QUANTARIUM RESEARCH

TerraIndex™ Home Price Index

Methodology, Coverage, Confidence and Product Reference

Whole-stock valuation intelligence for timely, hyperlocal measurement of the U.S. residential housing market.

WHITE PAPER

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SECTION 01

What is the TerraIndex Home Price Index?

TerraIndex is Quantarium's Home Price Index (HPI). It measures change in the QVM-estimated values of the U.S. residential housing stock, rather than relying only on homes that sold, and publishes the results as monthly Home Value Indices (HVIs) at geographic levels from National to Census Tract, subject to data sufficiency.

Residential housing markets are difficult to measure in real time. Individual properties transact infrequently, transaction records arrive with delay, and the mix of homes that sell in any given month can differ materially from the composition of the broader housing stock. TerraIndex is designed to resolve that measurement problem.

TerraIndex is built on the Quantarium Valuation Model (QVM), Quantarium's automated valuation model (AVM), which estimates values for about 105 million U.S. single-family properties (as of October 2026). QVM regularly recomputes estimated property values across the national footprint, and TerraIndex aggregates those valuations into market-level Home Value Indices (HVIs) and percentage changes across multiple geographies. Quantarium publishes monthly market reports while rapidly incorporating newly reported market information through its underlying processing cycle, so new information is captured with minimal lag.

The result is a measurement system built to answer a straightforward question: *how is the value of the broader housing stock changing now?* TerraIndex is a current and historical measurement product; it does not include a long-horizon home-price forecast.

TerraIndex key facts

FOUNDATION	QVM property-level value estimates across about 105 million U.S. single-family properties (as of October 2026).
COVERAGE	National, State, County, CBSA, ZIP Code and Census Tract outputs, subject to data sufficiency.
PROPERTY SCOPE	Single-family detached and single-family attached residential properties in the current product.

TerraIndex key facts — CONTINUED

REFRESH	QVM regularly recomputes national footprint values; geographic market measures tracked regularly; customer-facing HVI series published monthly.
STATISTIC	Median estimated residential property value within a geography, reducing sensitivity to extreme-value outliers.
CONFIDENCE	Property counts and Mean FSD (the mean Forecast Standard Deviation of the underlying property estimates; lower values indicate higher confidence) provide context on the reliability of the underlying valuation population.
FORECASTING	No long-horizon forecast. TerraIndex is a timely measurement of observed and modeled market value movement.

SECTION 02

How TerraIndex differs from transaction-based home price indices

TerraIndex measures value change across the modeled housing stock, not only the homes that sold during the period.

The simplest housing measures are transaction measures: median sale price, average sale price, or repeat-sale indices derived from properties that happen to change hands. Those approaches are useful, but each observes only the subset of the housing stock that transacts. At current turnover rates that subset is small relative to the full residential universe, and it can shift meaningfully by price tier, property type and geography from one period to the next.

TerraIndex resolves that ambiguity with a broader approach. It begins with property-level QVM estimates and summarizes the movement of the estimated housing stock inside each geography. Because the underlying population is not limited to recent sales, TerraIndex is designed to reduce the compositional noise that arises when a month contains disproportionately more high-end, low-end or otherwise atypical transactions.

CONVENTIONAL HPI

Transaction-only view

Measures the homes that sold — a small, shifting slice of the market.

VS

TERRAINDEX™ HPI

Whole-stock view

Measures value movement across the modeled housing stock — not just what closed.

TerraIndex design principles

MEASURE THE BROADER MARKET	TerraIndex uses QVM-estimated values across the residential population available to the model, rather than measuring only properties that closed during the period.
LOCALIZE WHEN THE DATA SUPPORTS IT	Market behavior is local, but very small geographies can lack enough observations for stable estimates. TerraIndex applies explicit sample-size and confidence logic to balance localization against statistical reliability. Quantarium's professional valuation tools also let users hyper-localize TerraIndex into their own drawn boundaries, for the most relevant read on local market conditions.
PRIORITIZE TIMELINESS AND STABILITY	QVM is recomputed on a regular cycle and Quantarium's data platform incorporates newly reported sales rapidly. Published monthly HVI vintages are intended to remain stable rather than being continuously rewritten after release.

SECTION 03

What data and models power TerraIndex?

TerraIndex inherits its market-measurement capability from QVM, which combines Quantarium's national property data foundation with proprietary valuation modeling to estimate residential property values at scale. The index then summarizes the distribution and movement of those property-level estimates inside each geography.

The AVM behind TerraIndex — Quantarium Valuation Model (QVM)

- QVM estimates values for about 105 million U.S. single-family properties for TerraIndex HPI purposes (as of October 2026).
- QVM has been tested by third-party AVM testing firms, including AVMetrics and Mercury Network, and has consistently ranked at or near the top on accuracy and hit-rate measures.
- Fitch Ratings has approved Quantarium as an acceptable AVM provider for use in secondary market securitizations, an additional external validation point for the underlying valuation technology.
- The QVM national footprint is recomputed on a regular cycle, allowing TerraIndex to reflect changes in the broader housing stock rather than waiting for a property to transact.

Why TerraIndex uses median property values

For a given geography, Home Value Index (HVI) calculations use the median of the available estimated residential property values rather than the arithmetic mean. The median is less sensitive to a small number of unusually expensive or inexpensive properties, and therefore provides a more stable representation of the center of the modeled housing-value distribution.

EXAMPLE: HOW A ZIP CODE HVI IS CALCULATED

If a hypothetical ZIP Code contains 1,000 residential properties and QVM produces estimates for approximately 980 of them, the monthly HVI is the median of those 980 modeled values — not the median of the handful of homes that happened to sell that month.

How current is TerraIndex data? (QDSP)

Quantarium's monthly TerraIndex reports state that, on any given production date, the valuation models incorporate more than 90% of the sales transactions that will ultimately be reported for the preceding four-week rolling period. This is supported by the Quantarium Data Services Platform (QDSP), which ingests and processes newly reported market data for QVM and TerraIndex. QDSP is designed to reduce processing lag, and the monthly TerraIndex report is normally available no later than the second Wednesday of the following month.

SECTION 04

How TerraIndex HVIs are built — National to Census Tract

TerraIndex converts property-level QVM estimates into market-level value measures. Quantarium tracks median estimated value movement at each geographic level, then publishes monthly HVI dollar values that customers can use directly or convert into percentage changes over the horizon relevant to their analysis.

TerraIndex produces HVIs at National, State, County, CBSA, ZIP Code and Census Tract levels, subject to data sufficiency.

GEOGRAPHY	PURPOSE / TREATMENT
National	Broad U.S. housing-value movement.
State	Statewide value movement and regional divergence.
County, CBSA	County and metropolitan-level market movement.
ZIP Code	Localized HVI where sufficient property-level estimates support reliable measurement.
Census Tract	More granular localized values where the underlying population is sufficiently dense.

How TerraIndex handles small ZIP Codes and sparse areas

Quantarium produces an independent HVI for a geography only when a sufficient number of estimated property values are available *and* the aggregated Mean FSD (Mean Forecast Standard Deviation) of the underlying property estimates meets a defined confidence threshold, maintaining a deliberate balance between coverage and HVI accuracy.

Housing data face an unavoidable tradeoff: the more local the geography, the smaller the property population and the greater the potential statistical instability. Real estate is local — but localization and reliable statistical inference pull against each other.

As of October 2026, approximately 12,000 ZIP Codes meet these thresholds; together they contain roughly 84% of U.S. single-family detached and attached residential properties. For smaller ZIP Codes, TerraIndex supplies property-count and Mean FSD information to indicate lower confidence.

WHY MORE GRANULAR ISN'T ALWAYS MORE ACCURATE

More granular is not automatically more accurate. TerraIndex preserves localized insight where the data support it, and exposes confidence information when the available population becomes thin.

SECTION 05

How TerraIndex measures confidence

What is Mean Forecast Standard Deviation (Mean FSD)?

TerraIndex carries forward confidence information from the underlying QVM estimates. Mean FSD is the mean Forecast Standard Deviation of the property estimates used in the HVI aggregation; lower Mean FSD indicates higher underlying valuation confidence.

SECTION 06

How often TerraIndex is updated and published

Regular processing, monthly publication

QVM regularly recomputes estimated values for the national footprint, and Quantarium tracks geographic value movement for monthly index production. Customer-facing HVI outputs are aggregated and published monthly; the public TerraIndex report for a given month is normally available no later than the second Wednesday of the following month.

REGULAR	REGULAR	MONTHLY	2ND WEDNESDAY
QVM revalues the national residential footprint.	Geographic median value movement is tracked.	Market movement is aggregated into HVI dollar values.	The monthly TerraIndex report is published.

Are published TerraIndex values revised?

Once a monthly HVI is released, Quantarium generally holds that published vintage stable rather than continuously restating historical values as late data arrive. This preserves point-in-time interpretability for users who need to know what the market measure showed when it was originally published.

Does TerraIndex forecast home prices?

TerraIndex is intentionally positioned as a measurement product. Its purpose is to provide a timely, geographically detailed view of current and historical home-value movement. Quantarium does not currently publish a multi-year home-price forecast as part of TerraIndex. Forecasting can be developed separately for specific analytical use cases, but it is not part of the core HPI product definition.

TerraIndex Market Commentary

To complement the index, Quantarium Research publishes the **TerraIndex Market Commentary**, a recurring analysis that places the latest TerraIndex results in the context of broader housing and economic conditions. The Commentary combines TerraIndex observations with relevant market indicators — mortgage rates, housing inventory, transaction activity, affordability, construction, employment and other economic measures — to add perspective on the forces shaping current housing-market trends. It is intended to help users understand what the market is doing and why, while keeping that analysis distinct from the underlying TerraIndex measurement.

SECTION 07

TerraIndex data outputs

TerraIndex supports both human-readable market monitoring and machine-consumable analytical workflows. Monthly HVI values provide a dollar-level reference point, while percentage changes can be calculated across arbitrary periods to support market surveillance, valuation oversight and portfolio analysis.

Core outputs

- Monthly Home Value Index (HVI) dollar levels by geography.
- National seasonally adjusted and non-seasonally adjusted readings.
- Mean FSD as a confidence indicator for the valuation population.
- Month-over-month and year-over-year appreciation / depreciation measures.
- Property-count information for localized geographies.
- Historical HVI series for trend analysis and point-in-time review.

SECTION 08

How banks and mortgage lenders use TerraIndex

TerraIndex is designed to support valuation oversight, mortgage and credit risk monitoring, portfolio analytics and model governance at banks and mortgage lenders.

TerraIndex use cases

VALUATION OVERSIGHT	TerraIndex ZIP-level year-over-year HVI change and Mean FSD help teams identify localized appreciation or depreciation before appraisals or portfolio marks drift from current market conditions.
MORTGAGE & CREDIT RISK	TerraIndex helps teams monitor markets where collateral values are strengthening, stabilizing or weakening, from national to local geographies.
PORTFOLIO ANALYTICS	TerraIndex helps teams apply a consistent market-value series across residential exposures without relying solely on recent transaction mix.
MODEL GOVERNANCE	TerraIndex helps teams use localized market movement, property counts and confidence measures as supporting context for AVM or valuation review.
MARKET INTELLIGENCE	TerraIndex helps teams track regional divergence and turning points using a near-current view of residential housing-stock values.
RESEARCH & STRATEGY	TerraIndex helps teams combine its data with macro, inventory, affordability or demographic data to study housing-market structure and local economies.

SECTION 09

TerraIndex advantages for valuation and risk teams

TerraIndex combines QVM, Quantarium's automated valuation model, which has been tested by third-party AVM testing firms, with a housing-stock measurement framework designed for recency, localization and confidence transparency.

What distinguishes TerraIndex

Whole-stock orientation

TerraIndex measures movement across QVM-estimated residential values instead of only the small subset of properties that transacted.

Fast market recency

TerraIndex combines regularly recomputed QVM and geographic processing with QDSP ingestion, and the monthly TerraIndex report is normally available no later than the second Wednesday of the following month.

Hyperlocal with guardrails

TerraIndex extends from national to ZIP Code and Census Tract levels while explicitly addressing the sample-size versus localization tradeoff.

Confidence transparency

TerraIndex reports property counts and Mean FSD to help users distinguish robust local series from lower-confidence areas.

AVM-quality foundation

Index quality is directly linked to QVM, an AVM tested by third-party firms including AVMetrics and Mercury Network, with strong accuracy and hit-rate performance.

Stable published vintages

Monthly releases remain point-in-time interpretable instead of being continually rewritten after publication.

SECTION 10

TerraIndex governance and methodology controls

TerraIndex applies the following governance principles, combining model governance inherited from QVM with product-level controls around sample size, confidence, publication timing and historical stability. A market index is useful only when users understand what it measures, how its outputs should be interpreted and where confidence is limited.

Product governance principles

- Apply a consistent QVM valuation framework across the national residential footprint.
- Use median-based aggregation to reduce sensitivity to extreme property values.

- Apply minimum-population logic for localized HVI production, and surface confidence metrics for smaller geographies.
- Publish monthly market readings on a consistent release cadence.
- Preserve released HVI vintages for point-in-time reproducibility.
- Separate the measurement objective of TerraIndex from long-horizon forecasting claims.

SECTION 11

Frequently asked questions about TerraIndex

What is TerraIndex?

TerraIndex is Quantarium's Home Price Index (HPI). It measures change in the QVM-estimated values of the U.S. residential housing stock, rather than relying only on homes that sold, and publishes the results as monthly Home Value Indices (HVIs) at geographic levels from National to Census Tract, subject to data sufficiency.

How does TerraIndex measure home price changes?

TerraIndex starts with property-level QVM value estimates, which are regularly recomputed, and tracks the median estimated value in each geography. Market movement is aggregated into monthly HVI dollar values, which customers can use directly or convert into percentage changes over the period relevant to their analysis.

How is TerraIndex different from transaction-based home price indices?

Transaction-based indices, such as median sale price or repeat-sale indices, observe only the homes that sold during a period, a small and shifting slice of the market. TerraIndex measures value change across the modeled housing stock, so it is designed to reduce the compositional noise caused by an unusual mix of sales in a given month.

How many properties does TerraIndex cover?

TerraIndex is built on QVM, which estimates values for about 105 million U.S. single-family properties (as of October 2026). The current product covers single-family detached and single-family attached residential properties.

What geographic levels does TerraIndex cover?

TerraIndex produces HVIs at National, State, County, CBSA, ZIP Code and Census Tract levels, subject to data sufficiency.

As of October 2026, approximately 12,000 ZIP Codes meet TerraIndex's thresholds for an independent HVI; together they contain roughly 84% of U.S. single-family detached and attached residential properties.

How does TerraIndex handle small geographies?

Quantarium produces an independent HVI for a geography only when a sufficient number of estimated property values are available and the aggregated Mean FSD meets a defined confidence threshold. For smaller ZIP Codes, TerraIndex supplies property-count and Mean FSD information to indicate lower confidence.

What is Mean FSD?

Mean FSD is the mean Forecast Standard Deviation of the QVM property estimates used in an HVI aggregation. Lower Mean FSD indicates higher underlying valuation confidence. TerraIndex provides Mean FSD alongside property counts so users can distinguish robust local series from lower-confidence areas.

Why does TerraIndex use the median?

For each geography, HVI calculations use the median of the available QVM-estimated residential property values rather than the arithmetic mean. The median is less sensitive to a small number of unusually expensive or inexpensive properties, so it provides a more stable representation of the center of the modeled housing-value distribution.

How often is TerraIndex updated and published?

QVM regularly recomputes estimated values for the national footprint, and Quantarium tracks geographic value movement for monthly index production. Customer-facing HVIs are published monthly, and the public TerraIndex report for a given month is normally available no later than the second Wednesday of the following month.

How current is the sales data behind TerraIndex?

Quantarium's monthly TerraIndex reports state that, on any given production date, the valuation models incorporate more than 90% of the sales transactions that will ultimately be reported for the preceding four-week rolling period. The Quantarium Data Services Platform (QDSP) ingests and processes newly reported market data for QVM and TerraIndex.

Are published TerraIndex values revised?

Once a monthly HVI is released, Quantarium generally holds that published vintage stable rather than continuously restating historical values as late data arrive. This preserves point-in-time interpretability for users who need to know what the market measure showed when it was originally published.

Does TerraIndex forecast home prices?

No. TerraIndex is a measurement product that provides a timely, geographically detailed view of current and historical home-value movement.

Quantarium does not currently publish a multi-year home-price forecast as part of TerraIndex. Forecasting can be developed separately for specific analytical use cases, but it is not part of the core HPI product.

SECTION 12

Glossary

Automated Valuation Model (AVM)	A statistical model that estimates a property's value.
CBSA (Core-Based Statistical Area)	A U.S. metropolitan or micropolitan area defined by the Office of Management and Budget.
Census Tract	A small statistical subdivision of a county defined by the U.S. Census Bureau.
Home Price Index (HPI)	The overall index framework. TerraIndex is Quantarium's HPI; its published series are Home Value Indices (HVIs).
Home Value Index (HVI)	The median QVM-estimated value of residential properties in a geography, in dollars, for a given month.
HVI Vintage	The HVI values as originally published for a given month.
Mean FSD	The mean Forecast Standard Deviation of the QVM property estimates used in an HVI aggregation. Lower Mean FSD indicates higher underlying valuation confidence.
Quantarium Data Services Platform (QDSP)	The platform that ingests and processes newly reported market data for QVM and TerraIndex.
Quantarium Valuation Model (QVM)	Quantarium's automated valuation model (AVM), which estimates values for about 105 million U.S. single-family properties (as of October 2026).
TerraIndex	Quantarium's Home Price Index. It measures change in the median QVM-estimated value of U.S. single-family residential properties, from National to Census Tract level, measured regularly and published monthly.
Transaction-Based Index	An index calculated only from properties that sold during the period, such as a median sale price or repeat-sale index.
Whole-Stock Measurement	Measuring value change across all modeled homes in a market, not only those that sold.

SECTION 13

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3. Fitch Ratings. Fitch Ratings Updates AVM Vendor FSD Thresholds; Adds Quantarium as Acceptable AVM Provider. April 11, 2023. fitchratings.com.
4. For AVM test results, contact the testing firms. AVMetrics. avmetrics.net. Mercury Network. mercuryvmp.com.

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For sales and data inquiries, contact sales@quantarium.com.

ABOUT QUANTARIUM

Founded by a team of leading scientists and Ph.D.s, Quantarium is a Seattle-based AI research, data, and differentiated IP portfolio company that has brought a novel and enabling set of technologies across a broad range of markets with a focus on real estate data analytics and practical innovation. Quantarium has a compelling blend of AI scientists, enterprise scale software architects, highly knowledgeable real estate professionals, and data experts in building successful software businesses.