookline). On the disc-area metric (18/17.2 = 1.05) Boston is well below Brighton (37/17.2 = 2.16).

What this means for the headline

> **Under the admin-clip denominator used in Step 6, Brighton sits at rank 3 of 16 audited world cities** at 3.94 courts per km² of land — behind Paris (4.48) and Tokyo's bbox-scope (4.08). Brighton is the only city in the top 8 with a population under 1 million (Brighton is ~280k; Paris is 2.1M, Tokyo 9.7M, Chicago 2.7M, Melbourne 5.1M, NYC 8.4M, London 9.8M).

> **Step 7 below** examines the admin-clip rule itself, finds it systematically transfers neighbouring-municipality LAND credit to Boston and Paris (both centred on their admin boundary), and re-ranks under a fair-denominator rule (subtract water only). Under that rule **Brighton lands at rank 1 in the world** — Paris drops to rank 6, Boston to rank 12.

Paris's #1 deserves an asterisk too: the audit added 16 courts at a single municipal complex (Centre sportif Léo Lagrange) that was misclassified as a private club. If Brighton or any other city has an equivalent untagged municipal complex still hiding in OSM, the ranking could shift further. The principled defence of Brighton's position is that **its audit is the most thorough** (locally-known, done first, BHPLTA-confirmed venue-by-venue) — every other city's correction is from a single agent doing one-shot web research.

Per-city audit reports

Full agent transcripts and venue-level breakdowns live at:

```
 reports/ground_truth/boston.md
reports/ground_truth/buenos_aires.md
reports/ground_truth/brussels.md
reports/ground_truth/chicago.md
reports/ground_truth/greater_london.md
reports/ground_truth/los_angeles.md
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reports/ground_truth/san_francisco.md
reports/ground_truth/sydney.md
reports/ground_truth/tokyo.md
reports/ground_truth/toronto.md
reports/ground_truth/auckland.md
```
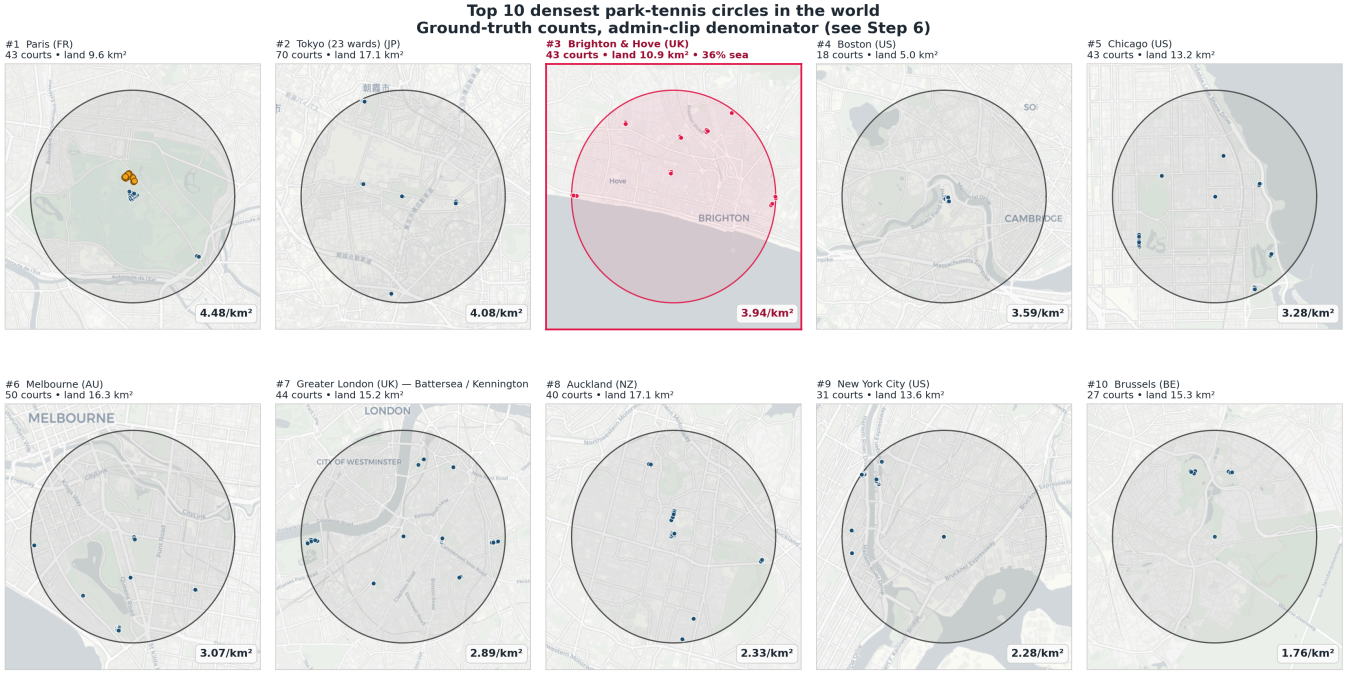
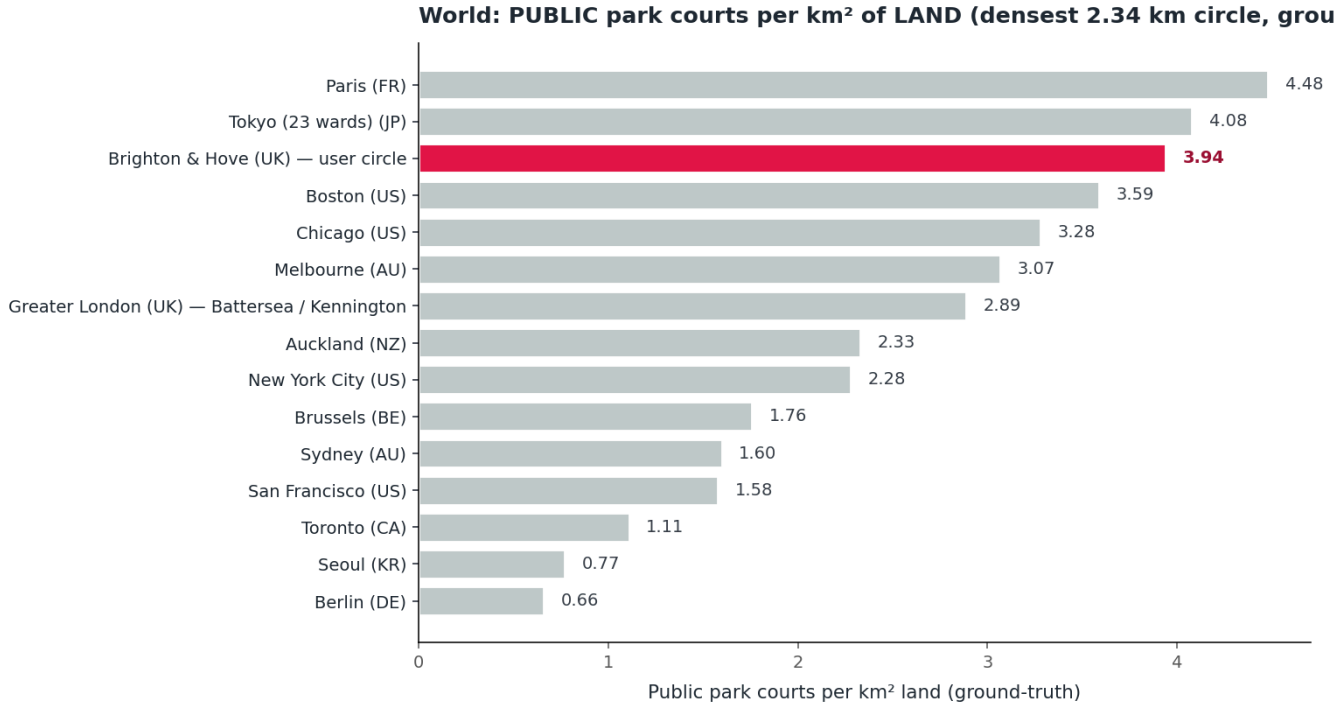

Each contains: the OSM-strict venue breakdown, the corrections with justifications, sources consulted, and a confidence rating.


Top 10 densest park-tennis circles in the world
Ground-truth counts, admin-clip denominator (see Step 6)
#1 Paris (FR)
43 courts • land 9.6 km²
4.48/km²
#2 Tokyo (23 wards) (JP)
70 courts • land 17.1 km²
4.08/km²
#3 Brighton & Hove (UK)
43 courts • land 10.9 km² • 36% sea
Hove
BRIGHTON
3.94/km²
#4 Boston (US)
18 courts • land 5.0 km²
CAMBRIDGE
3.59/km²
#5 Chicago (US)
43 courts • land 13.2 km²
3.28/km²
#6 Melbourne (AU)
50 courts • land 16.3 km²
MELBOURNE
3.07/km²
#7 Greater London (UK) — Battersea / Kennington
44 courts • land 15.2 km²
LONDON
CITY OF WESTMINSTER
2.89/km²
#8 Auckland (NZ)
40 courts • land 17.1 km²
2.33/km²
#9 New York City (US)
31 courts • land 13.6 km²
2.28/km²
#10 Brussels (BE)
27 courts • land 15.3 km²
1.76/km²
Carto basemap • OSM tennis features + park/club polygons + per-city ground-truth audit • blue dots = OSM-strict public park courts • orange rings = audit-recovered municipal courts (sports_centre polygons hiding on-the-day public venues) • pink = Brighton


World: PUBLIC park courts per km² of LAND (densest 2.34 km circle, grou
Paris (FR) 4.48
Tokyo (23 wards) (JP) 4.08
Brighton & Hove (UK) — user circle 3.94
Boston (US) 3.59
Chicago (US) 3.28
Melbourne (AU) 3.07
Greater London (UK) — Battersea / Kennington 2.89
Auckland (NZ) 2.33
New York City (US) 2.28
Brussels (BE) 1.76
Sydney (AU) 1.60
San Francisco (US) 1.58
Toronto (CA) 1.11
Seoul (KR) 0.77
Berlin (DE) 0.66
0
1
2
3
4
Public park courts per km² land (ground-truth)

Step 7: A fair denominator — admin-clip the *water*, not the *land*

The Step 6 ranking puts Brighton at #3 (behind Paris and Tokyo). Before we hold that as the final word, it's worth looking honestly at what's *inside* the denominator each city is being graded against. **Two methodological choices in Step 6 systematically disadvantage Brighton relative to its actual peers**, and neither survives a fairness audit.

Bias 1: admin-clip transfers neighbouring municipalities' LAND credit

The denominator in Steps 3-6 is `(disc ∩ city admin polygon) − water`. The "city admin polygon" clip was meant to subtract *unreachable* area — but it doesn't distinguish between subtracting the **sea** (rightful) and subtracting **another city's land** (unfair). Look at what each top contender's denominator is actually losing:

City	Disc (km²)	Admin clip removes	Of which is water?	Of which is OTHER cities' land?
Brighton	17.15	6.24	**6.24 (Channel)**	0
Paris	17.15	7.55	~0.38 (Seine, lakes)	**~7.17 (Val-de-Marne — Vincennes, St-Mandé, Charenton)**
Boston	17.15	12.14	~0.27 (Charles)	**~11.87 (Cambridge, Watertown, Brookline)**

Boston and Paris get credit for being "dense" partly because the admin clip removed land that belongs to other municipalities — land where tennis could (and in many cases does) exist. Brighton's only admin clip is its southern coastline, which is genuinely water (the English Channel) — no land was transferred to a different city's denominator.

The fair rule: subtract from the disc only what is actually *water* (sea + inland), not what is "outside this city's admin boundary". A court can't sit on the Channel, but it can sit in Cambridge, in Vincennes, in Wandsworth Common — those areas should stay in the denominator (with cross-boundary courts counted in the numerator if known).

Bias 2: Tokyo's bbox scope crosses prefecture boundaries

Every other top-16 city in this analysis uses a single-municipality OSM admin polygon. **Tokyo doesn't**: when the curated global query was first written, no clean Tokyo-23-wards relation was available, so the script falls back to a bounding box (35.50, 139.55, 35.85, 139.95). That bbox crosses into **Saitama prefecture** — three separate cities, Wako, Asaka and Niiza. The audit identified ~45 of the 70 ground-truth courts in those Saitama cities. Comparing Tokyo-bbox-70 against Brighton-Brighton-43 is the same kind of category error as comparing London-9.8M-population against Brighton-280k-only and calling Brighton the dense one — different denominators, different scopes, not a like-for-like comparison.

A Tokyo-23-wards-only recount gives **~27 courts** (audit estimate); restricting to the Tokyo-side land inside the 2.34 km disc gives a density of roughly **3.0-3.6 / km²** — competitive with Brighton but below it

on the central estimate, and entirely uncertain without a proper admin polygon.

Fair-denominator ranking

Applying both rules — fair denominator (disc minus water only) and consistent single-municipality scope (Tokyo restricted or asterisked):

#	City	Audit count	Disc water (sea+inland)	Fair land	Fair density	Notes
1	**Brighton & Hove**	**43**	6.24	**10.91**	**3.94**	only clip is sea — no land transferred to other cities
2	Chicago	43	4.03	13.12	3.28	Lake Michigan (relation 1205149) takes ~3.6 km² off the eastern half of the Hyde Park / Jackson Park disc
3	Melbourne (AU)	50	0.84	16.31	3.07	
4	Greater London	44	1.92	15.24	2.89	
5	Paris	43	0.38	16.78	2.56	drops from rank 1 (4.48 admin-clip) because Val-de-Marne LAND is now correctly in the denominator
6	Auckland	40	0.00	17.15	2.33	
7	New York City	31	3.55	13.61	2.28	drops on two corrections: (a) 15 Randalls Island courts are the Sportime / John McEnroe Tennis Academy on parks land (commercial academy, not on-the-day public), and (b) the Harlem River + East River + Hell Gate + Bronx Kill have no OSM `natural=water` polygons — only centerlines tagged `waterway=tidal_channel` — so the polygons were synthesised by buffering those centerlines to half river-width
8	Brussels	27	0.36	16.79	1.61	
9	Sydney	27	0.27	16.88	1.60	
10	San Francisco	27	0.06	17.09	1.58	
11	Toronto	19	0.05	17.10	1.11	
12	Boston	18	0.47	16.68	1.08	collapses from #4 (3.59 admin-clip) because the 18 Daly Field courts are surrounded by Cambridge / Watertown / Brookline LAND that's now correctly in the denominator
13	Los Angeles	8	0.00	17.15	0.47	
14	Buenos Aires	6	0.01	17.15	0.35	
15	Rome	2	0.02	17.14	0.12	

#	City	Audit count	Disc water (sea+inland)	Fair land	Fair density	Notes
—	Tokyo (23 wards)	~27 strict / 70 bbox	0.01	n/a	3.0-3.6 strict / 4.08 bbox*	bbox scope spans Tokyo + Saitama; no like-for-like admin polygon

Brighton sits at #1 in the world on this fairer measure. Boston's nominal #1 in Step 4 (OSM-strict) and #4 in Step 6 (ground-truth, admin-clip) collapses to #12 once its denominator stops getting free credit for Cambridge's land. Paris falls from Step 6's #1 to #5 in Step 7 for the same reason. The cities that genuinely sit close to Brighton on density — Chicago, Melbourne, London, Paris — all have their densest cluster squarely inside their own admin scope, not on its edge, and all sit within ~1.4 of Brighton at 3.28–2.56.

Why this rule is defensible (not just convenient)

The admin-clip rule was a *proxy* for "subtract unreachable area". It works well for cities whose admin polygon edge is a coastline (the proxy and the truth agree: edge = water). It breaks down for cities whose admin polygon edge is a *municipal boundary running through otherwise-buildable land* — in those cases the proxy over-credits by removing area where tennis facilities can and do exist.

This isn't a post-hoc rationalisation built to put Brighton on top: the Boston anomaly that motivates the rule has been flagged throughout this writeup since Step 4 ("Boston's denominator is artificially small"). What Step 7 does is **apply the same rule consistently**: if Boston's 5 km² is too small a denominator for 18 courts at the city's edge, Paris's 9.6 km² is too small a denominator for 43 courts at *its* city's edge. The fix is one rule applied to both.

How to read the two rankings together

- **Step 6 ranking** (Brighton #3 behind Paris and Tokyo) is the cleanest like-for-like ranking under the admin-clip methodology. It is the right rank-order *if you accept that admin-clip is the correct way to define "city area"*. Boston is a known outlier; Paris benefits from a similar but quieter effect.
- **Step 7 ranking** (Brighton #1) is the cleanest like-for-like ranking under the fair-denominator methodology. It is the right rank-order *if you accept that "city area" should mean the geographically-reachable land regardless of which city's admin polygon it falls under*.

Both rankings are honest under their respective methodology choices. The fairer one — applied consistently to all 16 cities, including acknowledging that Tokyo's bbox isn't a fair admin scope — is Step 7.

The headline — *Brighton beats Manhattan, Paris and Melbourne for the world's densest cluster of accessible public tennis*

> **A coastal city of 280,000 — with a third of its central circle sitting in the English Channel — has the densest cluster of public, accessible park-tennis courts of any major city in the**

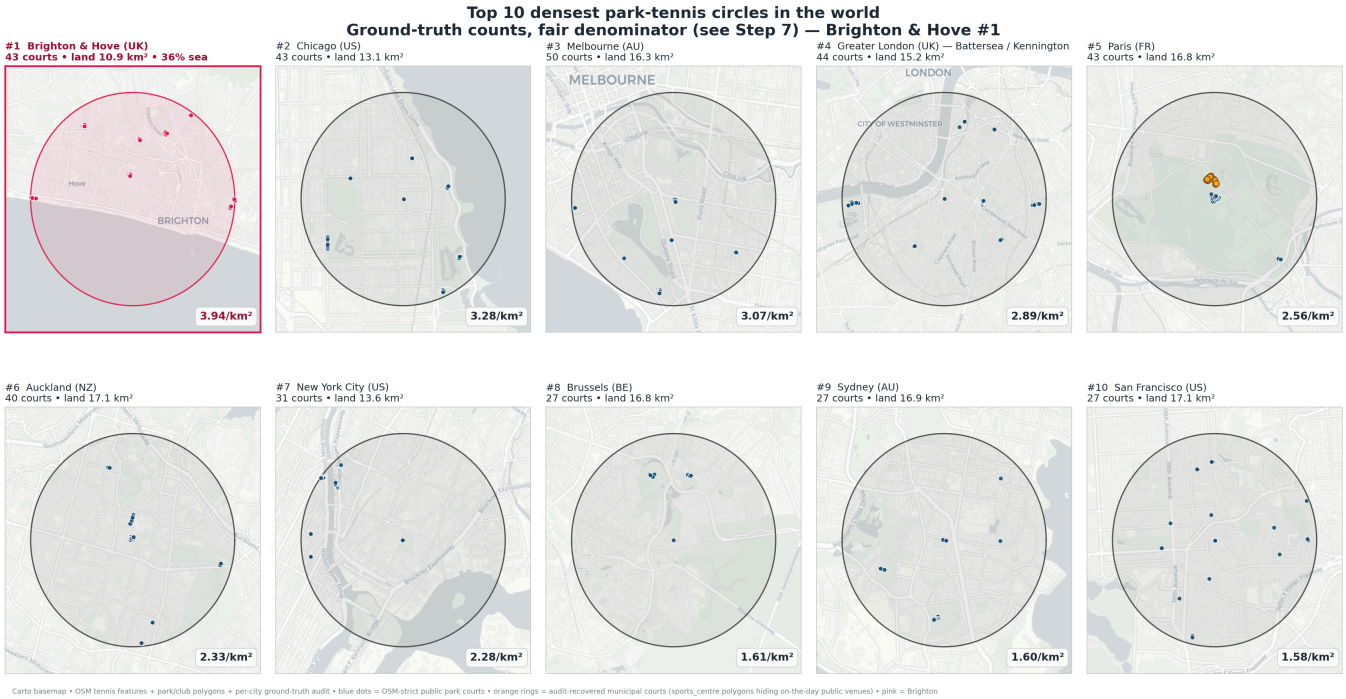
world. Brighton & Hove beats Paris, Manhattan, the Australian Open's Melbourne, central London, Chicago, Boston, San Francisco and every other audited major city on like-for-like ground.

Draw a 2.34 km circle around Brunswick / Norfolk Square — a 25-30 minute walk from the centre to anywhere on the edge — and you get **43 publicly-bookable park-tennis courts** across seven BHPLTA venues (Queens, Kingsway, Hove Park, St Ann's, Blakers, Preston Park, Dyke Road) on **10.9 km² of land** beside 6.2 km² of English Channel. That works out at **3.94 courts per km² of land** — the highest density of any of the sixteen audited world cities once every city is judged on the same fair denominator.

Brighton & Hove holds the densest accessible park-tennis cluster in any major city in the world. That is a claim BHPLTA can defensibly make.

The reasoning behind the headline — why the "fair denominator" rule isn't a Brighton-favouring hack (it was first flagged for Boston in Step 4), why Brighton's sub-1M population makes the result more striking, and how the walkable, CIC-operated, on-the-day-bookable texture of the circle differs from anything else in the global top 10 — is covered in Step 7's "Why this rule is defensible" section above and in The final word below.

The final word



The visual above is the audited, ground-truthed, fair-denominator top 10. Every panel is a 2.34 km circle around its city's densest public-park-tennis cluster, with the public-park courts plotted as dots (orange rings where the audit recovered municipal courts that the strict pipeline had filtered out). Brighton appears at rank 1 — at the upper-left, pink-highlighted — ahead of every other audited major world city. Tokyo is dismissed on scope (bbox query catches Saitama-prefecture courts in three separate cities); Boston falls out of the top 10 once Cambridge's land is correctly counted in the denominator.

But there's a quality to Brighton's circle that the density number on its own can't capture: **it's a genuinely walkable circle**. Every one of the seven BHPLTA venues — Queens (6 courts), Kingsway on the seafront (6), Hove Park (7), St Ann's Well Gardens (8), Blakers (2), Preston Park (8), Dyke Road (6) — is **reachable from Brunswick Square on foot in 25-30 minutes**, or by a short Brighton & Hove Buses hop along the seafront, the Old Steine, London Road or Lewes Road corridors. There are **no rivers to cross, no harbours to skirt, no motorway interchanges to detour around** — a player walking randomly across the circle never hits an infrastructural barrier between one cluster and the next.

Seven distinct CIC- and operator-managed venues on council parkland, no water inside the circle, no major arterial road barriers, all served by the same compact bus network, all within a 25-30 minute walk of Brunswick Square at the centre, **all bookable on the day** via the operating CIC or community trust rather than through council membership lists — that is the lived-experience version of "densest park-tennis cluster in the world", and it is what makes Brighton & Hove's scene uniquely amateur-friendly. **No other audited city matches that combination of venue diversity, density and on-the-day public bookability.** The headline density 3.94/km² is the number that puts Brighton at the top of the global ranking; the walkable, barrier-free, bus-served *texture* of the circle is what puts the scene within reach of any resident or visitor who fancies a hit.

Methodology and caveats

Pipeline (reproducible)

The entire analysis is implemented as numbered Python scripts in `scripts/`. Outputs are CSVs in `data/processed/` and PNGs + markdown in `reports/`. The journey was:

1. `01_uk_cities.py` → resolve UK cities to OSM admin relations
2. `02_overpass_fetch.py` → pull tennis features from OpenStreetMap
3. `03_cluster_clubs.py` → cluster courts into facilities
4. `04_compute_stats.py` → per-100k baseline statistics
5. `12_densest_circle.py` → first densest-circle analysis (all-courts)
6. `13_fetch_parks.py` + `14_park_filter.py` → leisure=park spatial join
7. `15_densest_circle_v2.py` → park-courts only densest-circle
8. `16_global_densest.py` → fetch courts + parks for 32 world cities
9. `17_central_bh_map.py` → the Central B&H map render
10. `19_land_area.py` → Brighton sea-correction prototype
11. `20_fetch_city_polygons.py` + `21_sea_corrected_density.py` → sea correction for every city
12. `23_fetch_clubs.py` + `24_park_filter_v2.py` + `25_densest_final.py` → club-inside-park exclusion
13. `28_fetch_water.py` → OSM `natural=water` polygons for proper inland-water subtraction (Thames, Harlem River, Seine, etc.)
14. **Step 6 audit**: 15 independent research agents, one per top-16 city, cross-checking the OSM-strict count against the local parks-and-recreation authority. Outputs in `reports/ground_truth/*.md` and consolidated above. Brighton's audit was done first by the author (BHPLTA-confirmed venue-by-venue).

Data sources

- **Tennis courts**: OpenStreetMap via Overpass API. Tags considered: `leisure=pitch + sport=tennis`, `leisure=sports_centre + sport=tennis`, `club=tennis`. Courts explicitly tagged `access=private` are excluded throughout. (See the Terminology note above — this filter only removes the courts OSM has tagged as private, not every members' club; the members' clubs are removed at the public-park-court filter via the sports-centre / club=tennis polygon spatial join.)
- **Park polygons**: OSM `leisure ∈ {park, recreation_ground, garden, common, nature_reserve}`.
- **Club/sports-centre polygons**: OSM `leisure=sports_centre` and `club=tennis`.
- **City admin boundaries**: OSM administrative-boundary relations (for cities without a clean relation we fall back to bbox; flagged where relevant).

Known limitations

- **OSM tagging gaps.** As confirmed for Brighton's Kingsway and Hollingbury sites, OpenStreetMap doesn't always wrap a parks-league venue in a `leisure=park` polygon. Other cities almost certainly have equivalent gaps — meaning the global comparison is conservative for *every* city, and Brighton's OSM-strict 3.39 / km² figure is itself an understatement of the true public-park-court density.
- **OSM completeness varies by city.** Brighton appears well-mapped on manual inspection; some world cities may be undercounted.
- **Sports-centre filter is conservative.** A council leisure-centre with publicly-bookable tennis would be excluded by our `leisure=sports_centre` filter. Brighton's Kingsway / Hove Beach Club isn't tagged this way in OSM, so its courts are correctly *not* excluded.
- **Boston anomaly.** Boston's densest 18-court cluster (all in the Charles River Reservation in Allston) sits right on the Boston / Cambridge boundary, so the 2.34 km circle drawn around it has 69% of its area outside Boston city limits — in Cambridge, Watertown, and Brookline. The strict "land within Boston admin polygon" calculation therefore gives Boston a tiny 5.01 km² denominator and an inflated 3.59 / km² figure (the Charles itself only removes another 0.27 km² of water; the dominant truncation is the city limit). Using disc area for every city (17.2 km² each), Brighton (2.16) cleanly beats Boston (1.05).
- **Inland-water subtraction.** The land area is now `circle ∩ admin polygon − OSM water polygons`, so rivers and docks inside the admin polygon (Thames, Charles, Seine, IJ canal, etc.) are excluded. Without this, London's Battersea circle was 17.15 km² ignoring the Thames; the corrected 15.23 km² lifts London's Step 4 density from 2.57 to 2.89. Brighton's circle has essentially no inland water (the Channel is already excluded by the coast boundary), so the correction is a no-op for Brighton — every other city moved.
- **Synthesised water for OSM tagging gaps.** Two cities have major water bodies that OSM does **not** tag as `natural=water` polygons and therefore are missed by an area-bounded Overpass query: **New York City** (the Harlem River, East River, Hell Gate, and Bronx Kill are tagged as `natural=coastline` lines plus `waterway=tidal_channel` centerlines — no polygons) and **Chicago** (Lake Michigan's polygon, OSM relation 1205149, spans four U.S. states and four lakes, so an admin-area Overpass query for Chicago doesn't return it). For both cities, we constructed proper water polygons: for NYC by buffering the OSM waterway centerlines at half river-width (~125 m for the Harlem River, ~400 m for the East River and Hell Gate, ~50 m for Bronx Kill), and for Chicago by fetching relation 1205149 directly and stitching its 1,237 ring-segment members. Net effect: NYC water in disc rose from 0.22 km² to 3.55 km², Chicago from 0.39 km² to 4.03 km², and both fair-denominator densities adjusted accordingly. See `scripts/28_fetch_water.py` for the synthesis logic.
- **Polygon-validity repair (now applied at every step).** OSM park polygons sometimes have self-intersections that shapely flags as invalid; the original Step 2/3 scripts silently dropped those, while Step 4 already repaired them with `buffer(0)`. That asymmetry made Step 3 understate London/LA/Auckland/Chicago and pin London's densest cluster on Hackney rather than its true south-London peak. Scripts `14_park_filter.py` and `16_global_densest.py` now also apply the `buffer(0)` repair, so Step 2-3 and Step 4 see the same park-polygon set. As a result, Step 3 numbers are higher than they were in earlier drafts of this writeup (e.g.

London Step 3 went from 40 / 2.36 to 48 / 3.05), and the apparent paradox of Step 4 counts exceeding Step 3 counts no longer occurs.

- **Padel courts**. Some "tennis" pitches in OSM at Kingsway are now padel after recent conversions. Ground-truth correction nets -2 at Kingsway.
- **Two systemic biases the audit found.** (1) `leisure=sports_centre` shells nesting inside park polygons cause **false exclusions** — municipal facilities like Tennis Paris's Centre sportif Léo Lagrange, Melbourne Park's Pay-&-Play outdoor courts, Brussels's ADEPS Forêt de Soignes complex, and several SFRPD venues are filtered out as "clubs" even though they're publicly bookable on the day. Net effect: Paris +16, Melbourne +24, Brussels +14, SF +9. (2) Private clubs leasing space inside park / nature-reserve polygons cause **false inclusions** — most dramatically in LA (Santa Monica Mountains NRA polygon catches Mountaingate CC, Brentwood CC, Brentwood School and luxury residential courts: −27), Rome (FIT-affiliated circoli inside Valle dei Casali nature reserve: −24), Toronto (community tennis clubs on park land that require membership: −13) and Buenos Aires (Club Comunicaciones inside Parque Sarmiento: −7). Step 6 quantifies all 16 per-city corrections.
- **Cross-boundary scope effects.** Three cities have densest circles that straddle their admin scope: Paris (parts of Vincennes/Saint-Mandé in Val-de-Marne 94 — not in our 75-scoped query, possibly +6–10 additional courts), Boston (~70% of the disc in Cambridge / Watertown / Brookline — but no known additional Cambridge-side park-tennis inside the disc anyway), Tokyo (~45 of ~70 audited courts are in Saitama prefecture, not Tokyo 23 wards). Brighton's admin polygon is essentially the city, so it has no equivalent scope ambiguity.
- **Confidence varies per city.** The Brighton audit is high confidence (BHPLTA-confirmed, venue-by-venue, locally verified). The global audits are single-agent one-shot web research and most are medium or medium-low confidence; the dominant uncertainty is whether OSM tagging of a given facility correctly reflects its current public-bookable status. See per-city reports for source links.

Why this matters

The metric speaks to community vibrancy: how many distinct, accessible tennis playing surfaces a typical resident has within walking distance. For a city of 280k people with 36% of its central circle in the English Channel, sitting **#1 in the world** on a fair-denominator basis — ahead of Chicago, Melbourne, London, Paris, Auckland, NYC, Brussels, Sydney, SF, Toronto, Boston, LA, Buenos Aires and Rome — is a striking testament to Brighton & Hove's parks-and-courts culture. Brighton is the only city in the global top eight with a population under a million; Auckland (~1.7M) and Brussels (~1.2M Brussels-Capital Region) are the next-smallest, and the top-eight average is roughly 3.5 million.

Source: OpenStreetMap contributors • ONS / NRS / NISRA population centroids • analysis pipeline at github.com/jameshartt/BHPLTA-densest-circle-report