



October 16, 2022

Federal Housing Finance Agency
Office of Financial Technology
Constitution Center
400 7th Street, SW
Washington, D.C. 20219

Re: [2022 Fintech in Housing Finance Request for Information](#)

To Whom It May Concern:

[HouseCanary](#), a real estate brokerage, and data and valuations technology company, based in San Francisco, is very pleased to respond to the Federal Housing Finance Agency's (FHFA's) Request for Information ("RFI"). Technology can bring benefits to consumers and regulators. Our comment letter today focuses on the benefits that sophisticated property valuation and appraisal technology systems can bring to single-family residential mortgage consumers, guarantors, investors, and regulators.

HouseCanary was [co-founded by Chris Stroud and me in 2013](#). Our organization built an industry-leading, comprehensive information and analytics system for residential real estate. It is considered the "gold standard" for residential real estate valuations with a 3% median absolute error rate on 114 million properties.

Very importantly, HouseCanary's system is non-discriminatory, fast, far more accurate, and much less costly than traditional appraisals. Attached is a slide deck that reviews the value proposition that HouseCanary brings to the single-family residential real estate market.

In November 2021, using the Freddie Mac's methodology, we tested HouseCanary's system for bias. The study found that there was none. Attached to this comment letter is a copy of that [study](#).

It is our understanding that the financial regulators will be issuing a joint agency rulemaking, perhaps towards the end of this year, to establish one set of standards for Automated Valuation Methods" (AVMs"). The rulemaking was a requirement under the Dodd-Frank Act that was given "new life" when the administration formed the [PAVE Task Force](#).

Following meetings we had with some policymakers this past June, HouseCanary's produced a whitepaper titled [Standards for Automated Property Valuation](#), that presents a set of recommendations for the use of AVMs and Evaluations in lieu of appraisals. These recommendations are based on a set of industry standards and data benchmarks to mitigate risk

when replacing a traditional appraisal with an automated solution. Importantly, HouseCanary believes that these standards should be transparent to regulators and lenders in identifying when AVMs can be used and when the use of a traditional appraisal would be warranted in lieu of an AVM (e.g., unusual properties; remote properties).

The requirements HouseCanary outlined are focused on ensuring safety and soundness in the system and provide a set of measurable, fact-based rules through which use of an automated in lieu of a traditional appraisal results in no additional risks. These rules create a basis for broad use of automated solutions for lenders in qualifying cases based solely on quantitatively-derived criteria.

Attached is a copy of that study, along with a sample of our “[Agile Insight](#)” – a fully automated appraisal. In addition, attached is a sample of our “[Agile Evaluation](#),” which is an automated valuation that includes information provided by an independent inspector. Importantly, Agile Evaluation’s condition-informed valuation ingests the information provided by the independent inspector into our system, rather than simply attaching the inspection information to an automated appraisal.

Today, the most sophisticated investors on Wall Street use HouseCanary’s system to evaluate single-family residential properties. When appropriate, we believe that individual homebuyers should benefit from the use of the same technology tools used by the most sophisticated Wall Street investors. As noted earlier, HouseCanary’s systems are faster, more accurate, less expensive, and without bias, but it is important that one set of standards be put in place that would govern all AVMs, including HouseCanary, to ensure that the systems are safe, sound, and unbiased.

Finally, there is another important benefit that sophisticated appraisal technology systems can bring to the individual home buyer, particularly first-time, low- to moderate-income and minority home buyers. Currently, individual home buyers using traditional appraisers not only have to pay between \$400 - \$1,500 for an individual appraisal, but they usually must wait about 2- 6 weeks for their appraisal to be completed. This places individual home buyers at a competitive disadvantage when they are competing against institutional investors using sophisticated appraisal systems in purchasing properties. By enabling individual home buyers to have access to the same technology tools used by the most sophisticated Wall Street investors, these home buyers can be competitive against institutional investors when bidding on a home.


We would welcome the opportunity to further discuss with the recommendations made in our recently-published white paper, along with the benefits that sophisticated valuation technology systems can bring to the mortgage industry and the consumers it services.

Thank you very much for your consideration of our recommendations.

Jeremy Sicklick
Co-Founder and CEO

Attachments:

1. ["HouseCanary Standards for Automated Valuations"](#) -- A slide deck that reviews the HouseCanary value proposition
2. ["AE-AVM Standards Whitepaper"](#) -- Standards for Automated Property Valuation white paper to ensure systems are safe, sound, and unbiased
3. ["Reducing Racial Bias in Home Valuations Using Automated Valuation Technology"](#)
4. ["Agile Evaluation Sample"](#) -- Condition-informed evaluation (i.e., an evaluation where an in-person inspection of the property is made and the information is then ingested into HouseCanary's AVM)
5. ["209 Churchwarden Rd"](#) – Example of fully automated property valuation for Baltimore property recently highlighted in [NY Times article](#)



Standards for Automated Property Valuation to Replace Appraisals

 House Canary

Bios



Jeremy Sicklick

Co-Founder & CEO

BCG, Marakon, Arthur Andersen
Wharton MBA, USC
jeremy@housecanary.com



Shannon Norris

VP, Sales

Leads GSE relationships, former
Appraiser
snorris@housecanary.com



Brandon Lwowski

Director, Research

Phd Candidate Univ of Texas - AI
BS Computer Science BS
Mathematics
blwowski@housecanary.com

About Us...

HouseCanary built industry-leading comprehensive information & analytics for US residential real estate

Gold standard residential real estate valuations
3% median absolute error on 114M properties

Technologically advanced property valuation software
Automating the valuation and underwriting to enable 114M+ properties to be instantly valued

50 state real estate brokerage and MLS member

Silicon Valley based technology DNA

THE WALL STREET JOURNAL.

Ryan Dezember and Cezary Podkul, "OK, Computer: How Much Is My House Worth?" Wall Street Journal, November 29, 2018.
<https://www.wsj.com/articles/ok-computer-how-much-is-my-house-worth-1543492800>

OK, Computer: How Much Is My House Worth?

Proposed regulations would allow the majority of homes to be bought and sold without being appraised by a human

Ryan Dezember and Cezary Podkul
Nov. 29, 2018



The battle between man and bot has a new front: your mortgage.

Federal regulators have proposed loosening real-estate appraisal requirements to enable a majority of U.S. homes to be bought and sold without being evaluated by a licensed human appraiser. That potentially opens the door for cheaper, faster, but largely untested property valuations based on computer algorithms.

The proposal was made earlier this month by the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corp. and the Federal Reserve. It would increase to \$400,000, from \$250,000, the value of homes that can be bought and sold without a tape-measure-toting appraiser visiting a property.

More than two-thirds of U.S. homes sell for \$400,000 or less, according to U.S. Census data and the National Association of Realtors. If the regulators' proposal had been in force last year, about 214,000 additional home sales, or some \$68 billion worth, could have been made without an appraisal, regulators said in their 69-page proposal.

Some worry, though, that dropping appraisal requirements would introduce new risks into the \$10.7 trillion market for home loans. "We still would prefer a human being doing the appraisal," said Lima Ekram, a mortgage-backed securities analyst at Moody's Investors Service.

 HouseCanary

www.housecanary.com



**HouseCanary is
trusted by
industry leaders**

6 of the top 10 mortgage lenders are clients

7 of the top 10 Single Family Rental REIT operators are clients

20 of the top buyers of residential whole loans on Wall Street

7 of the largest Wall Street bulge bracket investment banks who trade mortgages and do warehouse lending

3 of the top 4 iBuyers

7 of the top 10 hard money lenders

Used by GSE & Fitch rating agency approval

Goals for this discussion

1

Share a framework of standards for an AVM to be used

in an objective and safe and sound way

2

Define when AVM models versus Evaluation should be used

to produce an accurate property valuation that can replace an Appraisal

3

Be an ongoing resource to you

as you consider appraisal and property valuation modernization

Overview



Automated valuation models can be utilized to overcome bias


Recent appraisal bias example:

The New York Times

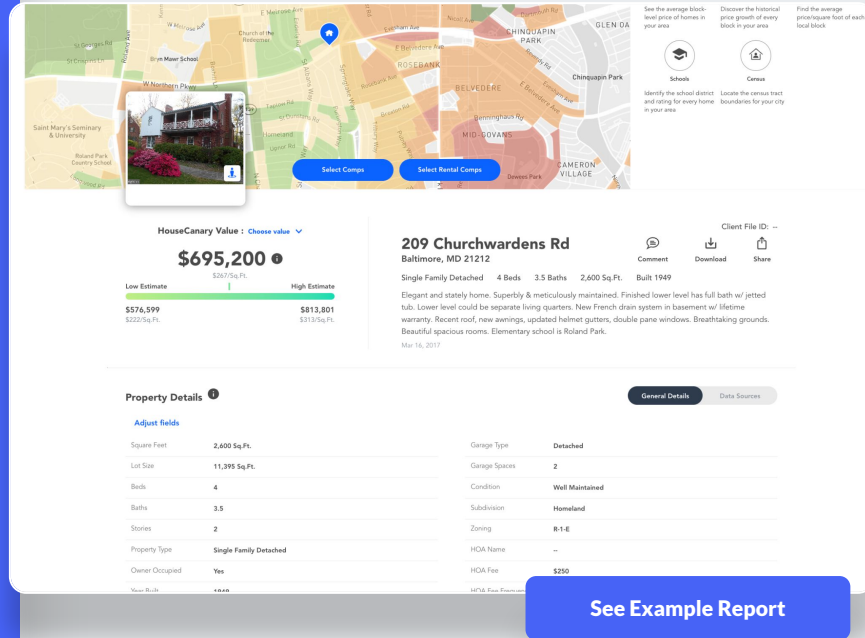
Home Appraised With a Black Owner: \$472,000. With a White Owner: \$750,000.

Nathan Connolly and his wife, Shani Mott, say an appraisal company undervalued their home based on their race. The couple has filed a lawsuit in Maryland.

Give this article | Share | Bookmark | 1.8K



Our AVM product would have solved the issue.



See the average block level price of homes in your area. Choose the historical price growth of every block in your area. Find the average price/square foot of each local block.

Identify the school district and rating for every home in your area. Locate the census tract boundaries for your city.

HouseCanary Value: Choose value

\$695,200

Low Estimate: \$576,599 (2022/5q Ft.) | High Estimate: \$813,801 (2027/5q Ft.)

209 Churchwardens Rd

Baltimore, MD 21212

Single Family Detached | 4 Beds | 3.5 Baths | 2,600 Sq Ft. | Built 1949

Elegant and stately home. Superbly & meticulously maintained. Finished lower level has full bath w/ jetted tub. Lower level could be separate living quarters. New French drain system in basement w/ lifetime warranty. Recent roof, new awnings, updated helmet gutters, double pane windows. Breathtaking grounds. Beautiful spacious rooms. Elementary school in Roland Park.

Mar 16, 2017

Property Details

Adjust fields

Square Feet	2,600 Sq Ft.	Garage Type	Detached
Lot Size	11,395 Sq Ft.	Garage Spaces	2
Beds	4	Condition	Well Maintained
Baths	3.5	Subdivision	Homeland
Stories	2	Zoning	R-1-E
Property Type	Single Family Detached	HOA Name	-
Owner Occupied	Yes	HOA Fee	\$250
Year Built	1949	HOA Escrow	-

See Example Report

Our Starting Perspective

High quality AVM technology **beats appraisals** on cost, quality, time, and with no racial bias

	Traditional Appraisal	HouseCanary AVM		
		Automated Valuation Model (AVM)	Interactive Valuation Platform	Condition-informed 'Evaluation'
Cost	\$400+	\$10	\$20	\$100 - \$200
Time	1-4 weeks	Instant	Instant	4 - 5 days
Use Case	Refinance or origination	Instant Estimate	Desktop underwrite & check appraisal	Appraisal replacement
Racial Bias	Yes	No	No	No

Our Prior Research

AVM does not generate values that are biased against Black, Latino or Minority homeowners.

HouseCanary Pre-List AVM (5/1/21 - 11/1/21)

Property Tract	Count	Mean Valuation Gap vs Contract Price	Gap vs. White	P-value
Overall	645,899	-0.8%	-	-
White	503,508	-0.9%	-	-
Minority (80%-100%)	37,899	0.1%	+1.0%	<0.0001 (1-Tail)
Latino (80%-100%)	4,701	-0.6%	+0.3%	0.224 (2-Tail)
Black (80%-100%)	6,419	2.3%	+3.2%	<0.0001 (1-Tail)

Source: HouseCanary, Reducing Racial Bias in Home Appraisals Using Automated Valuation Technology, November 2021



[Open White Paper](#)

Focus

HouseCanary whitepaper on standards for automated property valuation

[Open White Paper](#)



Modern AVM's and Evaluations have more data and context than Appraisals

What you receive with our product	AVM (Agile Insight)	Evaluation (Agile Eval)
Current home value	✓	✓
Informed by condition as of last transaction	✓	✓
Projected home value	✓	✓
Comparables assessment	✓	✓
Comparables adjustment grid	✓	✓
Property details	✓	✓
Sales history	✓	✓
Rental estimate	✓	✓
Market analysis	✓	✓
Turn time (business days)	INSTANT	3-5 Days
Interior/Exterior Inspection		✓



Agile Insights (AVM)

Instant context around a home's property value

- Capture objective property data and analytics.
- Quickly obtain insights into individual properties and data and analytics, property details, and local market information.
- Personalized co-branding and contact information for company, loan officer or realtor.

See Sample

Company Name
www.companywebsite.com

AGILE INSIGHTS
Automated Valuation Model Report

Property Location:
123 Main St.
Glendale, AZ 85305

Original Address Inputted
123 Main St. Glendale, AZ 85305

Value Estimate:
\$445,500

Client:
HouseCanary

Effective Date:
03/13/2019

Client File ID #
Sample_123456

Order Name
AI March Tap

Ordered Date
03/10/2019

HouseCanary Value
\$445,500
\$161.41 / Sq.Ft.

Confidence
High (98%)

Forecast Standard Deviation
0.12

HouseCanary Rental Value
\$2,425 (\$0.87 / Sq.Ft.)

Low Rental Value
\$2,149 (\$0.78 / Sq.Ft.)

High Rental Value
\$2,701 (\$0.98 / Sq.Ft.)

Subject
Property Type: Single Family Detached
Occupancy Type: Owner
Beds / Baths: 4 Bd / 3 Ba
PUD / HOA Fees: Yes / \$87 per month
GLA / Lot Size: 2,760 / 17,424 sq ft
HOA Fee Includes: Common Area Maint
Year Built: 2003
APN #: 1234567890

Transaction History

Event	Date	Price	Source	Type
Cancelled	01/05/07	---	ABRMLS	
Listed	09/15/06	\$589,900	ABRMLS	
Sold	07/03/03	\$251,790	Public Records	Arm's-Length

Subject's Comparability to Market

Bedrooms
of Properties vs. Bedrooms

Bathrooms
of Properties vs. Bathrooms

Age
of Properties vs. Age

Gross Living Area
of Properties vs. Gross Living Area

Legend
● Subject property
○ Nearby properties

Index
Line chart showing index from 2014 to 2019.


HouseCanary Forecast for Subject
Line chart showing forecast from 2018 to 2022.

3 Year Growth

Year	Value	Change
2020	\$467,250	+5%
2021	\$490,619	+5%
2022	\$505,331	+3%

Market Status: Neutral Market

Market Metrics:
This month last year: 66
This month: 67

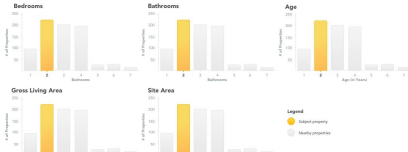

 HouseCanary File ID # I_RFYQZTRK Client File ID # BMS273845 Order Name Palmdale Est BPO_03212018 Ordered Date 08/08/2018

123 Main St San Francisco, CA 94120
 AGILE EVALUATION

Subject

Property Type	Single Family Home	Other Structures on Property	None Visible			
Bed# / Bath#	3 / 3.0 / 2.5 Ba	Non-Residential Use	Yes / Children			
GLA / Lot Size	2,500 / 4,000	View Factors	Residential, City/Skyline / Beneficial			
Property Viewable	Yes	Functionality Utility Loss	Yes / Need to enter bedroom for only bathroom			
Evidence of Occupancy	Yes / Cars in Driveway, None in Mailbox	Location Influences	Residential / Neutral - Residential neighborhood			
Occupancy Type	Owner	Adverse Site Conditions	None noted			
PUD / HOA Fees	No / \$	Conforms to Neighborhood	Yes - Typical for neighborhood			
HOA Fee Includes	Heat, Garbage, Water	APN #	1234567890			
Common Elements	Pool, Gym, Tennis Court	Transaction History				
Special Assesstion	Solar Panels, In-ground Pool	Sale Type	Date	Price	Source	Loan Type
		Sold	11/18/18	\$2,100,000	Public Record	ArmsLength
		Leased	09/18/18	\$1,500,000	MLS	MLS

Subject's Comparability to Market




Comments

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed lobortis mollis eros quis efficitur. Mauris aliquam risa vitae metus commodo varius. Vestibulum eget lobortis dolor. Nam a odio. In. Proin lobortis ornare ut congue pellentesque. Donec gravida interdum turpis ut dapibus. Ut quis suscipit turpis, ac tristique metus. Proin lobortis ornare ut congue pellentesque.

Condition


Roof Condition	Very Good	Damages Comment	Boards up home
Exterior Wall Condition	Very Good	Condition Rating (C1-C4)	C4
Building Damages	Owner Neglect, Vandalism	Repair Cost	\$1000

Inspection Comments
 House is in great condition.

Report Date: 08/16/2018 Agile Evaluation powered by  Page 1

Exterior Property Condition

Roof Condition	Very Good	Condition	Good
Exterior Wall Condition	Very Good	Condition	Good
Building Damages by any of the following	None Noted	Condition	Good
Adverse Site Conditions	None Noted	Condition	Good
Comment	None noted		

Report Date: 08/16/2018 Agile Evaluation powered by  Page 7

Non-Residential Use: No
 Comment: None
 View Factors: Water, Residential
 Impact on Value: None - Beneficial

Agile Evaluation

HouseCanary integrates onsite property inspections with the power of automated valuations.

Timely Comprehensive Data

- Designed to meet Interagency Guidelines
- Artificial intelligence driven, condition informed valuations
- 50 state coverage via 3 nationwide inspection partners with 30,000+ inspectors and 90+ inspection points
- MLS and Public Record data, including: interior and exterior MLS and subject photo image recognition, MLS & inspector commentary
- Quality control functionality for automated and human based review
- Standard 4 day turn time (2-3 day rush orders available)

Approved by industry leaders

- Goldman Sachs
- Credit Suisse
- Deutsche Bank
- Major lenders
- AMCs

See Sample

Standards Framework



Main Objective

With the recommendations presented, we aim to reduce the burden on each institution, and propose a centralized solution, where AVM and Evaluation providers can be certified for use if they meet objective quality standards to ensure accuracy and safety & soundness in the system.

- 1. Data Quality Standards**
- 2. Testing Standards**

Summary

Summary of Recommendations

Approach Standards

1. To appropriately value a property, a waterfall approach should be used. If an AVM is not an appropriate method based on the criteria, fall back to an Evaluation. If an Evaluation also fails to meet the applicable criteria, then an appraisal is needed.
2. Based on the standards presented in this paper, approximately 85% of all US properties can be approved for AVM or Evaluation use in lieu of a traditional appraisal.

Data Standards

1. AVM providers need both public record and MLS data to train accurate and reliable AVM models.
2. Appraised value should not be used during the training process of an AVM model.
3. For a property to be considered for an Evaluation, the following conditions must be met:
 - a. Address is known, complete and validated
 - b. Accurate building or parcel level latitude and longitude available
 - c. Accurate and available gross living area
 - d. Parcel lot size less than or equal to 10 acres
 - e. Property type known (single family, condo, etc.)
 - f. Adequate coverage from the AVM provider of all properties in the neighborhood and/or adjacent neighborhoods of subject property. At a minimum, 70% of coverage at the census block group level.
4. For a property to be considered for an AVM, it must pass all Evaluation criteria as well as:
 - a. High confidence of AVM for subject property with a forecast standard deviation less than 0.15 or a confidence score greater than 85%
 - b. At least 5 highly similar comparable properties available that have been sold or currently pending a sale within the last 365 days
 - c. AVM value for subject property falls within the 5th and 95th percentile of comparable properties when property differences are accounted for
 - d. AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft
5. AVM and Evaluation must be conditioned-informed (Human or Computer Vision/Image Recognition).
6. AVM valuation must have been created no more than 30 days prior to valuation date using closed comparables within the last 365 days to account for the latest market conditions.



Approximately 85% of all US properties can be approved for AVM or Evaluation use in lieu of a traditional appraisal.

Approach Standards

To appropriately value a property, a waterfall/cascade approach should be used.

40%

APPROVED for
AVM automation

45%

APPROVED for
Evaluation/condition
informed valuation

15%

FAILS automation and
appraisal required

“Approximately **85%** of all US properties can be approved for AVM or Evaluation use in lieu of a traditional appraisal

If an AVM is not an appropriate method based on the criteria, fall back to an Evaluation.

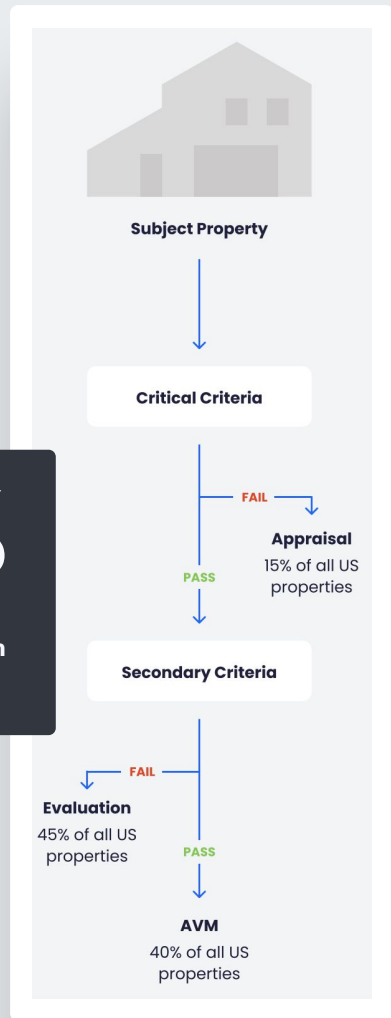
If an Evaluation also fails to meet the applicable criteria, then an appraisal is needed.

Data Standards Critical Criteria

- Address is known, complete and validated.
- Accurate building or parcel level latitude and longitude available.
- Accurate and available gross living area.
- Property type known (single family, condo, etc).
- Adequate data coverage of all properties in the neighborhood and/or adjacent neighborhoods of the subject property. At a minimum, 70% of coverage at the census block group level.

45%

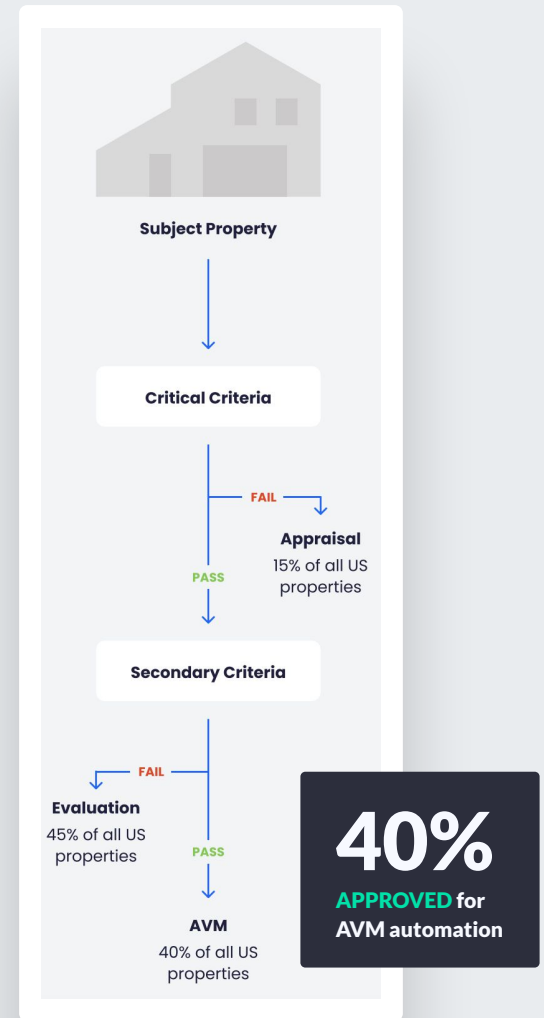
APPROVED for
Evaluation/condition
informed valuation



Data Standards

Secondary Criteria

- High confidence of AVM for subject property with a forecast standard deviation less than 0.15 which is a confidence score greater than 85%.
- At least 5 highly similar comparable properties available that have been sold or pending for sale within the last 365 days.
- AVM value for subject property falls within the 5th and 95th percentile of comparable properties when property differences are accounted for.
- AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft.



Data Standards

Condition Informed

AVMs and Evaluations should be condition informed because:

The standardized C1-C6 property condition and quality ratings scale are a requirement for purchasing a mortgage and needed for appraisals.

This requirement can be completed two different ways:

1. Using a human inspector that visits the property
2. Leveraging artificial intelligence and computer vision/image recognition models to measure the condition.

Testing and Metrics Standards

Third Party and internal testing and reporting model accuracies should be a requirement. This is clearly stated in FIRREA section 1124 a.4.

Access to these reports increases model transparency and context.

Minimum Requirements

1. Purchase Mean Percentage Error (“MPE”) should be between -2% and 2%
2. Purchase Median Percentage Error (“MdPE”) should be between -2% and 2%
3. Purchase Prediction Percentage Error at the 10% threshold (“PPE10”) should be greater than or equal to 80%
4. Prelist PPE10 should be greater than or equal to 60%

Summary:

Framework for Objective Standards Checklist

AVM Certified Checklist (Manual)

Provider:		Date of Model Run:	
Mean PE:		Median PE:	
PPE10 Purchase:		PPE10 Prelist:	

Description	Remarks	<input checked="" type="checkbox"/>
CRITICAL CRITERIA		
Address is known, complete and validated.		<input type="checkbox"/>
Accurate building or parcel level latitude and longitude available.		<input type="checkbox"/>
Accurate and available gross living area.		<input type="checkbox"/>
Parcel lot size less than or equal to 10 acres.		<input type="checkbox"/>
Property type known (single family, condo, etc.)		<input type="checkbox"/>
70% of coverage at the census block group level.		<input type="checkbox"/>
SECONDARY CRITERIA		
High confidence of AVM for subject property with a forecast standard deviation less than 0.15.		<input type="checkbox"/>
At a minimum, 5 highly similar comparable properties available that have recently been sold or currently pending sale.		<input type="checkbox"/>
AVM value for subject property falls within the 5th and 95th percentile of adjusted comparable properties.		<input type="checkbox"/>
AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft.		<input type="checkbox"/>

Conclusion

- Our goal is to ensure objective quality standards focused on safety & soundness in the housing market when using AVM's and Evaluations in place of Appraisals.
- This is an objective framework meant to be a thought starter and can be adjusted.
- Using modern technology like AVM's and Evaluations can reduce racial bias and benefit consumers, lenders, and regulators with lower cost, faster, higher quality property underwriting on loans
- We look forward to being a trusted resource you can refer to.

Thank You



Standards for Automated Property Valuation

Requirements and data-driven benchmarks to mitigate risk when replacing traditional appraisals with automated solutions.



Table of Contents

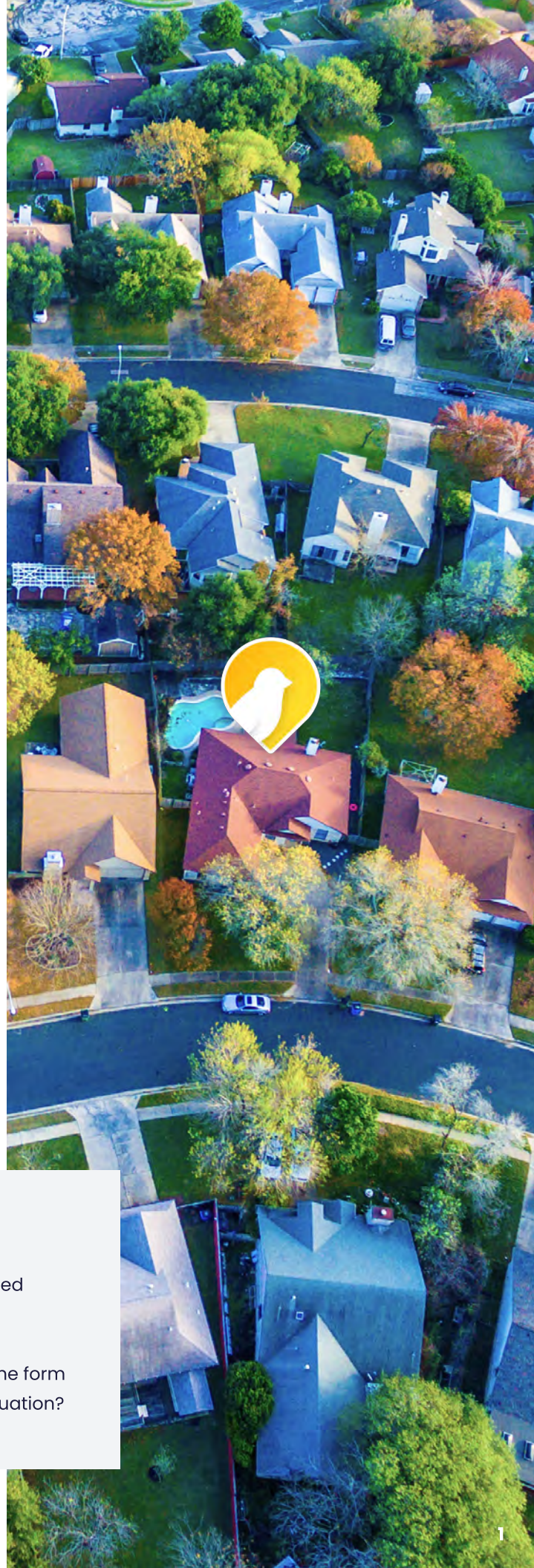


Introduction	1
Summary of Recommendations	2
What is an AVM?	3
What is an Evaluation?	3
Waterfall Approach	5
Standards & Proper Use of AVMs and Evaluations	6
Testing Standards for Accuracy	8
Fairness and Bias	12
Conclusion	13
AVM Certified Checklist (Manual)	14
AVM Certified API	15

Introduction

With the increase of technological advances in the housing market ecosystem, providing an alternative to a traditional appraisal with the use of these technologies has quickly become the headline in many discussions across the policy making community. With the negative findings on racial bias in traditional appraisals, combined with the acute need for consumers to have access to property valuation solutions that are faster, more accurate, and less expensive, the push for greater adoption of an automated valuation model (“AVM”) and/or a quantitatively-based technological tool for evaluations (“Evaluations”) has never been more needed.

While there is promise with AVMs and Evaluations, HouseCanary proposes a set of recommendations for policy makers and AVM providers around industry-wide standards and appropriate uses for an underwriting grade solution, as well as requirements for accuracy and fairness testing that exceed the standards presented in 12 U.S.C. 3354. **With the recommendations presented, we aim to reduce the burden on each individual depository institution, resulting in elimination of duplicative work, and propose a centralized solution, where AVM and Evaluation providers can be certified for use with respect to certain properties and/or transactions.** Our gold standard requirements provide a set of measurable, fact-based rules through which use of an automated solution in lieu of a traditional appraisal results in no additional risks. These rules create a basis for broad use of automated solutions for lenders in qualifying cases based solely on quantitatively-derived criteria.



This paper seeks to answer the following questions:

1. What should the standards be for an AVM to be deemed acceptable for use in a safe and sound way?
2. When should AVM models be condition-informed, in the form of an Evaluation, to produce an accurate property valuation?

Summary of Recommendations

Approach Standards

1. To appropriately value a property, a waterfall approach should be used. If an AVM is not an appropriate method based on the criteria, fall back to an Evaluation. If an Evaluation also fails to meet the applicable criteria, then an appraisal is needed.
2. Based on the standards presented in this paper, approximately 85% of all US properties can be approved for AVM or Evaluation use in lieu of a traditional appraisal.

Data Standards

1. AVM providers need both public record and MLS data to train accurate and reliable AVM models.
2. Appraised value should not be used during the training process of an AVM model.
3. For a property to be considered for an Evaluation, the following conditions must be met:
 - a. Address is known, complete and validated
 - b. Accurate building or parcel level latitude and longitude available
 - c. Accurate and available gross living area
 - d. Parcel lot size less than or equal to 10 acres
 - e. Property type known (single family, condo, etc.)
 - f. Adequate coverage from the AVM provider of all properties in the neighborhood and/or adjacent neighborhoods of subject property. At a minimum, 70% of coverage at the census block group level.
4. For a property to be considered for an AVM, it must pass all Evaluation criteria as well as:
 - a. High confidence of AVM for subject property with a forecast standard deviation less than 0.15 or a confidence score greater than 85%
 - b. At least 5 highly similar comparable properties available that have been sold or currently pending a sale within the last 365 days
 - c. AVM value for subject property falls within the 5th and 95th percentile of comparable properties when property differences are accounted for
 - d. AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft
5. AVM and Evaluation must be conditioned-informed (Human or Computer Vision/Image Recognition).
6. AVM valuation must have been created no more than 30 days prior to valuation date using closed comparables within the last 365 days to account for the latest market conditions.



Approximately 85% of all US properties can be approved for AVM or Evaluation use in lieu of a traditional appraisal.

Testing Standards and Metrics Recommendations:

1. Mean Percentage Error (“MPE”) should be between -2% and 2%
2. Median Percentage Error (“MdPE”) should be between -2% and 2%
3. Purchase Prediction Percentage Error at the 10% threshold (“PPE10”) should be greater than or equal to 80%
4. Prelist PPE10 should be greater than or equal to 60%
5. Third party testing of two core AVM benchmarks: purchase and prelist
6. AVM and Evaluation should be required to test for bias against minority groups

What is an AVM?

With many use cases for AVMs existing, we focus on the definition proposed in 12 U.S.C. 3354. An automated valuation model is “any computerized model used by mortgage originators and secondary market issuers to determine the collateral worth of a mortgage secured by a consumer’s principal dwelling.”

By emphasizing the word “any computerized model”, this allows room in the market for various mathematical, statistical, and/or machine learning models used in combination with different methodologies to estimate the value of a property. It is important for all AVMs to comply and adhere to a set of general quality control standards in order to be deemed safe and appropriate. 12 U.S.C. 3354 provides a list of general quality control standards that must be met for appropriate AVM use.

1. Ensure a high level of confidence in the estimates produced by automated valuation models.
2. Protect against the manipulation of data.
3. Seek to avoid conflicts of interest.
4. Require random sample testing and reviews.
5. Account for any other such factor that the agencies determine to be appropriate.

In this paper, we propose concrete recommendations regarding the processes and tools needed to address the broad standards stated above. We also extend these guidelines to cover Evaluations.

What is an Evaluation?

When an AVM fails to meet all the standards for appropriate use for a property, an Evaluation is the next possible alternative to an appraisal. An Evaluation is a condition-informed home evaluation that leverages high confidence AVM values in combination with independent data collection, along with market and subject characteristic validation. By combining onsite property data collection with deep contextual data supporting a value, software-based Evaluations have the potential to provide a solution that extends the benefits of a standalone AVM by adjusting the value based on the insights gained from the new data.

As well as meeting the 12 U.S.C. 3354 requirements for AVM use, an Evaluation must adhere to the [Interagency Appraisal and Evaluation Guidelines \(IAG\)](#). According to the IAG, an Evaluation is defined as “a valuation permitted by the Agencies’ appraisal regulations for transactions that qualify for the appraisal threshold exemption, business loan exemption, or subsequent transaction exemption. An Evaluation should also “contain sufficient information detailing the analysis, assumptions, and conclusions to support the credit decision.”



The be approved for use, an Evaluation must at a minimum do the following:

1. Identify the location of the property.
2. Provide a description of the property and its current and projected use.
3. Provide an estimate of the property’s market value in its actual physical condition, taking into account use and zoning designation as of the effective date of the evaluation (that is, the date that the analysis was completed), as well as any other limiting conditions.
4. Describe the method(s) the institution used to confirm the property’s actual physical condition and the extent to which an inspection was performed.
5. Describe the analysis that was performed and the supporting information that was used in valuing the property.
6. Describe the supplemental information that was considered when using an analytical method or technological tool.
7. Indicate all source(s) of information used in the analysis, as applicable, to value the property, including:
 - a. External data sources (such as market sales databases and public tax and land records); and
 - b. Property-specific data (such as previous sales data for the subject property, tax assessment data, and comparable sales information).
8. Provide evidence of a property inspection.
9. Provide photos of the property.
10. Provide a description of the neighborhood; or local market conditions.
11. Include information on the preparer when an evaluation is performed by a person, such as the name and contact information, and signature (electronic or other legally permissible signature) of the preparer.

Though this list of requirements may seem extensive, technological advances within the real estate ecosystem have resulted in major efficiencies that allow much of this information to be quantitatively-derived. By using information provided by human inspectors to augment this data-first approach, Evaluation vendors with appropriate technological investment should be able to meet these standards and therefore have their Evaluations certified for use when deemed appropriate. These software evaluations are products, and products are not “compliant” in themselves. Products can be designed in a compliant manner but their appropriate use by the institution is a necessary condition for full compliance. Compliance requires the appropriate use of any product in line with regulatory requirements, which is the responsibility of the institution relying on the chosen product.

Waterfall Approach

An AVM or Evaluation will not be the appropriate approach to valuing every property in the United States. However, based on a sample of 20 metropolitan statistical areas (“MSAs”) and using a combination of Multiple Listing Service (“MLS”) and public record data, we estimate that 40% of all US residential properties can be appropriately valued using a standalone AVM and an additional 45% can be appropriately valued using an Evaluation. This gives 85% coverage of all US residential properties that could be valued using quantitatively derived models. With the recommendations of standards that follow, HouseCanary proposes a waterfall approach to determining whether a property can be valued using an AVM or Evaluation in lieu of a traditional appraisal.

If certain standards and qualifications are met and an AVM is deemed to be an appropriate valuation method, then full automation is appropriate. When an AVM fails to meet these criteria, the next best solution is to perform an Evaluation with independent inspectors and price validation. Finally, if any of the critical criteria suggested below fail, then use of a traditional appraisal is needed and an AVM or Evaluation should not be used.

With this waterfall approach, additional risks that may materialize with automation will greatly be reduced providing safe, trustworthy, and transparent valuations of consumer dwellings.



Standards for Proper Use of AVMs and Evaluations

To strengthen the existing quality control standards for AVMs and Evaluations, which are fairly broadly defined, HouseCanary strongly recommends more specific requirements for how these standards should be put into practice. Requirements around data, condition, neighborhood statistics, as well as appropriate comparable properties, are needed for an AVM or Evaluation to value a property with sufficient accuracy and reliability.

Data Standards

At a minimum any automated valuation estimate should utilize two primary transactional residential real estate datasets in order to ensure comprehensive coverage of transaction data. The two datasets typically making up this population are public record data, primarily county recorder data, and MLS data.

County recorder data includes deeds recorded with each real estate transaction, and in most markets includes the closed arm's-length sale price. Other relevant public record data includes annual assessments along with any property characteristics used in those assessments, as well as mortgage recordings.

MLS data includes the history of listing prices, contracts, and closing prices for properties listed for sale on an MLS. These records also include a set of property characteristics and other descriptive fields associated with each listing. The primary significance of this dataset is that MLS data offers a duplicate set of closed prices that can be compared and/or verified alongside county deed records. Furthermore MLS is the primary source of data around the history of listed prices for a given property.

While we believe appraisal data should be used to verify property characteristics, we do not think it should be used to train an AVM. With the recent studies done by Freddie Mac [\[1\]](#) [\[2\]](#), as well as the numerous reports of appraisals being subject to human bias and unfair valuations, training a model on this data would eventually lead to similar results.

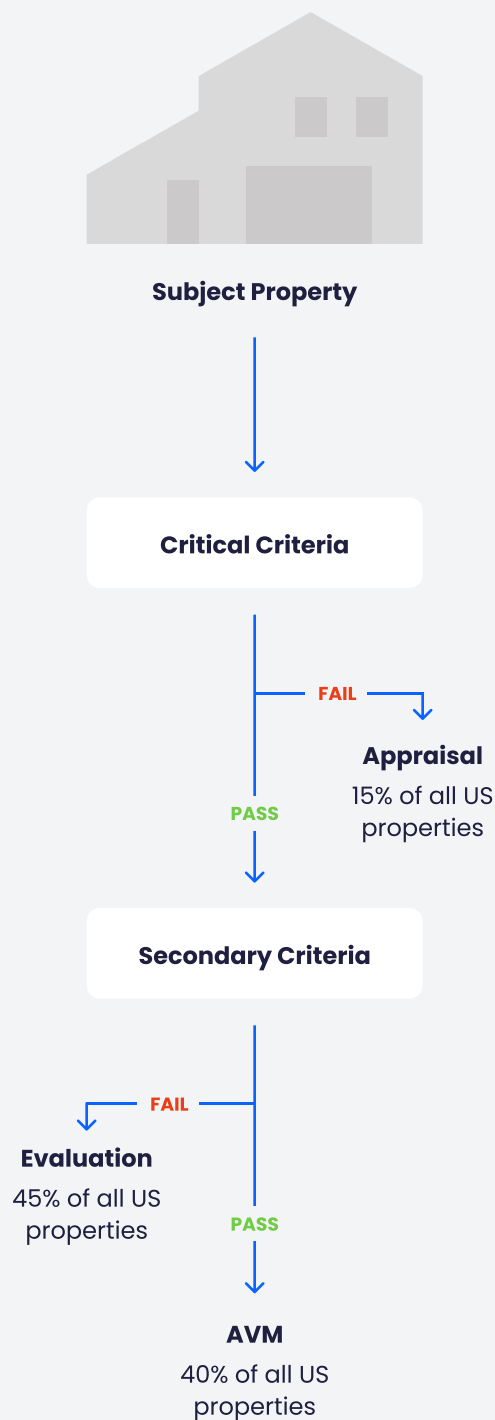
At HouseCanary, we believe that leveraging both public and MLS datasets, while excluding appraisal data, to train an AVM is critical in producing accurate and reliable value estimations of a property. Without both datasets present, reaching nationwide coverage would suffer due to: a) certain "non-disclosure" markets and b) not being able to validate property characteristics across multiple sources. It should be noted that MLS data is only available to MLS participants, which include fully licensed brokerages such as HouseCanary.

Critical and Secondary Criteria

At HouseCanary we recommend a waterfall approach to deciding whether an AVM, Evaluation, or Appraisal is appropriate for a particular transaction. For an AVM or Evaluation to be considered and certified for use, a property should be required to pass the following criteria.

The first level criteria, or "Critical Criteria," can be used to determine whether an AVM or Evaluation meets the requirements presented in 12 U.S.C. 3354, and also includes additional criteria that we recommend to ensure that an automated valuation meets baseline quality standards. The Critical Criteria can be summarized as validating that enough data is available about the subject property to appropriately select comparable properties. Without sufficient data regarding comparable properties, a traditional appraisal is needed to accurately estimate the value.

The AVM Waterfall



Critical Criteria Summary

1. Address is known, complete and validated.
2. Accurate building or parcel level latitude and longitude available.
3. Accurate and available gross living area.
4. Parcel lot size less than or equal to 10 acres.
5. Property type known (single family, condo, etc).
6. Adequate data coverage of all properties in the neighborhood and/or adjacent neighborhoods of the subject property. At a minimum, 70% of coverage at the census block group level.

Failure to satisfy all of the criteria listed would indicate that an appraisal is needed because there is insufficient data and property information for an AVM or Evaluation to confidently estimate the value of a property. If however, the above-listed criteria is met, the property would qualify for an Evaluation at a minimum in lieu of an appraisal without increasing the risk. The next step in the waterfall would then be to apply a second tier of criteria, or "Secondary Criteria", which would be used to determine if an AVM can be used.

Secondary Criteria Summary

1. High confidence of AVM for subject property with a forecast standard deviation less than 0.15 or a confidence score greater than 85%.
2. At least 5 highly similar comparable properties available that have been sold or pending for sale within the last 365 days.
3. AVM value for subject property falls within the 5th and 95th percentile of comparable properties when property differences are accounted for.
4. AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft.

If a property meets all the standards from the Critical Criteria as well as the Secondary Criteria, then the property should qualify for the use of an AVM in lieu of an appraisal without increasing the potential risks.

Conditioned Informed

Our last recommendation is that both AVMs and Evaluations should be condition informed. One requirement for purchasing a mortgage is to provide the current condition of the property “using the standardized C1-C6 property condition and quality ratings scale.” In order for AVMs and Evaluations to be a replacement for an appraisal, they too should be condition informed. This requirement can be completed two different ways: 1. using a human inspector that visits the property, or 2. leveraging artificial intelligence and computer vision/image recognition models to measure the condition.

If an AVM is using images of the property to estimate its current condition, then HouseCanary suggests requirements about the images being used. The images used should be geotagged as well as time-stamped in order to ensure their authenticity. If each photo is time-stamped and geotagged, then users of AVMs can be more confident that the image belongs to the subject property and represents the current state of the property. In addition, HouseCanary also recommends that at least 2 photos of the main kitchen and each of the living areas as well as 1 photo for every other room in the house be used. This provides the image recognition models enough data to accurately and appropriately estimate the condition of the subject property. If these requirements can't be met, a human inspector should visit the site in person to verify the condition of the property.

Testing Standards for Accuracy

In addition to the criteria above, in order to promote transparency and increase the confidence in AVMs and Evaluations, testing and reporting model accuracies should be a requirement. This is clearly stated in FIRREA section 1124 a.4. Access to these reports increases model transparency without the risk of exposing intellectual property. In the following sections, we discuss the minimum requirements for random testing and reviews of the models underlying AVMs and Evaluations.

Target Variable

In order to generate a benchmark that can be used to measure model performance, the model's valuation estimate should be measured against a market observable price. It is HouseCanary's recommendation that the arm's-length sale price should form the basis for the target variable in all benchmarking situations.

First, the arm's-length sale price is a market observed price, and is not itself an estimate or opinion of value.

Second, by definition of being at arm's-length, the closed price represents the value settled upon between two unrelated parties, each acting in their own self interest.

Metrics

In order to meet the requirements of FIRREA section 1124 a.4, AVMs used to estimate the value of a property are required to be evaluated with random sample testing and reviews. When measuring the accuracy of an AVM on a random sample, it is important that all providers use the same metric to allow for comparisons between providers. We recommend that all AVM accuracies should be reported in terms of percent error. The percent error measurement indicates how accurate the AVM estimate is after normalizing for the sale price of a property. Percent error is defined as the following:

$$\text{Percent Error} = \frac{\text{Estimated Value}}{\text{Sale Price}} - 1$$

Aside from percent error, at a minimum, HouseCanary recommends two different types of metrics when performing random sample testing and review: mean-based and percentile-based statistics.

Mean percent error (MPE) and mean absolute percent error (MAPE) should always be included when reporting mean-based statistics. The MPE is the computed average of percent errors, and since negative and positive values can offset each other, this is a standard way to measure the bias of a model. It can help analysts answer the question, “Does this AVM have a tendency to undervalue or overvalue properties?”. The MAPE is the computed average of the absolute value of the percent error. This transforms all negative percent errors to positive percent errors, measuring the overall predictive accuracy of the AVM.

Mean-based statistics are important in evaluating the accuracy and bias of models, but they are also vulnerable to outliers. These outliers can heavily influence the accuracy measure, causing the AVM to appear inaccurate overall. That is why, in addition to MPE and MAPE, we recommend that percentile based statistics also be reported.

Percentile-based statistics are robust to outliers, and similar to mean-based statistics, median percent error (MdPE) and median absolute percent error (MdAPE) are indicators of the bias and accuracy of an AVM. The major difference between the two is how they are calculated. The MdPE and MdAPE use the median, or the 50th percentile, as a statistic, instead of the mean.

While MdPE and MdAPE are accurate descriptors of the center of the error distribution, other percentile statistics help determine the overall shape and variance of the errors. PPE 5, PPE 10 and PPE 20 are used to measure a model’s percent prediction error at the 5, 10, and 20 percent thresholds. PPE is the percentage of the AVM estimates that fall within the threshold error. For example, a 50% PPE 5 means 50% of the AVM values in the random sample test are within 5% of the benchmark value. The PPE statistics measure the variance of the distribution. A high PPE 5, PPE 10 and PPE 20 indicate a tight distribution around 0, representing an appropriately trained AVM.

By requiring the mean- and percentile-based statistics above, when reviewing a random sample test of an AVM, an analyst can quickly identify if an AVM is appropriate for the use case at hand. Beyond reporting requirements, we believe an AVM should equal or surpass the performance of traditional appraisals to be deemed acceptable as an appraisal replacement tool. Leveraging data provided by Fannie Mae [\[1\]](#), we propose the following four minimum requirements for AVM accuracy:

1. MPE is between -2% and 2%
2. MdPE is between -2% and 2%
3. Purchase PPE10 greater than or equal to 80%
4. Prelist PPE10 greater than or equal to 60%

Levels of Measurement

Increased transparency will lead to increased confidence in AVMs among mortgage originators and secondary market issuers. To enhance that transparency, we recommend that AVM providers report the metrics described above at varying levels of granularity. These additional levels of measurement should include, but need not be limited to: geography, property type and model confidence.

For geography, the mean and percentile metrics should be reported at a national level, but also reported at different levels of geography. At a minimum, an accuracy report on an AVM should include the metrics at a State, County, and MSA level. This would highlight what locations the AVM achieves high performance and where the model suffers. This is important when testing for fairness and bias mentioned later in the report.

AVM reports should also be broken down by property type: Single Family Detached, Condo, Multi-Family Housing, etc. This would allow AVMs trained for specific property types to show their validity in valuing that type of property and get certified for use in specific use cases.

AVM accuracy reports should also include the metrics grouped by confidence levels, i.e., when an AVM is confident in its estimation, what is the accuracy? When the AVM is unsure and has low confidence, what is the accuracy?

With all of the above information included in an accuracy report, transparency is promoted, allowing analysts to make decisions on the subset of housing for which the AVM is appropriate. Without the above metrics, transparency would diminish, and the confidence in using AVMs would decrease. At the same time, providing these statistics not only promotes transparency but also interpretability of the AVM without risking the intellectual property of the AVM.

Non-Disclosure Markets

There are 15+ states currently where the transaction price does not have to be legally recorded with the county recorder. Consequently, the deed records in these states generally do not include the closed sale price, and often include a placeholder value such as \$10.

In order to do model benchmarking in these states, one generally needs to go to the MLS records. In these cases, more often than not, the agent will record the closed sale price within the listing record. Using MLS sourced prices in these non-disclosure markets allows for model benchmarking.

The non-disclosure situation is another example of why we suggest that both public record data and MLS data form the foundation of a residential real estate dataset.

Benchmarks

Continuous benchmarking of AVMs is vital in identifying performance decay. We recommend two benchmarks that measure AVM performance at different points in the life cycle of a property transaction: purchase and prelist.

The purchase benchmark examines the percent error of the AVM as it existed just prior to having the knowledge of the sales price. This benchmark allows the AVM to use the list price as an anchor for making predictions. The

observed error rates on the purchase benchmark serve as a proxy for the valuation uncertainty one would observe in purchase transactions where the property was openly listed for sale on the MLS prior to closing.

The prelist benchmark examines the percent error of the AVM as it existed prior to a property listing for sale, and then compares it to the eventual sold price associated with that listing. We suggest restricting this set of observations to properties that have not listed or sold within the prior five years to truly simulate an off market situation. We believe comparing the accuracy of the AVM value when there was no recent list price to anchor off of provides a truer measure of the AVM's ability to estimate off-market value. The observed error rates on the prelist benchmark serve as a proxy for the valuation uncertainty one would observe in a refinance situation (or any other off-market situation) where the property was not listed for sale on the MLS, or recently sold, at the time the valuation estimate was generated.

Third Party Testing

Section 1135 of FIRREA sections a.2 through a.4 requires that AVMs should be subject to random sample testing and reviews. For these reasons, HouseCanary recommends that AVM providers complete frequent third party testing and reviews.

Third party testing provides trust and equal opportunity across AVM providers by providing objective, independent evaluations of AVM quality. With the third party testers being independent of the AVM provider, the risks of data manipulation and conflicts of interest are greatly reduced.

Recency of AVMs

An AVM valuation must have been created no more than 30 days prior to the valuation date using the most recent closed comparables and latest market conditions. In other words, an AVM model needs to be retrained at a minimum on a monthly cadence to guarantee the value is an appropriate estimation of the property valuation at the time of the inquiry.

Model Validation by Segment

We recognize that there are instances in which an AVM might satisfy our suggested performance requirements in some geographic locations or for certain property types but not for others due to insufficient data, or other reasons. For that reason, we recommend validating models for specific segments of the population as well as globally. These segments could include type of property (single-family detached, condominium, etc), geographic location (county, metropolitan statistical area, state, etc), total loan value and/or loan-to-value, or any other segment of interest.

For example, if a vendor could show that its AVM met our suggested performance requirements in a set of specific counties for single-family detached properties, we believe that AVM should be considered an appropriate appraisal replacement tool in those counties for those kinds of properties, even if the data does not support using the AVM as an appraisal substitute in every location or for every type of property.

As noted above, we believe the minimum benchmark criteria for automated valuations should be in line with the

benchmark values observed in appraisal valuation errors. In particular, for a refinance or other off-market situation, we believe the reference appraisal error should be one in which the appraisal was done blind to any contract price [1].

Fairness and Bias

In recent years, there has been evidence suggesting that systematic bias present in the real estate ecosystem impacts minority populations with appraisals and AVMs. At HouseCanary we take fairness of valuations seriously and consider it an important requirement for using AVMs in all cases. Recently, HouseCanary released a nationwide study that showed AVM technology, when trained appropriately, reduced and eliminated any statistically significant bias between different minority census tracts [1]. For those reasons, we suggest the following requirements for measuring and testing fairness in AVMs and Evaluations.



Racial Disparate Testing for AVMs

In order to discover any negative variance associated with race or ethnicity, we suggest that racial disparate testing should be done on AVMs. By requiring racial disparate testing, this would minimize systematic bias that could negatively impact protected minority groups.

While performing racial disparate testing at the property level is ideal, collecting this attribute on every property is impracticable and would increase the amount of resources needed for automating valuations. We suggest and support performing the racial disparate test at a census tract level, using various thresholds to determine the race of the individual property.

The US Census Tract level data includes statistics on household demographics available to the public. Based on the household demographics, you assign a race to every census tract based on a percentage threshold requirement (HC tests both 50% and 80%). If a census tract has a larger percentage of a certain race that exceeds the threshold, then every property in the tract is assumed to have the same race.

With census tract race identified, AVM providers could test and provide the results on the accuracy similarities and differences between White and minority census tracts, and provide the analysis supporting if the differences are statistically significant. This provides constant fairness measures as well as transparency to how well an AVM performs on different subpopulations.

Evaluation Fairness

The formulation of an Evaluation is such that it isolates the site visit where data is collected about the condition of the subject from the valuation analysis that is generated by an AVM and then finalized by Quality Control professionals. Whereas a traditional appraisal or BPO would generally be completed in its entirety by the same person that visits the home and enters and potentially meets the homeowners, Evaluations include a natural separation of tasks such that any bias that might be a factor with a single person completing a report from inspection through value conclusion is precluded. This separation minimizes the risk that the biases of the person conducting data collection to establish a condition assessment will improperly influence the value that ultimately is determined for the report.

Conclusion

This paper presents a set of recommendations for the use of AVMs and Evaluations in lieu of appraisals. These recommendations are based on a set of industry standards and data benchmarks to mitigate risk when replacing a traditional appraisal with an automated solution. In order to move towards consumer-friendly solutions that lower costs, shorten turnaround times, and reduce racial bias, in a manner that does not increase risk for lenders, greater adoption of AVMs and Evaluations is needed. We present not only data requirements but also testing standards with the goal of reducing the burden on each individual depository institution and creating a centralized solution where AVM and Evaluation providers can get approved and deemed appropriate for use when these requirements are met. By adhering to these guidelines, HouseCanary firmly believes that the potential risks associated with automating a solution for appraisals could be greatly reduced and eliminated in most cases.

AVM Certified Checklist (Manual)

Provider:		Date of Model Run:	
Mean PE:		Median PE:	
PPE10 Purchase:		PPE10 Prelist:	

Description	Remarks	<input checked="" type="checkbox"/>
-------------	---------	-------------------------------------

CRITICAL CRITERIA

Address is known, complete and validated.		<input type="checkbox"/>
Accurate building or parcel level latitude and longitude available.		<input type="checkbox"/>
Accurate and available gross living area.		<input type="checkbox"/>
Parcel lot size less than or equal to 10 acres.		<input type="checkbox"/>
Property type known (single family, condo, etc.)		<input type="checkbox"/>
70% of coverage at the census block group level.		<input type="checkbox"/>

SECONDARY CRITERIA

High confidence of AVM for subject property with a forecast standard deviation less than 0.15.		<input type="checkbox"/>
At a minimum, 5 highly similar comparable properties available that have recently been sold or currently pending sale.		<input type="checkbox"/>
AVM value for subject property falls within the 5th and 95th percentile of adjusted comparable properties.		<input type="checkbox"/>
AVM value for subject property falls within 5th and 95th percentile of the census block group distribution of price-per-sqft.		<input type="checkbox"/>

AVM Certified API

Request

[https://api.AVM.com/v2/property/value_analysis/check?
street_address=4123+Main+St&zipcode=94132&estimated_value=1050000&include_comp_based_analysis=true](https://api.AVM.com/v2/property/value_analysis/check?street_address=4123+Main+St&zipcode=94132&estimated_value=1050000&include_comp_based_analysis=true)

Response

```
{
  "input_params": {
    "product_type": "value_analysis",
    "include_comp_based_analysis": "true",
    "zipcode": "90274",
    "street_address": "43 Valmonte Plz",
    "estimated_value": "1050000"
  },
  "recommended_approach": "Evaluation",
  "checks": {
    "All pre-analysis checks passed": true,
    "Address is supported": true,
    "Address is complete": true,
    "Precise geocode is available for address": true,
    "Property at address is of supported type": true,
    "Census block group information is available": true,
    "Enough information on neighborhood characteristics is available": true,
    "Gross living area of property is available or provided as input": true,
    "Comps available for analysis": true
  },
  "avm_value_analysis": {
    "avm_value": 1801218,
    "avm_confidence": "high",
    "neighborhood_analysis": {
      "5th_percentile_value_per_sqft": 578.1,
      "95th_percentile_value_per_sqft": 988.7,
      "within_neighborhood_norms": true,
      "avm_value_sqft": 987
    },
    "comp_based_analysis": {
      "95th_percentile_adjusted_comp_value": 1734155,
      "avm_value_percentile_in_adjusted_comp_values": 96.55,
      "within_adjusted_comp_values": false,
      "5th_percentile_adjusted_comp_value": 1134796,
      "number_of_comps": 116
    }
  }
}
```




Reducing Racial Bias in Home Appraisals Using Automated Valuation Technology



Overview

In September 2021, government-sponsored enterprise Freddie Mac published the results of a study, titled "[Racial and Ethnic Valuation Gaps in Home Purchase Appraisals](#)," which found severe bias present in appraisal data, concluding that – through the traditional appraisal process – racial minorities are more likely to receive an appraisal value that is lower than the contract price the property was sold for.

Traditional appraisals have come under fire in recent years for consistently providing inaccurate or insufficient property information and specifically, undervaluing minority-owned homes relative to white-owned homes. When evaluating each property, appraisers must select comparable properties in adherence with a set of rules (e.g., time of sale, distance from target property, etc.) upon which to base their valuation figure. In its Q3 2021 examination of the appraisal industry, Fannie Mae reported that the three most frequent issues in traditional appraisals – which accounted for 62% of the overall appraisal defects – are all related to the selection of comparable properties ("comp selection"). Comp selection is one of the most subjective elements of the traditional appraisal process and is, therefore, highly susceptible to the conscious and unconscious biases of individual appraisers.

HouseCanary has built and developed industry-leading property valuation technology that provides highly accurate, objective information to power real estate transactions of all kinds. We believe our automated valuation tools, which deliver results based on hundreds of property data points and deep contextual information, can help significantly reduce the bias present in traditional home appraisals. To measure the accuracy of our automated valuation tools in appraising homes in minority neighborhoods, we conducted a statistical study of our technology using the Freddie Mac report as a guide. In particular, we sought to determine whether use of our automated property valuation tools could mitigate the effects of appraisal bias highlighted in the Freddie Mac analysis.



Following an examination of the study's results, we concluded that our automated valuation models are significantly more effective at removing bias from the property valuation process compared to traditional appraisals.

Key takeaways & results

Automated valuation models (AVMs) are more reliable tools for providing a fair valuation when compared to traditional appraisals. Our results, which can be found in the appendix, show that HouseCanary's automated valuation tool generally outperformed our comp valuation tool in producing unbiased valuations. When sufficient data is available to support an AVM for a property, our research suggests it is a more reliable tool for providing a fair valuation than either our comp valuation tool or a traditional appraisal.

No evidence of racial bias exists in HouseCanary's automated comp and AVM tools. Following our analysis, which can be found in the appendix, we found no evidence of racial bias in HouseCanary's automated comp and AVM tools. This stands in stark contrast to the results of Freddie Mac's examination of traditional appraisals, which found that "Black and Latino applicants receive lower appraisal values than the contract price more often than White applicants."

HouseCanary's comp-based and AVM values are fair to homeowners when neighborhoods are more diverse. Our research found that our comp-based and AVM values tend to become more favorable to homeowners as the percentage of racial minorities in a tract increases. On the contrary, Freddie Mac found that in traditional appraisals, the discrepancy between appraisal value and sales price "increases as the percentage of Black or Latino people in the tract increases." For example, Freddie Mac's research demonstrated how, as the threshold of minorities increases (e.g., from 50% to 80%), traditional appraisal data becomes more unfair, whereas HouseCanary's models actually tend to favor minority homeowners more as the percentage of minority homeownership in a tract increases.



Conclusion

Having persisted for years, appraisal bias has become an increasingly important issue as countless reports of racial prejudice and discrimination have come to the forefront of public awareness. Earlier this year, the Biden-Harris administration [announced](#) a series of actionable steps to narrow the racial wealth gap in the U.S. and address racial discrimination in the housing market, including inequity in home appraisals.

Amid increased scrutiny on inherent bias in traditional appraisals, some have highlighted the industry's lack of diversity and the steady decline in licensed appraisers, as well as the meaningful progress made in the development of automated valuation tools in recent years.

In 2020, the [Urban Institute](#) found that 89% of all property appraisers and assessors are white while just 2% are Black and 5% are Hispanic. The majority of appraisers fall on the higher end of the age spectrum as well, with very few under the age of 34. The [Appraisal Foundation 2021 Diversity Survey](#) calculated that roughly 66% of all licensed appraisers are above the age of 55. The survey also found that nearly 64% of all appraisers are male.

According to Fannie Mae's estimates, appraisal submission volume has increased steadily over the last decade, reaching record highs in the spring of 2021, while the number of active appraisers has gradually declined at a rate of approximately 1% per year. If this trend continues, automated valuation tools could become all the more important in handling the outsized demand for accurate home appraisals.

The results of our study on automated valuation technology clearly demonstrate that HouseCanary's automated comp and AVM tools are unbiased with regard to race and ethnicity, and can thus augment the appraisal process by curtailing discrimination against minority homeowners.

When used effectively, these tools can also be more efficient and cost-friendly without the implicit bias that appears to be inherent within the traditional appraisal process. With the publication of this research, we look forward to continuing the discussion about the role automated valuation technology can play in the real estate industry to promote equality throughout the entire homeownership journey.



Appendix

Methodology

Data Collection: We began by compiling a random sample of 10,000 arm's length sales of residential real estate that have closed since September 1, 2021. We then removed transactions for which homeowner ethnicity data was unavailable or where we detected issues with the accuracy or integrity of the data, leaving us with a sample size of 9,916 total transactions.

Ethnicity Attributes: To measure the impact of valuation bias across different ethnic groups, we leveraged similar techniques to Freddie Mac. Using census tract level data from the US Census Bureau's American Community Survey, we grouped each tract according to whether the homeowners accounted for were more than 50% White Non-Hispanic or more than 80% Black, Latino or Minority¹. Following Freddie Mac's approach, if a tract was over 50% White Non-Hispanic or over 80% Black, Latino or Minority, our testing assumed that every homeowner in that tract was the same race or ethnicity as the tract's majority group.

One slight difference in our approach versus Freddie Mac is that Freddie Mac analyzed tracts that were 50+% Black, Latino and Minority as well as 80+%. We found that there was a much greater variation of outcomes in the 50+% groups than the 80+% groups, particularly in tracts that were 50+% Minority. In our opinion, the assumption that all homeowners in a tract that is majority non-White can be treated identically is harder to justify at the 50% threshold. So, focusing on 80+% minority tracts seemed likely to yield the most reliable results. In addition, because the Freddie Mac study showed appraisal bias increasing as the percentage of Minority, Black or Latino homeownership increases in a tract, focusing on the tracts that are most vulnerable to appraisal bias in this sense seemed appropriate.

HouseCanary Valuation Tools: Our proprietary valuation tools include an automated valuation model, or AVM, as well as a comp valuation tool. Our comp valuation tool begins by examining recently sold properties within a small search radius around the property of interest and slowly expanding the search until 500 appropriate comps have been identified. The tool then ranks these comps based on our proprietary similarity score. Our similarity score is based on inputs such as GLA and bed, bath and lot size as well as the outputs from a regression model that accounts for time of sale as well as distance between properties. Our comp valuation tool calculates a value for the subject property based on the average sale price among the 10 comps with the highest similarity scores.

Measuring Valuation Gap: To test our valuation tools for bias, we began by measuring the percentage difference between the value calculated by our tool for each subject property and the sale price of that property. We did this by subtracting the sale price from the tool value and then dividing the result by the sale price.

$$\text{percent difference} = \frac{\text{Comp Value} - \text{Sale Price}}{\text{Sale Price}}$$

¹Every group other than non-Hispanic Whites (e.g., Asian) was counted as Minority.

Methodology (cont.)

For our AVM, the equation is:

$$\textit{percent difference} = \frac{\textit{AVM value} - \textit{Sale Price}}{\textit{Sale Price}}$$

We believe sale price is the fairest metric to use as a target variable since this value is agreed upon by two separate parties negotiating at arm's length. In each case, a positive percent change can be interpreted as an overvaluation and a negative value can be interpreted as an undervaluation.

By aggregating these calculations by census tract and comparing the results for different tracts, we can examine whether a relationship appears to exist between the racial or ethnic makeup of a tract and the likelihood of a negative valuation gap occurring, (i.e., whether valuation bias seems to exist).

Results

The results of multiple tests are provided in the following section. We ran a two-tailed t-test to compare mean valuation gaps and a one-tailed t-test where the two-tailed t-test failed.

In the tables that follow, the results of the t-test are provided as well as the gap between the White and Minority tracts. The null and alternative hypotheses are also provided for each of the t-tests. Each t-test's results are tested using a 0.05 significance level. This is used consistently when rejecting or failing to reject a null hypothesis.

These tests start with two baselines: the valuation gap for the total sample and for White tracts. You will find these results in the first two rows of the result tables. The valuation gap is then presented for tracts that are 80+% Minority, Latino or Black. In addition, we ran t-tests comparing the mean gaps of the Minority, Black and Latino tract to the White tracts.

Null Hypothesis (2-Tail): Group mean for valuation gap of Black, Latino or Minority tracts is equal to the group mean for valuation gap of White tracts

Alternative Hypothesis (2-Tail): Group mean for valuation gap of Black, Latino or Minority tracts is not equal to the group mean for valuation gap of White tracts

If any two-tail test was rejected, we ran a one-tail test. The 1-tail hypotheses were:

Null Hypothesis (1-Tail): Group mean for valuation gap of White tracts is less than or equal to the group mean for valuation gap of Minority tracts

Alternative Hypothesis (1-Tail): Group mean for valuation gap of White tracts is greater than the group mean for valuation gap of Minority tracts

Comp Based Valuation Gap Results

Given all tests and p-values in the table, we failed to reject the null hypothesis at the 0.05 significance level for all groups. This shows that there is no evidence of racial or ethnic bias when using the automated comp based valuation.

Property Tract	Count	Mean Valuation Gap vs Contract Price	Gap vs. White	P-value
Overall	9916	0.67%	-	-
White	7787	1.2%	-	-
Minority (80%-100%)	633	-0.33%	-1.53%	.3264
Latino (80%-100%)	71	7.59%	+6.3%	.5781
Black (80%-100%)	132	0.30%	-0.9%	.5377

Property Tract	Count	Mean Valuation Gap vs Contract Price	Gap vs. White	P-value
Overall	9916	2.01%	-	-
White	7787	2.31%	-	-
Minority (80%-100%)	633	2.02%	-0.29%	.8621
Latino (80%-100%)	71	11.2%	+8.89%	.4746
Black (80%-100%)	132	1.92%	-0.39%	.8479

AVM Valuation Gap Results

Similar results are found when measuring bias with our AVM valuations. Given all tests and p-values in the table, we fail to reject the null hypothesis at the 0.05 significance level for all groups. Whether using HouseCanary's AVM or Comp Based Value to generate valuations, there is no evidence of bias against the different minority populations.

Additional Testing

To further demonstrate the robustness of our findings, we performed these same tests using data from our internal AVM prelist benchmark. We use this benchmark to examine our AVM performance by comparing the AVM's pre-listing estimated value for a property that has been sold with its closed sale price. The dataset for these tests consists of all homes that have been sold in the previous 6 months (dating back to May 1st, 2021). An advantage of testing this benchmark is that it provides a much larger sample size than is possible with the randomized sample based methods used above.

Prelist AVM Valuation Gap

For the Latino 80+% group, we fail to reject the null hypothesis that the mean valuation gap for White tracts and Latino tracts are equal. For Black and Minority tracts, these tests show a positive valuation gap compared to a slightly negative valuation gap for White tracts. So, Black and Minority homeowners actually fare slightly better in these tests than White homeowners. This result reinforces our conclusion that our AVM does not generate values that are biased against Black, Latino or Minority homeowners.

Property Tract	Count	Mean Valuation Gap vs Contract Price	Gap vs. White	P-value
Overall	645,899	-0.8%	-	-
White	503,508	-0.9%	-	-
Minority (80%-100%)	37,899	0.1%	+1.0%	<0.0001 (1-Tail)
Latino (80%-100%)	4,701	-0.6%	+0.3%	0.224 (2-Tail)
Black (80%-100%)	6,419	2.3%	+3.2%	<0.0001 (1-Tail)

References

1. [Freddie Mac Research Note](#)
2. Fannie Mae Q3 Appraisal Update
3. [White House Task Force](#)
4. [Urban Institute](#)
5. [Appraisal Foundation 2021 Diversity Survey](#)



Agile Evaluation

Sample Report

What's inside?

This Agile Evaluation is designed to provide a deeper understanding of the data behind every home valuation. Our Agile Evaluations are based on HouseCanary's industry-leading real estate data and are backed by several decades of sales transactions. They are more objective than a single person's assessment of value and more consistent and reliable than similar valuation products that don't use data as their foundation.

The latest evolution in home valuation tools at your fingertips



Accuracy

Decades of transaction sales data and deep market context allow us to generate accurate, reliable valuations that are better than a BPO at pinpointing market value.



Objectivity

Using algorithms to determine the relationships between different variables that affect home price gives us objective insight that's not available in BPOs today.



Coverage

Our data covers millions of homes across the US and uses multiple sources to find the most recent, deepest information on as many individual properties as possible.

Here are some of the additional features you'll find in this report:

Data you won't get in a BPO

- ✓ The value of the land where the property sits
- ✓ The home's price forecast and risk of a price decline
- ✓ FEMA, superfund, and other disaster-related details
- ✓ The fair-market rent of the home

Familiar layout

- ✓ We've designed Agile Evaluation to look and feel like a BPO so you can quickly find the information you need
- ✓ Additional property details that you won't find in a BPO are nestled within a clean, easy-to-absorb format

Next level comps

- ✓ Our data-enhanced comp selection chooses the closest, most relevant comparable listings to the subject property
- ✓ We provide MLS photos for not only the subject property but also every comp used so you can see similarities and differences with your own eyes

Image recognition

- ✓ Check inspection details, such as the condition of the home
- ✓ Evaluate the data and confirm accuracy

If you have questions or comments about this sample report, or would like to learn more about ordering an Agile Evaluation, contact your sales representative.



Your logo here

Company Name

www.companywebsite.com

Agile Evaluation

Exterior Inspection Evaluation Report



For Property Located at:

123 Main St.

Glendale, AZ 85305

Value Estimate / Condition:

\$400,000 / C4

Client:

HouseCanary

Effective Date:

03/13/2019

123 Main St Glendale, AZ 85305

AGILE EVALUATION

Subject

APN # 1234567890

Property Type	Single Family Detached	Special Amenities	There were no special amenities observed during the exterior inspection of the subject property.
Beds / Baths	4 Bd / 3 Ba	Other Structures on Property	None Visible
GLA / Lot Size	2,760 / 17,424 sq ft	Non-Residential Use	No
Year Built	2003	View Factors / Impact on Value	None Notable / Neutral
Property Viewable	Yes	Locational Influences / Impact - Comments	Residential / Neutral
Evidence of Occupancy	Window Coverings	Adverse Site Conditions	None noted, There were no adverse site conditions noted during the exterior inspection of the subject property.
Occupancy Type	Owner	Conform to Neighborhood	Yes. The subject property conforms to the surrounding neighborhood.
PUD / HOA Fees	Yes / \$87 per month		
HOA Fee Includes	Common Area Maint		
Common Elements	Unknown		

Transaction History

Sale Type	Date	Price	Source	Loan Type
Listed	01/22/19	\$420,000	ARMLS	
Listed	09/15/06	\$589,900	ARMLS	
Sold	07/03/03	\$251,790	Public Records	Arms-Length

Subject's Comparability to Market



123 Main St Glendale, AZ 85305

AGILE EVALUATION

Condition

Condition determined by inspector has been verified by HouseCanary's proprietary image detection technology

Roof Condition	Good
Exterior Wall Condition	Good
Building Damages	None Noted
Damages Comment	None Noted

Condition Rating (C1-C6) C4

Overall, the subject is considered to be in average condition appears adequately maintained with no evidence of major repairs needed. The front is well-maintained and is average for the neighborhood.

Neighborhood & Subject Marketability

Urban/Suburban/Rural	Suburban
FEMA Disaster	Declared Date: 2014-11-05 End Date: 2014-09-09 Fema Disaster #: 4203 Title/Type: SEVERESTORMANDFLOODING Data Current To: 2018-08-13

FEMA Flood	Effective Date: 2013-10-16 Flood Risk: Low Flood Zone: X Map #: 04013C1715L
------------	--

Superfund	Within 0 miles: 0 Within 1 miles: 2 Within 4 miles: 0 See addendum for details
-----------	---

Neighborhood Price Range \$355,00 to \$485,600

MSA 1-Year Risk of Decline 10.4% very low

Probability this market's median home prices will be lower 12 months from the current market median price

The subject neighborhood is generally considered to be suburban, with an approximate density of 400 SFRs per mile. Property values in the area have been increasing over the past year, approximately 6% over the year, with 3% growth occurring in the past 3 months. Demand and supply appear to be in balance, with average DOM of 95 days for transactions over the past 3 months. Sales of SFRs over the past year range from \$355,000 to \$485,600, with a median/predominate price of \$390,000, and ranging in age from 1yrs to 57yrs old and a predominate age of 19yrs.

Months of Supply - ZIP



This month last year
2.1

This month
2.5

Days on Market - Sold or De-listed Properties








This month last year
66

This month
67






123 Main St Glendale, AZ 85305


Competitive Closed Sales

	Subject	Sold 1	Sold 2	Sold 3	Sold 4
					
Street Address	123 Main St, Glendale, AZ 85305	345 Main St. Glendale, AZ 85303	567 Main St. Glendale, AZ 85403	890 San Juan Ave Glendale, AZ 85403	123 San Juan Ave Glendale, AZ 85403
Miles to Subject	-	0.28	0.35	0.39	0.41
Subdivision	McDonald Ranch	McDonald Ranch	None	None	Missouri Ranch
Similarity	-	High	High	High	High
Sales Type	Active	Arms-Length	arms_length_sale	Arms-Length	Arms-Length
Location	-	Same	Same	Inferior	Superior
Year Built	2003	2005	1982	2004	2004
Gross Living Area	2,743 sf	3,184 sf	3,191 sf	3,184 sf	3,184 sf
Beds/Baths	4 / 3.0	5 / 3.0	3/ 2.0	4 / 3.0	4 / 3.0
Lot Size	17,424 asf	17,010 sf	32,465 sf	17,050 sf	19,396 sf
Basement	-	-	-	-	-
Garage/Parking	Attached Garage: 3, Driveway: 3	Garage: 4	Garage: 5	Garage: 3	Garage: 3
Pool	-	-	-	-	-
Condition	C4	C4	C4	C4	C4
List Date	01/22/2019	07/21/2018	06/07/18	06/01/18	06/22/18
List Price	\$420,000	\$424,000	\$369,000	\$449,000	\$479,000
Sale Date / DOM	-	01/17/2019 / 275	07/31/2018 / 55	07/27/18 / 59	08/02/2018 / 4
Sale Price	-	\$413,000	\$360,000	\$445,000	\$462,000
Net Adjustment	-	-\$20,000	\$40,000	-\$25,000	-\$65,000
Adjusted Sale Price	-	\$392,800	\$400,000	\$420,000	\$397,000

123 Main St Glendale, AZ 85305


Competitive Listings

	Subject	Active 1	Active 2	Active 3	Active 4
					
Street Address	123 Main St, Glendale, AZ 85305	8364 W Luke Ave, Glendale, AZ 85305	8376 W San Juan Ave, Glendale, AZ 85305	8376 W San Miguel Ave, Glendale, AZ 85305	8027 W Luke Ave, Glendale, AZ 85305
Miles to Subject	-	0.06	0.13	0.19	0.32
Subdivision	McDonald Ranch	Missouri Ranch	-	-	Missouri Estates
Similarity	-	High	High	Moderate	High
Sales Type	Active	Active	Active	Active	Pending
Location	Beneficial	-	-	-	-
Year Built	2003	2003	2002	2002	2005
Gross Living Area	2,743 sf	3,440 sf	3,440 sf	4,040 sf	2,884 sf
Beds/Baths	4 / 3.0	5 / 3.0	5 / 3.0	5 / 3.0	3 / 3.0
Lot Size (ac.)	17,424 sf	18,035 sf	19,131 sf	24,161 sf	17,264 sf
Basement	-	-	-	-	-
Garage/Parking	Attached Garage: 3, Driveway: 3	Unknown	Unknown	Unknown	Unknown
Pool	-	-	-	-	-
Condition	C4	C4	C4	C4	C4
List Date	01/22/2019	10/02/2018	12/11/2018	11/22/2018	11/21/2018
List Price	\$420,000	\$410,000	\$395,000	\$490,000	\$440,000
Last Sale Date / DOM	07/03/2003 / 55	05/07/2014 / 103	04/04/2003 / 97	05/26/2003 / 40	12/13/2014 / 6
Last Sale Price	\$251,790	\$340,000	\$390,000	\$329,100	\$315,000
Net Adjustment	-	-\$33,766	-\$34,186	-\$83,762	-\$24,679
Adjusted Sale Price	-	\$306,234	\$355,814	\$245,338	\$290,231

123 Main St Glendale, AZ 85305



Conclusion

MLS Comments (Listing & Sold)

Sold - Comp 1

Beautiful 5 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence. Handsome kitchen cabinets and convenient laundry room for you. Master suite includes half-bath and his/her closets. Updated windows and clean siding in great shape. Garage is semi-finished and includes service door to the back yard. Must See!

Sold - Comp 2

Beautiful 3 bedroom, 2 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence.

Sold - Comp 3

Beautiful 4 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence. Handsome kitchen cabinets and convenient laundry room for you. Master suite includes half-bath and his/her closets. Updated windows and clean siding in great shape. Garage is semi-finished and includes service door to the back yard. Must See!

Sold - Comp 3

Beautiful 4 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence. Handsome kitchen cabinets and convenient laundry room for you. Master suite includes half-bath and his/her closets. Updated windows and clean siding in great shape. Garage is semi-finished and includes service door to the back yard. Must See!

Listing - Comp 1

Beautiful 5 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence. Handsome kitchen cabinets and convenient laundry room for you. Master suite includes half-bath and his/her closets. Updated windows and clean siding in great shape. Garage is semi-finished and includes service door to the back yard. Must See!

Listing - Comp 2

Beautiful 5 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new. Yard shows pride of ownership and is great for entertainin with big back yard and privacy fence. Handsome kitchen cabinets and convenient laundry room for you. Master suite includes half-bath and his/her closets. Updated windows and clean siding in great shape. Garage is semi-finished and includes service door to the back yard. Must See!

Listing - Comp 3

Beautiful 5 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-new.

Listing - Comp 3

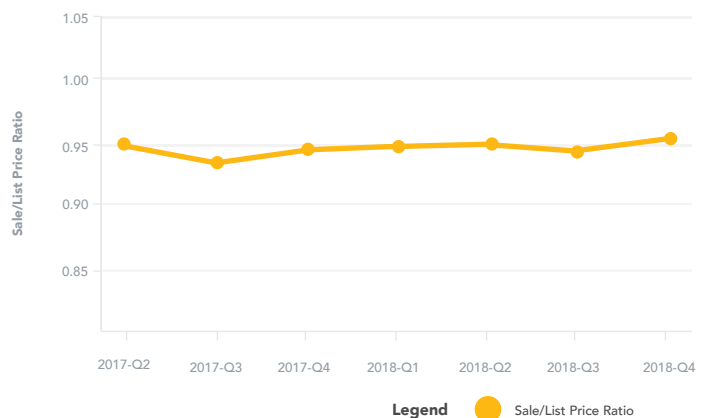
Beautiful 5 bedroom, 3 bath home is ready to move-in and available for immediate possession. New paint throughout and carpet is like-

Reconciliation Comments

A survey and analysis of comparable sales and listings in the subject's competitive market area suggests an ample number of highly similar sales exist in the market. Generally speaking, the predominate drivers of value in the subject area are: Location, GLA, and year built. Comparable sales presented in the grid were selected based on overall subject similarity, with primary consideration of characteristics that strongly influence value in the competitive area. In the final analysis, primary weight is placed on the adjusted sale prices of Comparable Sales #1, #3, and #4, due to overall similarity and gross adjustments warranted in equating to the subject. The price estimate conclusion falls within both the adjusted and unadjusted sale prices of comparable sales analyzed.

Sale/List Price Trend

Sale/List Price Ratio: 95%



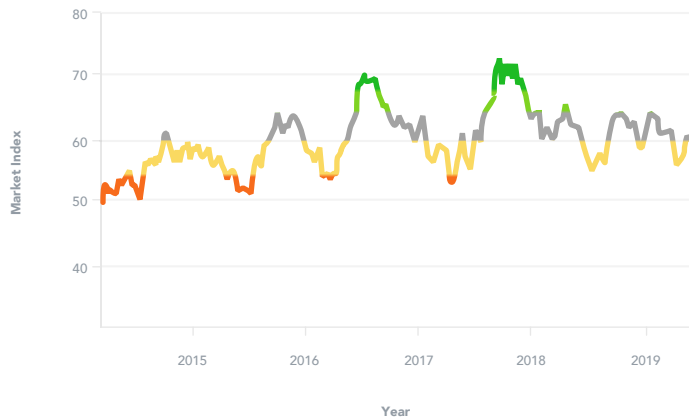
123 Main St Glendale, AZ 85305

AGILE EVALUATION

Final Value

Land Value	\$140,169	Medium Confidence	Market Rent Estimate	\$2,425	Moderate Confidence
As Is List Price	\$445,500				
Market Value Estimate	\$445,500	High Confidence			
30-Day Value Estimate	\$417,500				

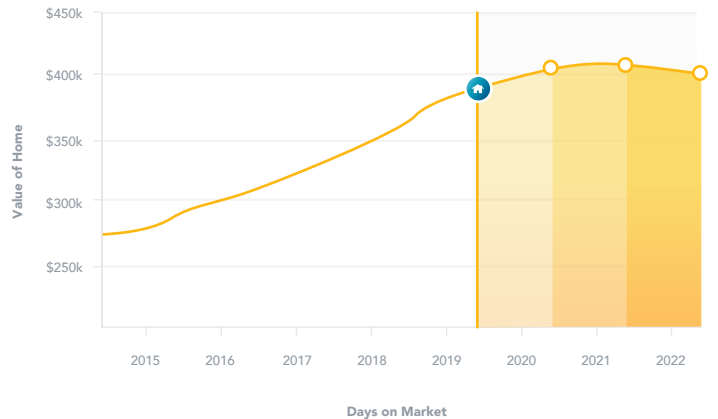
Market Index



This month last year	This month	Market Status
59.86	60.67	Seller's Market

● Strong Seller's
 ● Seller's
 ● Neutral
 ● Buyer's
 ● Strong Buyer's

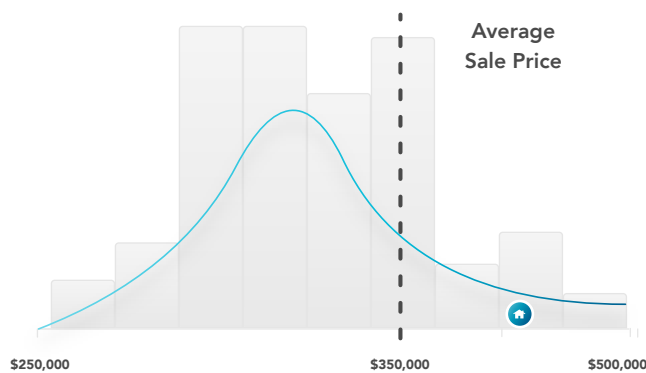
HouseCanary Forecast for Subject



3 Year Growth

1 Year	+5%	2 Year	+5%	3 Year	+3%
2020	• \$443,327	2021	• \$446,080	2022	• \$436,814

Comparable Home Price Trend



Pricing Marketing Strategy Comments

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed lobortis mollis eros quis efficitur. Mauris aliquam risus vitae metus commodo varius. Vestibulum eget lobortis dolor. Nam a odio dui. Proin lobortis venenatis dui consequat pellentesque. Donec gravida interdum turpis ut dapibus. Ut quis suscipit nulla, eu tristique metus. Proin lobortis venenatis dui consequat pellentesque.

123 Main St Glendale, AZ 85305


3rd Party Exterior Inspection

Single Family Home | Completed Inspection Date: 03/13/2019

Inspector comments

Overall, the subject is considered to be in average condition appears adequately maintained with no evidence of major repairs needed. The front is well-maintained and is average for the neighborhood.

Property Information

Evidence of Occupancy	Yes	Car parking (# spaces)	Driveway(3) / Attached Garage(2) / Built-in Garage/ Detached Garage/ Carport/ Dedicated Off-Site Parking/ None
	Cars In Driveway/ Evidence Of Furniture/ Window Coverings / Air Conditioner On/ Smoke From Furnace/ Shoveled Walkway/ Driveway/ Garbage Cans/ Lawn Maintenance/ Name On Mailbox/ Other	Special Amenities	Solar Panel(s), Ornate Landscaping, Irrigation System, Graywater System, Water Collection System, Outdoor Kitchen, In-ground Pool, In-ground Hot Tub, Sport Court, Dock, Sauna, RV Parking, Orchard (hobby), Vineyard (hobby), Patio, Deck, Porch, Balcony, Fireplace, Front Yard, Back Yard, Courtyard, Other None
Property Viewable	Yes		
Comment		Comment	
Attachment Type	Detached		
PUD	No		
Common Elements	Pool/ Gym/ Tennis Court/ Basketball Court/ Clubhouse/ Dog Park/ Golf Course/ Recreation Area/ Park/ None/ Unknown/ Other		
Stories	1		
Other Structures on Property	None Visible		
Overall Condition	C4 Adequately maintained, some cosmetic damage and minimal repairs may be needed.		
Neighborhood Description	Suburban/ Urban/ Rural		
Locational Influences	Residential		
Impact on Value	Neutral		
Conform to Neighborhood	Yes		
Comment	The subject property conforms to the surrounding neighborhood.		
Non-Residential Use	No		
Comment			
View Factors	None Notable		
Impact on Value	Neutral/ Beneficial/ Adverse		

Exterior Property Condition

Roof Condition	Poor/ Fair/ Average/ Good/ Very Good/ Excellent
Exterior Wall Condition	Poor/ Fair/ Average/ Good/ Very Good/ Excellent
Building damage by any of the following	Owner Neglect/ Vandalism/ Fire/ Flood/ Tornado/ Storm/ Wind/ Hail/ Freezing/ Hurricane/ Earthquake/ Mudslide/ Landslide/ Other None Noted
Comment	
Adverse Site Conditions	Contamination, Failing secondary structure(s), Encroachments, Significant junk/trash, Sinkhole, Wetlands, Extreme slope that prevents development or impacts site utility, Other None noted
Comment	There were no adverse site conditions noted during the exterior inspection of the subject property.

123 Main St Glendale, AZ 85305

Photos - Inspection - Subject



Address Verification

Date
03/13/2019



Address Verification

Date
03/13/2019

123 Main St Glendale, AZ 85305

 **AGILE EVALUATION**

Photos - Inspection - Subject



Street Left

Date
03/13/2019



Street Right

Date
03/13/2019

123 Main St Glendale, AZ 85305

Photos - Inspection - Subject



Exterior Left

Date
03/13/2019



Exterior Right

Date
03/13/2019

123 Main St Glendale, AZ 85305

 **AGILE EVALUATION**

Photos - Inspection - Subject



Front

Date
03/13/2019

123 Main St Glendale, AZ 85305

 **AGILE EVALUATION**

Photos - MLS - Subject

SFARMLS | Listing ID #1234567 | Date: 05/02/2018



Front



Bedroom



Kitchen



Bathroom

Only a few images from the MLS are displayed to give an assessment of the comparable. There maybe more images available on the MLS.

123 Main St Glendale, AZ 85305

 **AGILE EVALUATION**

Comp 1 MLS Photos

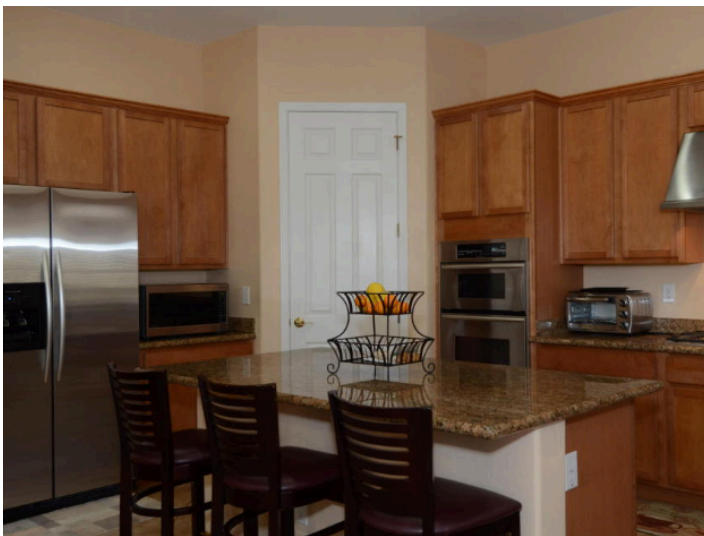
SFARMLS | Listing ID #1234567 | Date: 05/02/2018



Front



Bedroom



Kitchen



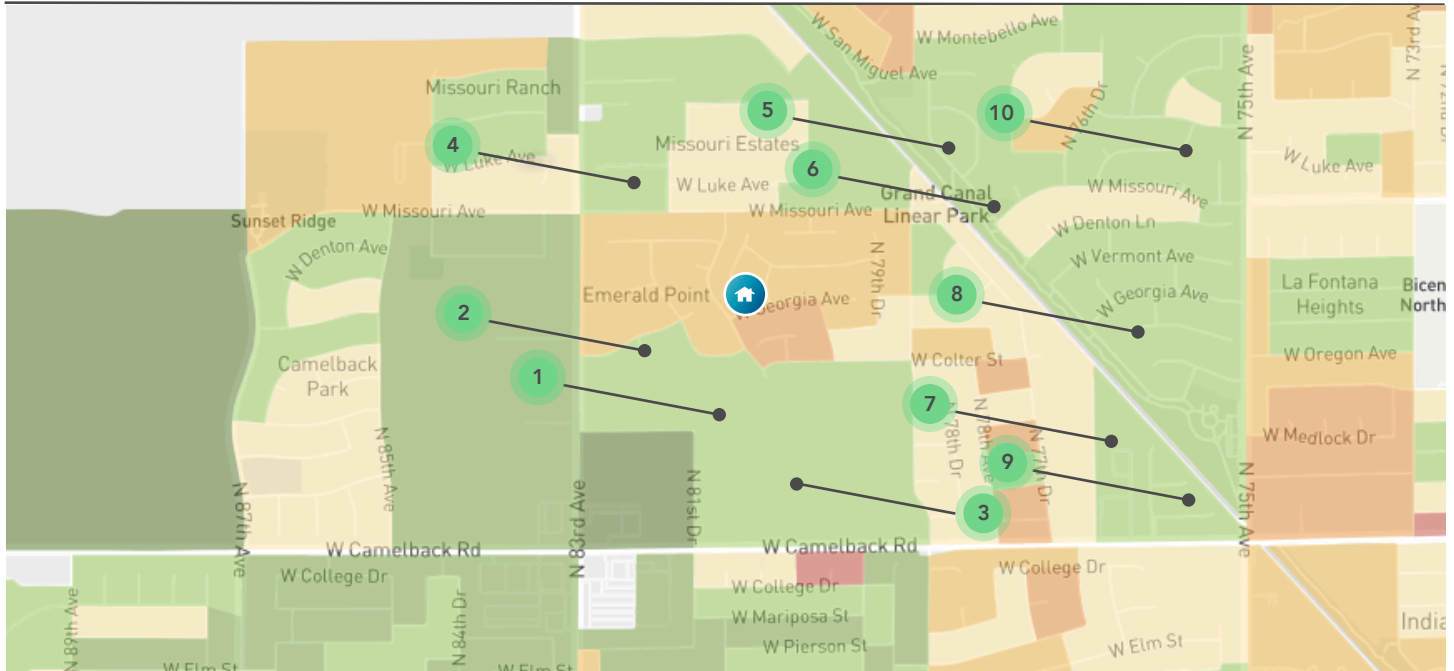
Bathroom

Only a few images from the MLS are displayed to give an assessment of the comparable. There maybe more images available on the MLS.

123 Main St Glendale, AZ 85305



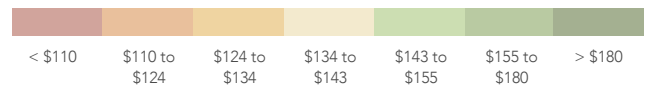
Recent Similar Sales



Similarity

● High Similarity
 ● Moderate Similarity
 ● Low Similarity
 🏠 Subject

\$/Sq.Ft.



#	Similarity	Distance	Property	Sale Price	Status	Sale Type	GLA	Beds	Baths	Age	Site Area
🏠 Subject		-	123 Main St.	-	-	-	2760	4	3.6	16	17,424 sf
1	● High	0.28mi	345 Main St Glendale, AZ 85303	\$413,000	Sold 01/2019	Arms Length	3,184	5	3	14	17,010 sf
2	● High	0.35mi	567 Main St. Glendale, AZ 85303	\$360,000	Sold 07/2018	Arms Length	3191	4	3.67	37	32,465 sf
3	● High	0.39mi	890 San Juan Ave Glendale, AZ 85403	\$445,000	Sold 07/2018	Arms Length	3,184	4	4	15	17,050 sf
4	● High	0.41mi	123 San Juan Ave Glendale, AZ 85403	\$462,000	Sold 08/2018	Arms Length	3,184	4	3.67	15	19,396
5	● High	0.66mi	6119 N 83rd Dr Glendale, AZ 85305	\$375,000	Sold 11/2018	Arms Length	2,769	4	3	17	12,999 sf
6	● High	0.07mi	8357 San Juan Ave. Glendale, AZ 85305	\$365,000	Sold 08/2018	Arms Length	2,291	3	2.67	16	17,702 sf
7	● High	0.4mi	8003 W San Miguel Ave Glendale, AZ 85303	\$380,000	Sold 08/2018	Arms Length	3,184	5	3.67	15	17,344 sf
8	● High	0.08mi	5479 N 83rd Dr Glendale, AZ 85303	\$389,066	Sold 07/2018	Arms Length	-	-	-	-	-
9	● High	0.04mi	8350 W Luke Ave Glendale, AZ 85305	\$360,000	Sold 05/2018	Arms Length	2,136	3	2	16	17,091 sf
10	● High	0.3mi	8035 W San Miguel Ave Glendale, AZ 85303	\$355,000	Sold 04/2018	Arms Length	2,494	3	3	14	17,010 sf

123 Main St Glendale, AZ 85305

Addendum

Superfund Site

Within 0 miles: 0**Within 1 miles:** 1

Detail 1:

- EPA Site ID: MOD007163108
- Link: <http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0700878>
- NPL Status: Deleted from the Final NPL
- Site Name: NORTH-U DRIVE WELL CONTAMINATION
- Updated Name: 2010-05-26

Detail 2:

- EPA Site ID: MOD007163108
- Link: <http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0700878>
- NPL Status: Deleted from the Final NPL
- Site Name: NORTH-U DRIVE WELL CONTAMINATION
- Updated Name: 2010-05-26

Within 4 miles: 0

Section: Neighborhood & Subject Marketability (page 2)

123 Main St Glendale, AZ 85305

Glossary

Days on Market

The current days on market is the average number of days since listing for all current listings on the market for the given geography. The calculation represents a 13-week rolling average to minimize rapid swings in the data.

Source: Local MLS, HouseCanary analysis

Market Rent Estimate

We value this property monthly rent at \$1,727. The sales price will likely fall between \$1,563 and \$1,890. This is HouseCanary's estimated rental value for this home. It is not a formal appraisal. This estimate is based on our market knowledge, and it should be used as a starting point to determine a home's rent.

Source: HouseCanary Analysis

Market Value Estimate

We value this property at \$445,500. This is HouseCanary's estimated market value for this home. It is not a formal appraisal. This estimate is based on our market knowledge, and it should be used as a starting point to determine a home's value.

Source: HouseCanary Analysis

Market Index

The market index is designed to measure supply versus demand at a local zip code level. The index ranges from 0-100 where values of 41-60 indicate a market in equilibrium (neutral). Values above 61 indicate that demand exceeds supply, and that the local area is a seller's market. Values below 41 indicate that supply exceeds demand, and that the local area is a buyer's market. Demand is measured using indicators such as sales volume, changes in listing prices, and days on market. Supply is measured using indicators such as inventory and the number of new listings.

Source: Local MLS, HouseCanary analysis

Market Status

The market status is the summary conclusion on the market index. Specifically whether the market is currently classified as a buyer's market, seller's market or neutral. For more details see market index definition.

Source: Local MLS, HouseCanary analysis

Months of Supply

The months of supply is a metric to reflect the pace at which listing inventory is turning over in the local market. The calculation reflects the total listings on the market divided by the 3-month rolling average of sales volume. Generally, less than 5 months of supply is considered inflationary due to the constrained nature of listings available for sale. A value greater than 7 months of supply is typically considered oversupplied and deflationary.

Source: Local MLS, HouseCanary Analysis

MSA 1yr risk of decline

The one year risk of decline is a proprietary HouseCanary metric that measures the probability that this market's median home prices will be lower 12 months from now than the current market median price. This one-year chance of loss is derived through HouseCanary's multivariate time series models using a combination of fundamental and technical indicators.

Source: Local MLS, HouseCanary Analysis

Comparable Properties

All nearby properties of the same property and sales type.

Source: Public Record HouseCanary analysis

123 Main St Glendale, AZ 85305



Glossary Continued

Non-disclosure state

In most non-disclosure states (or counties) both transaction sales price and date are not available to the general public. This data is not available because either the transaction details are not required or cannot legally be disclosed to the public. As a result, HouseCanary relies on different data to provide information such as comparable properties in our Agile Evaluation.

When a request for a Agile Evaluation occurs in a non-disclosure area, HouseCanary uses listing information to populate comparable properties in the recent similar, active and historical sections of the report. Specific fields will change in these sections, for example in recent similar listings, sales price will be replaced with listed price.

The following fourteen states are considered non-disclosure: Alaska, Idaho, Indiana, Kansas, Louisiana, Mississippi, Missouri (certain counties), Montana, New Mexico, North Dakota, Texas, Utah and Wyoming.

Source: Public Record, MLS

Owner Occupancy

Owner occupancy indicates whether the owner of the home is the primary resident.

Source: Public Record

Property Type

Property Type indicates the classification of the building based upon public record information. HouseCanary has normalized property type information into five groupings: Single Family Detached, Condominium, Townhouse, Manufactured/Mobile Home and Income Generating Property. Note that buildings that do not fall into these categories, i.e. apartment houses, highrise apartments, etc. will not be mapped into one of these categories.

Source: Public Record

Recent Similar Sales

Similar comparables within a 1-year timeframe close to the subject property.

Source: Public Record, HouseCanary analysis

Similarity Level

HouseCanary proprietary score calculated via multivariate analysis using a combination of geographic information and key property characteristics such as bedrooms, square footage, lot size, etc. The measure defines similarity of comparable properties relative to the subject property.

Source: Public Record, MLS, HouseCanary analysis

Valuation Suitability Score

HouseCanary's valuation suitability score is measured in percentage terms relative to the estimated price. This score allows for comparison of accuracy on two or more properties regardless of the magnitude of the individual price estimates. Formally, if the Valuation Suitability Score is X and the estimated price is P, then the lower price bound approximately equals $P * (X/100)$ and the upper price bound approximately equals $P * (2 - (X/100))$. Scores over 85 imply high model accuracy, scores between 70-85 imply average model accuracy, and scores below 70 imply low model accuracy

Source: Public Record, Local MLS, HouseCanary analysis

123 Main St Glendale, AZ 85305

Data Sources

HouseCanary accesses up-to-date data from county recorders and local MLS's. Recency of certain data is reflected by the effective date on the report. We use this data combined with HouseCanary proprietary analytics to bring you the most comprehensive, simple and accurate Agile Evaluation for every property.

For questions, please contact HouseCanary at support@housecanary.com.

Disclaimer

This report is designed to meet the requirements to be considered an evaluation as outlined in the 2010 Interagency Guidelines, which requires that an evaluation at a minimum:

- Identify the location of the property.
- Provide a description of the property.
- Provide an estimate of the property's market value in its actual physical condition, use and zoning designation as of the effective date of the evaluation (that is, the date that the analysis was completed), with any limiting conditions.
- Describe the method(s) the institution used to confirm the property's actual physical condition and the extent to which an inspection was performed.
- Describe the analysis that was performed and the supporting information that was used in valuing the property.
- Describe the supplemental information that was considered when using an analytical method or technological tool.
- Indicate all source(s) of information used in the analysis, as applicable, to value the property, including:
 - External data sources (such as market sales databases and public tax and land records);
 - Property-specific data (such as previous sales data for the subject property, tax assessment data, and comparable sales information);
 - Evidence of a property inspection;
 - Description of the neighborhood;
 - Local market conditions.

Data contained in this report was obtained from public records, such as tax assessment and recorder data, as well as private record sources, such as MLS and other such sources for the area (when available). Sources used for data in this report are considered reliable and customarily relied upon in the normal course of valuation practice.

As specified in Appendix B of the Interagency Guidelines, an evaluation can be based on analytic methods or technological tools. This report is an evaluation using those specified methods/tools. The methodology for the analytics can be found at: <https://www.housecanary.com/property-valuation-method>. Since the valuation of this property is not based on an appraiser's inspection, it is recommended that the client has the requisite expertise to manage and validate technological tools, as required by Appendix B of the 2010 Interagency Guidelines.

Unless indicated otherwise, the condition of the subject property is determined based on an inspector viewing and photographing the property from the street. An industry standard condition rating (C1-C6) is provided by the inspector. The property has not been inspected beyond the views provided in the photographs. For properties that are "exterior only", no interior inspection of the subject is performed. If a later interior inspection indicates a substantially different condition rating, a different valuation may result.

123 Main St Glendale, AZ 85305

Condition Rating

Appendix D: Field-Specific Standardization Requirements of Fannie Mae and Freddie Mac Uniform Appraisal Dataset Specification.

- C1** The improvements have been very recently constructed and have not previously been occupied. The entire structure and all components are new and the dwelling features no physical depreciation.
Note: Newly constructed improvements that feature recycled materials and/or components can be considered new dwellings provided that the dwelling is placed on a 100 percent new foundation and the recycled materials and the recycled components have been rehabilitated/re-manufactured into like-new condition. Improvements that have not been previously occupied are not considered “new” if they have any significant physical depreciation (that is, newly constructed dwellings that have been vacant for an extended period of time without adequate maintenance or upkeep).
-
- C2** The improvements feature no deferred maintenance, little or no physical depreciation, and require no repairs. Virtually all building components are new or have been recently repaired, refinished, or rehabilitated. All outdated components and finishes have been updated and/or replaced with components that meet current standards. Dwellings in this category either are almost new or have been recently completely renovated and are similar in condition to new construction.
Note: The improvements represent a relatively new property that is well-maintained with no deferred maintenance and little or no physical depreciation, or an older property that has been recently completely renovated.
-
- C3** The improvements are well-maintained and feature limited physical depreciation due to normal wear and tear. Some components, but not every major building component, may be updated or recently rehabilitated. The structure has been well-maintained.
Note: The improvement is in its first-cycle of replacing short-lived building components (appliances, floor coverings, HVAC, etc.) and is being well-maintained. Its estimated effective age is less than its actual age. It also may reflect a property in which the majority of short-lived building components have been replaced but not to the level of a complete renovation.
-
- C4** The improvements feature some minor deferred maintenance and physical deterioration due to normal wear and tear. The dwelling has been adequately maintained and requires only minimal repairs to building components/mechanical systems and cosmetic repairs. All major building components have been adequately maintained and are functionally adequate.
Note: The estimated effective age may be close to or equal to its actual age. It reflects a property in which some of the short-lived building components have been replaced, and some short-lived building components are at or near the end of their physical life expectancy; however, they still function adequately. Most minor repairs have been addressed on an ongoing basis resulting in an adequately maintained property
-
- C5** The improvements feature obvious deferred maintenance and are in need of some significant repairs. Some building components need repairs, rehabilitation, or updating. The functional utility and overall livability are somewhat diminished due to condition, but the dwelling remains useable and functional as a residence.
Note: Some significant repairs are needed to the improvements due to the lack of adequate maintenance. It reflects a property in which many of its short-lived building components are at the end of or have exceeded their physical life expectancy, but remain functional.
-
- C6** The improvements have substantial damage or deferred maintenance with deficiencies or defects that are severe enough to affect the safety, soundness, or structural integrity of the improvements. The improvements are in need of substantial repairs and rehabilitation, including many or most major components.
Note: Substantial repairs are needed to the improvements due to the lack of adequate maintenance or property damage. It reflects a property with conditions severe enough to affect the safety, soundness, or structural integrity of the improvements.



AGILE INSIGHTS

Automated Valuation Model Report



Property Location

209 Churchwardens Rd
Baltimore, MD 21212

Value Estimate

\$695,200

Client Name

HouseCanary

Effective Date

09/09/2022

209 Churchwardens Rd Baltimore, MD 21212



HouseCanary Value
Average Confidence (83%)
0.17 FSD

\$695,200

\$267.38 / Sq.Ft



HouseCanary Rental Value
High Confidence (89%)
0.11 FSD

\$3,682

\$1.42 / Sq.Ft



Subject

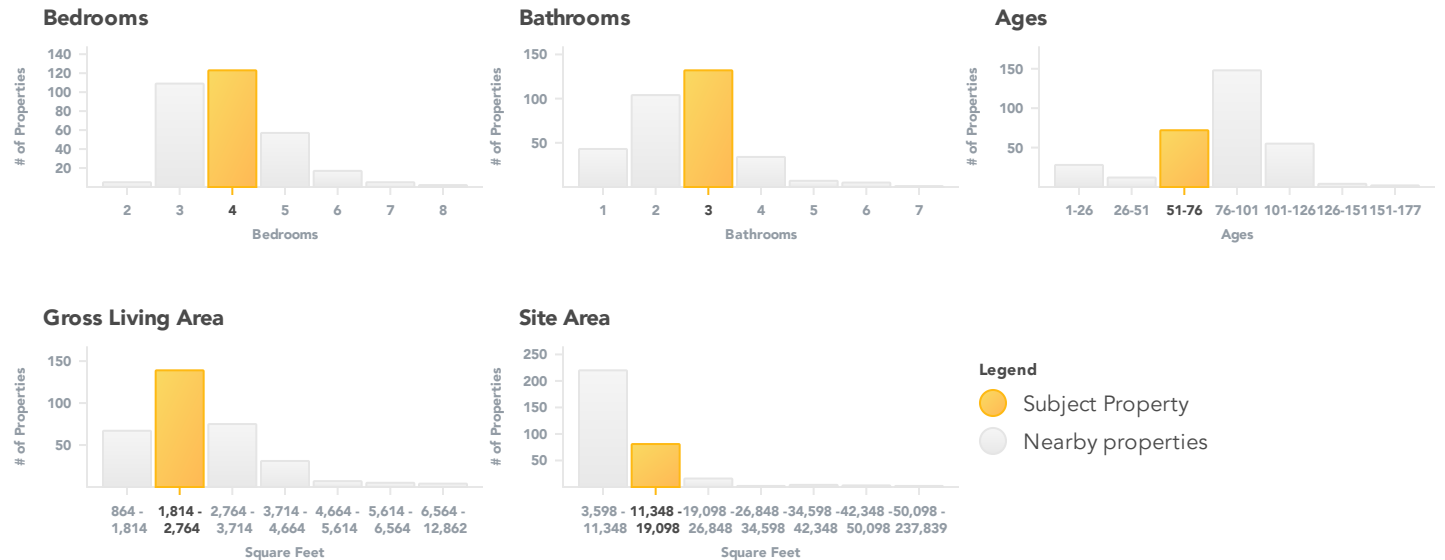
APN # 27-68-4983B-019

Property Type	Single Family-Detached	Occupancy Type	Owner
Beds / Baths	4 Bd / 3.5 Ba	HOA Fee	-
GLA / Lot Size	2,600 sf / 11,395 sf	HOA Fee Includes	-
Year Built	1949		

Transaction History

Event	Date	Price	Source	Type
Sold	03/16/2017	\$450,000	BRIGHTMLS	Non-Distressed
Pending	01/29/2017	-	BRIGHTMLS	-
Listed	04/19/2016	\$479,900	BRIGHTMLS	-
Listed	04/19/2016	\$536,900	BRIGHTMLS	-

Subject's Comparability to Market



209 Churchwardens Rd Baltimore, MD 21212

Competitive Closed Sales

	Subject	Sold 1	Sold 2	Sold 3	Sold 4
Street Address	209 Churchwardens Rd Baltimore, MD 21212	5203 N Charles St Baltimore, MD 21210	5424 Springlake Way Baltimore, MD 21212	316 Broxton Rd Baltimore, MD 21212	5212 Tilbury Way Baltimore, MD 21212
Miles to Subject	-	0.55	0.10	0.38	0.47
Subdivision	Homeland	Homeland	Homeland	Homeland	Homeland
Similarity	-	High	High	High	High
Sales Type	Arms length sale	Arms length sale	Arms length sale	Arms length sale	Arms length sale
Location	-	Similar	Superior	Similar	Similar
Year Built	1949	1979	1948	1929	1929
Gross Living Area	2,600 sf	2,592 sf	2,368 sf	3,128 sf	2,313 sf
Beds/Baths	4 / 3.5	4 / 3.5	3 / 3.0	4 / 3.5	5 / 2.5
Lot Size	11,395 sf	17,593 sf	10,593 sf	8,319 sf	9,404 sf
Basement	Yes	Yes	Yes	Yes	Yes
Pool	No	No	No	No	No
Condition	Well Maintained	Well Maintained	Excellent	Excellent	Excellent
List Date	04/19/2016	11/09/2021	06/10/2022	03/05/2022	05/07/2022
List Price	\$479,900	\$699,900	\$689,000	\$675,000	\$699,000
Sale Date / DOM	03/16/2017 / 288	03/31/2022 / 105	08/01/2022 / 5	04/25/2022 / 4	07/14/2022 / 36
Sale Price	\$450,000	\$660,000	\$706,000	\$690,000	\$675,000
Net Adjustment		-\$33,230 (-5%)	\$7,433 (1%)	\$1,246 (0%)	\$22,758 (3%)
Adjusted Sale Price		\$626,770	\$713,433	\$691,246	\$697,758

209 Churchwardens Rd Baltimore, MD 21212

Competitive Listings

	Subject	Pending 1	Active 2	Active 3	Active 4
Street Address	209 Churchwardens Rd Baltimore, MD 21212	5702 Saint Albans Way Baltimore, MD 21212	5507 Springlake Way Baltimore, MD 21212	5417 Springlake Way Baltimore, MD 21212	5607 Purlington Way Baltimore, MD 21212
Miles to Subject	-	0.28	0.10	0.16	0.13
Subdivision	Homeland	Homeland Historic District	Greater Homeland Historic District	Homeland	Greater Homeland Historic District
Similarity	-	High	High	Moderate	Moderate
Sales Type	Arms length sale	Pending	Active	Active	Active
Location	-	Similar	Similar	Similar	Similar
Year Built	1949	1983	1952	1946	1958
Gross Living Area	2,600 sf	3,422 sf	2,164 sf	2,250 sf	3,567 sf
Beds/Baths	4 / 3.5	4 / 2.5	3 / 3.5	3 / 3.0	4 / 3.0
Lot Size	11,395 sf	8,886 sf	13,494 sf	10,985 sf	9,683 sf
Basement	Yes	Yes	Yes	Yes	Yes
Pool	No	No	No	No	No
Condition	Well Maintained	Excellent	Well Maintained	Excellent	Excellent
List Date	04/19/2016	09/06/2022	07/14/2022	08/27/2022	04/21/2022
List Price	\$479,900	\$749,000	\$624,990	\$695,000	\$734,900
Last Sale Date / DOM	03/16/2017 / 288	09/30/2020 / 3	06/28/2004 / 57	04/01/2022 / 13	01/16/2020 / 141
Last Sale Price	\$450,000	\$679,000	-	\$425,000	\$370,000
Net Adjustment		-\$23,088 (-3%)	\$89,513 (14%)	\$109,601 (16%)	-\$20,672 (-3%)
Adjusted List Price		\$725,912	\$714,503	\$804,601	\$714,228

209 Churchwardens Rd Baltimore, MD 21212



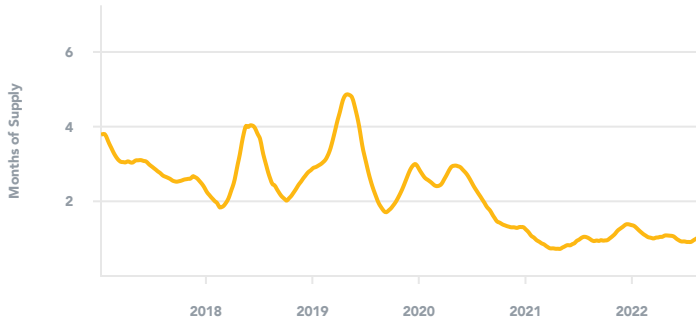
Neighborhood & Subject Marketability

Neighborhood Price Range \$25,000 to \$4,200,000

MSA 1-Year Risk of Decline 5.1% very low

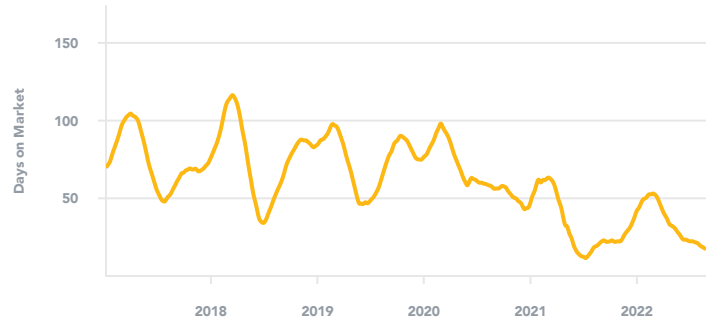
Probability this market's median home prices will be lower 12 months from the current market median price.

Months of Supply - ZIP



This month last year **1.0** This month **1.1**

Days on Market - Sold or De-listed Properties



This month last year **36** This month **48**

Conclusion

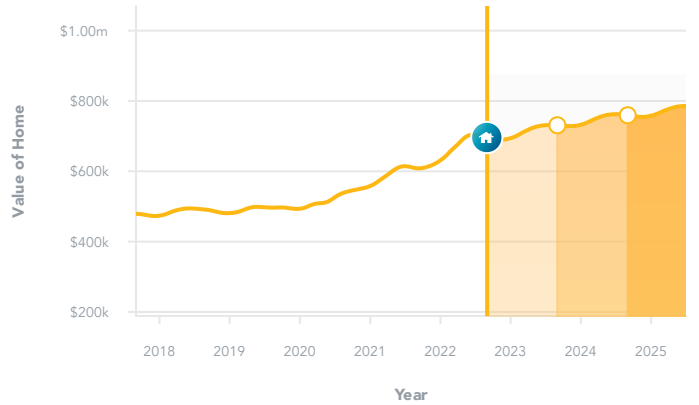
Market Index



This month last year **89** This month **85** Market Status **Strong Seller's Market**

● Strong Seller's ● Seller's ● Neutral ● Buyer's ● Strong Buyer's

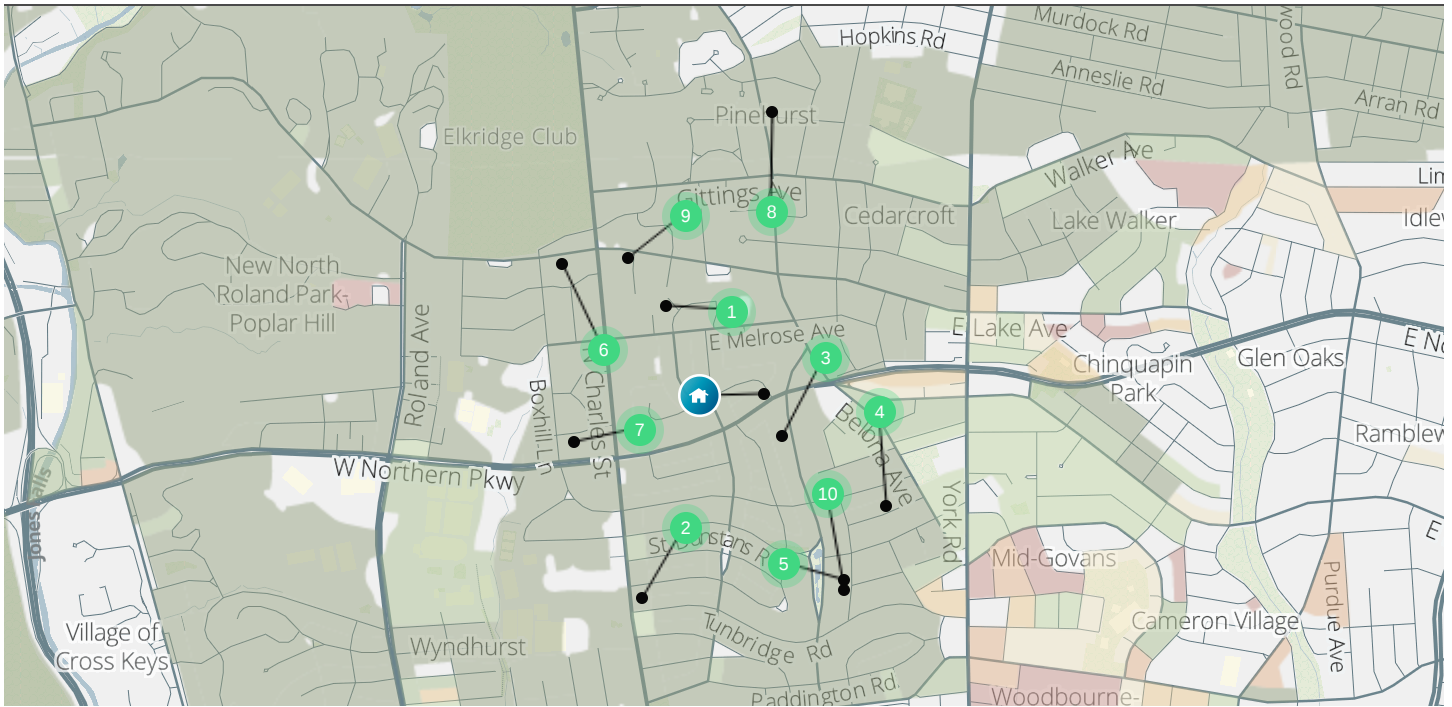
HouseCanary Forecast for Subject



3 Year Growth

1 Year	+5%	2 Year	+9%	3 Year	+13%
2023	\$731,013	2024	\$759,445	2025	\$785,762

209 Churchwardens Rd Baltimore, MD 21212

Recent Similar Sales

Similarity
● High Similarity
 ● Moderate Similarity
 ● Low Similarity
 ● Subject

\$/Sq.Ft.


#	Dist. (mi)	Property	Sale Price	Status	Sale Type	GLA (sf)	Beds	Baths	Age (y)	Site Area (sf)
●	-	209 Churchwardens Rd	\$450,000	-	Arms length sale	2,600	4	3.5	73	11,395 sf
● 1	0.30	5702 Downing Pl Baltimore, MD 21212	\$615,000	Sold 01/2022	Arms length sale	2,693	4	3.5	37	9,713 sf
● 2	0.55	5203 N Charles St Baltimore, MD 21210	\$660,000	Sold 03/2022	Arms length sale	2,592	4	3.5	43	17,593 sf
● 3	0.10	5424 Springlake Way Baltimore, MD 21212	\$706,000	Sold 08/2022	Arms length sale	2,368	3	3	74	10,593 sf
● 4	0.38	316 Broxton Rd Baltimore, MD 21212	\$690,000	Sold 04/2022	Arms length sale	3,128	4	3.5	93	8,319 sf
● 5	0.47	5212 Tilbury Way Baltimore, MD 21212	\$675,000	Sold 07/2022	Arms length sale	2,313	5	2.5	93	9,404 sf
● 6	0.55	9 W Lake Ave Baltimore, MD 21210	\$500,000	Sold 06/2022	Arms length sale	2,640	3	3	63	12,292 sf
● 7	0.45	11 Tamworth Rd Baltimore, MD 21210	\$742,500	Sold 03/2022	Arms length sale	2,430	4	3.5	81	10,872 sf
● 8	0.64	202 Midhurst Rd Baltimore, MD 21212	\$617,500	Sold 10/2021	Arms length sale	2,735		3	54	21,135 sf
● 9	0.44	7 E Lake Ave Baltimore, MD 21212	\$510,000	Sold 06/2022	Arms length sale	2,508	5	3	63	10,959 sf
● 10	0.49	5208 Tilbury Way Baltimore, MD 21212	\$573,000	Sold 06/2022	Arms length sale	2,453	3	2.5	93	9,456 sf

209 Churchwardens Rd Baltimore, MD 21212



Glossary

Comparable Properties

All nearby properties of the same property and sales type that have been ranked according to their similarity to the subject property's locational and physical characteristics.

Source: Public Record, HouseCanary analysis

Days on Market (DOM)

The average number of days since listing for all current property listings on the market for the given geography. The calculation represents a 13-week rolling average to minimize rapid swings in the data.

Forecast Standard Deviation (FSD)

A statistical measure of model uncertainty in the value estimate generated by the AVM. Lower values of FSD imply less uncertainty in the value estimate. FSD is measured in percentage terms relative to the value estimate to allow for comparison of model uncertainty across multiple properties, regardless of the actual dollar value of those individual estimates. FSD below 0.15 implies high model confidence, FSD between 0.15-0.3 implies average model confidence, and FSD above 0.3 implies low model confidence.

Source: House Canary analysis

Market Index

Designed to measure supply versus demand at a local zip code level. The index ranges from 0-100 where values of 41-60 indicate a market in equilibrium (neutral). Values above 61 indicate that demand exceeds supply, and that the local area is a seller's market. Values below 41 indicate that supply exceeds demand, and that the local area is a buyer's market. Demand is measured using indicators such as sales volume, changes in listing prices, and days on market. Supply is measured using indicators such as inventory and the number of new listings.

Source: Local MLS, HouseCanary analysis

Market Rent Estimate

We value this property monthly rent at \$3,700. This is HouseCanary's estimated rental value for this home. It is not a formal appraisal. This estimate is based on our market knowledge, and it should be used as a starting point to determine a home's rent.

Source: HouseCanary analysis

Market Status

The market status is the summary conclusion on the market index, specifically identifying whether the market is currently classified as a buyer's market, seller's market or neutral. For more details see market index definition.

Source: Local MLS, HouseCanary analysis

Market Value Estimate

We value this property at \$695,000. This is HouseCanary's estimated market value for this home. It is not a formal appraisal. This estimate is based on our market knowledge, and it should be used as a starting point to determine a home's value.

Source: HouseCanary analysis

Months of Supply

A metric to reflect the pace at which listing inventory is turning over in the local market. The calculation reflects the total listings on the market divided by the 3-month rolling average of sales volume. Generally, less than 5 months of supply is considered inflationary due to the constrained nature of listings available for sale. A value greater than 7 months of supply is typically considered oversupplied and deflationary.

Source: Local MLS, HouseCanary analysis

MSA 1yr risk of decline

A proprietary HouseCanary metric that measures the probability that this market's median home prices will be lower 12 months from now than the current market median price. The one-year chance of loss is derived through HouseCanary's multivariate time series models using a combination of fundamental and technical indicators. Source: Local MLS, HouseCanary analysis

Source: Local MLS, HouseCanary analysis

209 Churchwardens Rd Baltimore, MD 21212



Glossary Continued

Non-disclosure state

In most non-disclosure states (or counties) both transaction sales price and date are not available to the general public. This data is not available because either the transaction details are not required or cannot legally be disclosed to the public. As a result, HouseCanary relies on different data to provide information such as comparable properties in this report.

When a request for this report occurs in a non-disclosure area, HouseCanary uses listing information to populate comparable properties in the recent similar, active and historical sections of the report. Specific fields will change in these sections, for example in recent similar listings, sales price will be replaced with listed price.

The following thirteen states are considered non-disclosure: Alaska, Idaho, Indiana, Kansas, Louisiana, Mississippi, Missouri, Montana, New Mexico, North Dakota, Texas, Utah and Wyoming.

Source: Public Record, MLS

Occupancy Type

HouseCanary surveys public record to report whether the subject is Owner or Tenant occupied. When public records reports the "Occupant" is the owner OR the public record "Owner Mailing Address" matches the subject address, the report states "Owner" as the "Occupancy Type". If the subject is reported as occupied, but the public record "Owner Mailing Address" does not match the subject address, "Occupancy Type" will be reported as "Tenant". Occupancy Type accuracy is not guaranteed.

Source: Public Record

Recent Similar Sales

Similar sales within a 1-year timeframe and a 1-mile radius to the subject property.

Source: Public Record, HouseCanary analysis

Similarity Level

HouseCanary proprietary score calculated via multivariate analysis using a combination of geographic information and key property characteristics such as bedrooms, square footage, lot size, etc. The measure defines similarity of comparable properties relative to the subject property.

Source: Public Records, MLS, HouseCanary analysis

Data Sources

HouseCanary accesses up-to-date data from county recorders and local Multiple Listing Service (MLS). Recency of certain data is reflected by the effective date on the report. We use this data combined with HouseCanary proprietary analytics to bring you the most comprehensive, simple and accurate Agile Insights for every property.

Disclaimer

This Agile Insights is provided solely for general business information purposes. No advisory, fiduciary or other relationship is created by any acceptance or use of this Agile Insights. The inclusion of this Agile Insights with any other materials does not constitute an endorsement by HouseCanary of any third party or any third party's products or services. The projected market, valuation and financial information, conclusions and other information contained in this Agile Insights are based upon tested methodologies for accuracy. However, such information and conclusions are not definitive forecasts, appraisals or opinions of valuations. All such information and conclusions are stated in terms of probability of likelihood based on market factors and information submitted to HouseCanary, and such information and conclusions are not guaranteed by HouseCanary and should not be construed as a certified appraisal or valuation, or investment advice, or relied upon for critical decision making. HouseCanary uses or has used public and/or confidential data and assumptions provided to HouseCanary by third parties, and HouseCanary has not independently verified the data and assumptions used in these analyses or data sets. Attributes for properties may be inaccurate because county assessor and MLS data does not always include recent additions and/or modifications to property structure. Changes in the underlying data or operating assumptions, or any loss of access to any one or more sources will clearly impact the analyses, information and conclusions set forth in this Agile Insights Report.