Table S1. Evidence and decision matrix for evaluating provisional functional classifications and site-specific restrictions of urban tree species.

Decision component	Explicit decision rule	Classification consequence
Carbon evidence	Prioritize annual biomass carbon accumulation per individual tree. Annualized life-cycle net carbon balance may be considered separately only when the accounting boundary and service life are documented.	Cumulative carbon values, leaf-level photosynthetic uptake, and stand-level accumulation do not independently establish an annual individual-tree carbon grade.
BVOC evidence	Record the reported emission rate, unit, compound coverage, measurement conditions, and whether the value represents a total, a partial sum, or a compound-specific proxy.	Compound-specific proxies support interpretation of the measured compound only. They do not establish total-BVOC emission classes.
Provisional trade-off hypothesis	Same-species evidence indicates carbon benefits together with comparatively elevated reported BVOC emissions or a potentially reactive emission composition.	Retain as a hypothesis requiring contextual assessment. Missing annual individual-tree carbon evidence leaves the integrated assignment unresolved.
Provisional synergy hypothesis	Same-species evidence supports carbon benefits together with comparatively lower or moderate reported emissions under sufficiently comparable conditions.	Consider a candidate for further integrated assessment. Monoterpene occurrence alone does not demonstrate environmental or health benefits.
Provisional lower-BVOC-emission candidate	Available total-emission or adequately characterized emission evidence supports comparatively lower reported BVOC emissions.	This is an emission descriptor. It does not establish low toxicity, low allergenicity, low water demand, or overall environmental safety.
Toxicity restriction	Record documented toxicity, relevant plant parts, exposure routes, and the accessibility of the proposed planting site.	A documented exposure concern can restrict site suitability regardless of the carbon or BVOC category. Carbon benefits do not offset a toxicity restriction.
Allergenicity assessment	Use documented species-, sex-, or cultivar-specific evidence and identify the relevant pollen or contact-exposure pathway.	Treat allergenicity as a separate qualitative constraint. Where supporting criteria are unavailable, record “not assessed” rather than assigning a low category.
Water suitability	Retain documented irrigation, evapotranspiration, or drought-response evidence together with its climatic and management context.	Assess suitability for the proposed site separately. Do not convert general drought tolerance into a universally low water-demand classification.
Missing or conflicting evidence	Record missing measurements, inconsistent taxonomic names, incompatible indicators, and contradictory emission descriptions explicitly.	Mark the assignment as unresolved or context-dependent. Do not substitute another species, cultivar, or spatial scale to complete the classification.