Solomon Adjustment Calculator

User Manual January 2025

Theory

Solomon is a suite of calculators that simplify the use of recognized methods in the sales grid. Six of the calculators are based on cost. Your subscription includes cost data licensed from Craftsman Book Company "National Building Cost 2025".

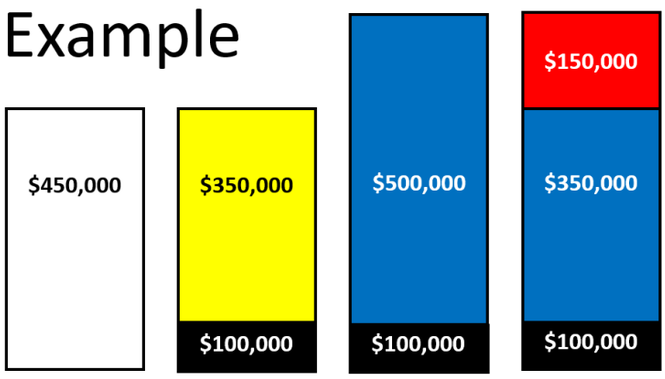
Solomon simplifies depreciated cost analysis. Depreciated cost is a recognized method[1] of developing adjustments in the sales grid.

The underlying concept is that real estate appraisers are engaged to develop an opinion of value that includes the site, "as-is" value of site improvements and the contributory value of the house. A key part of the analysis is the sales comparison grid, in which the appraiser applies adjustments to comparable sales. These adjustments reflect the contributory value of features of the house. If the house contributes 70% of its cost, and one more square foot of GLA costs $100, then a GLA adjustment of $70 is supported. If one more bath costs $10,000, an adjustment of $7,000 makes sense.

Here is an example: When a buyer and seller agree on a price of $450,000, an appraiser who knows land values should think of this as the buyer paying $100,000 for the site and $350,000 for the building. (Assume $100,000 includes "As-is value of Site Improvements.) The $350,000 amount is called the Contributory Value of the Improvements. An appraiser who goes the next step and applies unbiased 3rd party cost data to the building characteristics may find that the current replacement cost of the building is $500,000.

This means that depreciation is $150,000. Contributory Value is 70% of replacement cost. ($350,000 / $500,000).

The assumptions of Economic Age-Life Depreciation (assumed in the 1004) are:



1. Effective Age / Economic Life is the percentage of depreciation.

2. Economic Life – Effective Age is Remaining Economic Life.

3. Remaining Economic Life / Economic Life is the percentage of current replacement cost paid by the market.

Solomon will help you support assignment results like effective age and remaining economic life. Beyond that, Solomon will simplify your analysis of these assignment results and their relationship to sales grid adjustments.

Economic Age-Life Depreciation is the first of two key concepts you need to understand to properly apply depreciated cost analysis.

When remaining economic life is extracted from the market, we have a basis for developing market-based adjustments *if we handle published cost data correctly*.

GLA cost data is published as average cost. We need to compare total cost of GLA, just like we compare sale prices of two comps we are using for a paired sale adjustment.

Key Point

Assume we need to support a GLA adjustment for a 2400sf house. We have located two sales in MLS that are identical except for GLA. Comp 1 has 2500sf and Comp 2 has 2300sf.

	Market Value	GLA	Adjustment
Comp 1	$460,000	2500	
Comp 2	$446,000	2300	
	$14,000	200	$70

The adjustment is developed by dividing the change in market value by the change in GLA. In this case, $70.

This is a classic example of Paired Data analysis.

[1] The Appraisal of Real Estate 15th Edition p372

"Paired data analysis is based on the premise that when two properties are equivalent in all respects but one, the value of the single difference can be measured by the difference in price between the two properties."[2]

The logic is rock solid. Application of this logic is limited by the appraiser's ability to locate pairs that are 'equivalent in all respects but one.'

Depreciated cost analysis overcomes the 'sparse pair' problem.

If you are not able to find 'two properties equivalent in all respects but one' in MLS, there is another source of data that will provide the answer. This source is the cost manual.

If the average cost of 2500sf of GLA is $144/sf, and the average cost of 2300sf of GLA is $147.83/sf, we know that a change in GLA of 200sf results in a change in cost of $20,000.

	GLA Size	Avg Cost	Total Cost	Marginal Cost
Comp 1	2500	$144.00	$360,000	
Comp 2	2300	$147.83	$340,000	
Change	200		$20,000	$100.00

Key Point

The change in total cost divided by the change in GLA is the marginal cost of GLA.

Marginal cost is the additional cost incurred in the production of one more unit of a good or service[3]

When there is no depreciation, the contributory value is 100% of its cost. The marginal cost of a feature is the adjustment rate.

When there is depreciation, we need to combine the concept of marginal cost with economic age-life depreciation (assumed in the residential appraisal forms). If depreciation is 30%, then contributory value is 70%. If contributory value is 70% of cost, the GLA adjustment is $70.00. $100 x 70% is $70.

Key Point

Economic Age-Life Depreciation: "A method of estimating depreciation in which the ratio between the effective age of a building and its total economic life is applied to the current cost of the improvements to obtain a lump-sum deduction; also known as the age-life method."[4]

Economic Life: "The period over which improvements to real estate contribute to property value."[5]

Effective Age: "The age of property that is based on the amount of observed deterioration and obsolescence it has sustained, which may be different from its chronological age."[6]

Remaining Economic Life: "The estimated period over which existing improvements are expected to contribute economically to a property; an estimate of the number of years remaining in the economic life of a structure or structural components as of the effective date of the appraisal; used in the economic age-life method of estimating depreciation."[7]

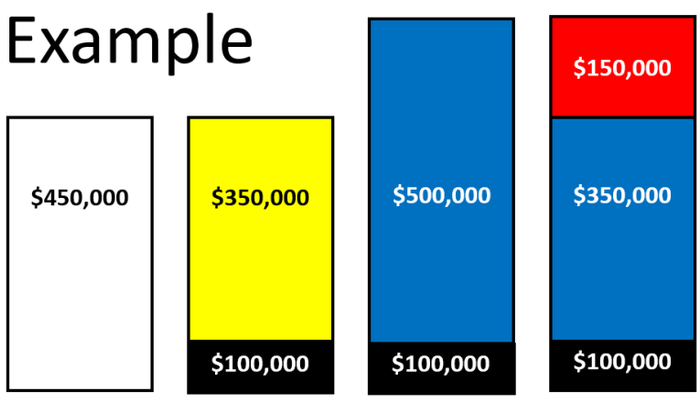
Recall our earlier example:

Depreciation is $150,000.

$150,000 / $500,000 = 30%

The contributory value of the building is $350,000. Replacement cost is $500,000.

$350,000 / $500,000 = 70%



[2] ibid
[3] Economics Online
[4] The Dictionary of Real Estate Appraisal 6th Edition
[5] ibid
[6] ibid
[7] ibid

If Economic Life is 60 years, and depreciation is 30%, Effective Age must be 18 years. 18/60 = 30%

If Effective Age is 18 years, Remaining Economic Life must be 42 years. 60 – 18 = 42.

Contributory value of the building, *as a percentage replacement cost,* is Remaining Economic Life / Economic Life.

42/60 = 70%

Depreciated cost is a recognized method of developing adjustments for the sales grid.[8] You need to start with a source of unbiased third-party cost data. The next step is to extract marginal cost from the cost manual. The third step is to extract depreciation from the market by completing the cost approach. Solomon automates all of this for you.

Sidekick uses the appraiser's estimates of Economic Life and Effective Age to calculate depreciated cost adjustments for GLA and sixteen other cost categories.

Solomon Adjustment uses the appraiser's estimate of Remaining Economic Life to calculate depreciated cost adjustments for GLA and nine other cost categories.

Solomon Cost extracts depreciation from the appraiser's estimate of market value and observed building characteristics to calculate depreciated cost adjustments for GLA and fifteen other cost categories.

Solomon Cost New is designed for new construction when there is no depreciation. Marginal replacement cost is calculated for GLA and thirteen other cost categories.

Solomon Site extracts site value from a comp sale price, building characteristics and the appraiser's estimate of effective age.

Solomon Manufactured calculates GLA and six other adjustments for manufactured housing.

Beyond cost related adjustments, Solomon provides tools you can use for adjustments that are not directly related to cost.

Solomon Market Time develops and documents market time adjustments by applying a rate of change to the interval between comparable contract date and report effective date. Rate of change is developed with secondary data (included) or $ per day.

Secondary Data applies survey data percentages to market value of comparable properties

Sensitivity Analysis finds and documents the correlation between adjusted sale price and unadjusted grid categories.

Forecast Analysis forecasts an acreage site value from acreage site sales, an improved parcel from GLA etc.

All Solomon calculators are web applications you access by subscription.

Monthly subscriptions are renewed automatically. There is no contract, and you may cancel your subscription at any time.

Annual subscriptions offer a savings of two months compared to monthly subscriptions. Annual subscriptions need to be renewed manually.

Solomon Plus includes all ten calculators.

The standard Solomon subscription *does not* include Sidekick, Secondary Data, Sensitivity Analysis or Forecast Analysis.

For any questions related to your subscription, contact info@solomonappraisalllc.com

For questions about appraisal related matters and the use of the Solomon calculators, contact Scott Cullen at scullen2@comcast.net

[8] The Appraisal of Real Estate 15th p362

Cost Data

Solomon licenses cost data from National Building Cost published by Craftsman Book Company. This means you do not need to pay separately for cost data. Solomon uses relevant data for each calculator in a streamlined manner. Quality and complexity assumptions are shown in Appendix B.

Cost data is comprised of a base cost, area modification factor and other factors. Solomon uses the term Zip Code Multiplier for Area Modification Factor. These are costs related to climate, material costs and labor rates that vary across the county. To bypass this cost modification, enter base instead of entering a zip code.

Other cost modifications are related to multiple builds, masonry construction etc. Solomon uses the term Factor for other factors. This is the quotation from National Building Cost:

"Note: Tract work and highly repetitive jobs may reduce the cost 8 to 12%. Add 4% to the square foot cost of floors above the second-floor level. Work outside metropolitan areas may cost 2 to 6% less. When the exterior walls are masonry, add 9 to 10% for class 2 and 1 structures and 5 to 8% for class 3, 4, 5 and 6 structures."

The Solomon interpretations of how these should applied are as follows:

Quality Rating	1	2	3	4	5	6
Multiple Builds	-12	-11	-10	-9	-8	-8
Masonry Construction	10	9	8	7	6	5

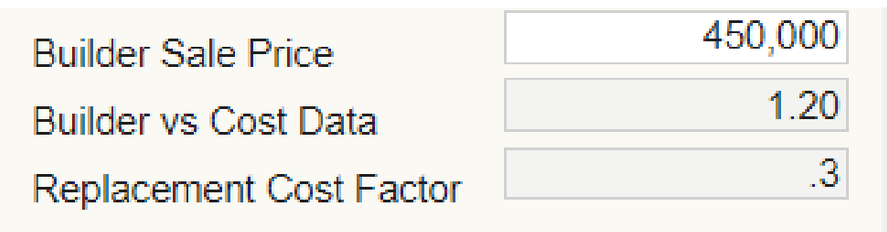
Use Factor to increase or decrease cost.

Factor can be used to account for multiple builds and masonry construction as shown above.

Factor can also be used to align effective age with your observation of the subject. If the house is 10 years old and Solomon Cost indicates effective age of 15 years, something is wrong. One possibility is Site Value or "As-is" Value of Site Improvements are too high. If you are confident of those numbers, the cost data may be too high. Using a negative value for the factor, such as -10, will lower effective age. A positive factor like 10 will increase effective age.

In **Solomon Cost**, when you are working with an estimate of value, factor does not change the adjustment rate. One dollar of cost will be offset by one dollar of depreciation.

Solomon Cost New can be used to extract a factor from your local market. In this example, if builder sale price is $450,000, enter 450,000 in the Builder vs Cost Data field. The replacement cost factor is .3 meaning that an increase of 30% in cost is required to match local builder cost.

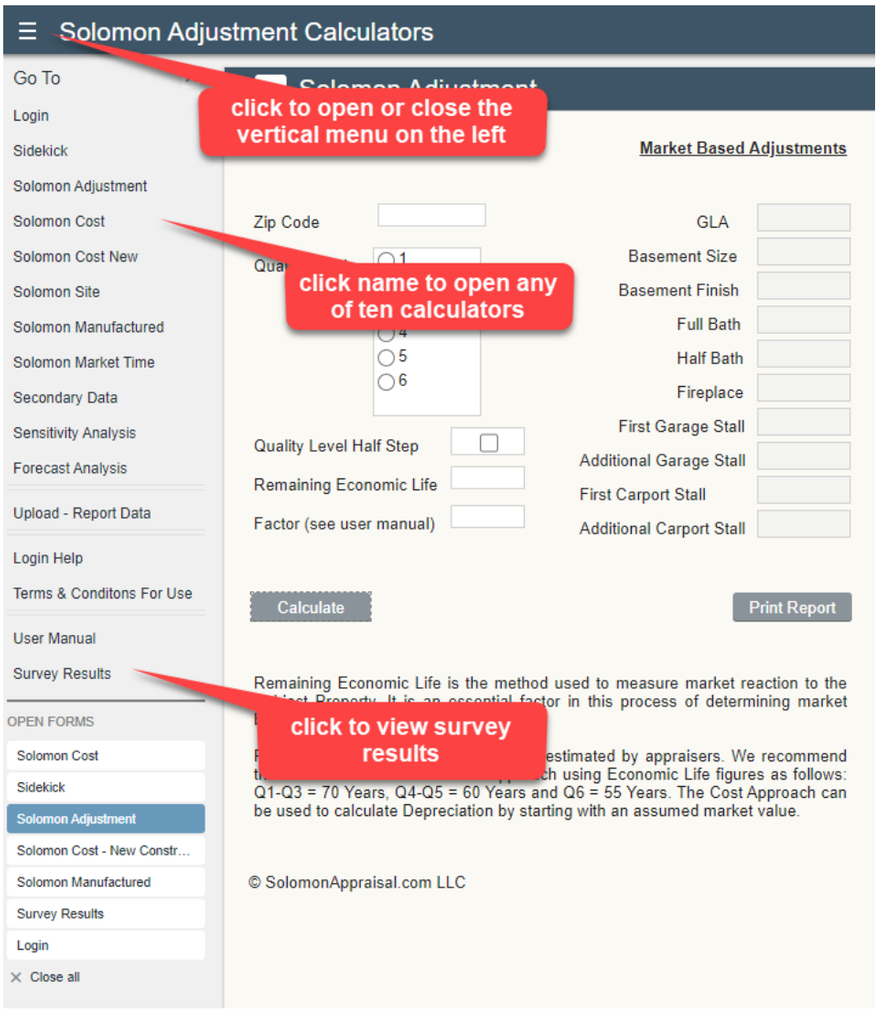


Navigation

Solomon Plus includes ten separate calculators.

Click the ‘hamburger’ to open or close the menu selections.

Click any calculator name



Click 'Survey Results' to view adjustments developed from peer consensus surveys.

Surveys are a form of secondary data. "Another form of data analysis—secondary data analysis—is used to support adjustments derived by other methods. This technique makes use of data that does not directly pertain to the subject or comparable properties. This secondary data describes the general real estate market and is usually collected by a data vendor research firm or government agency like the county assessor. Secondary data may need verification.[9]

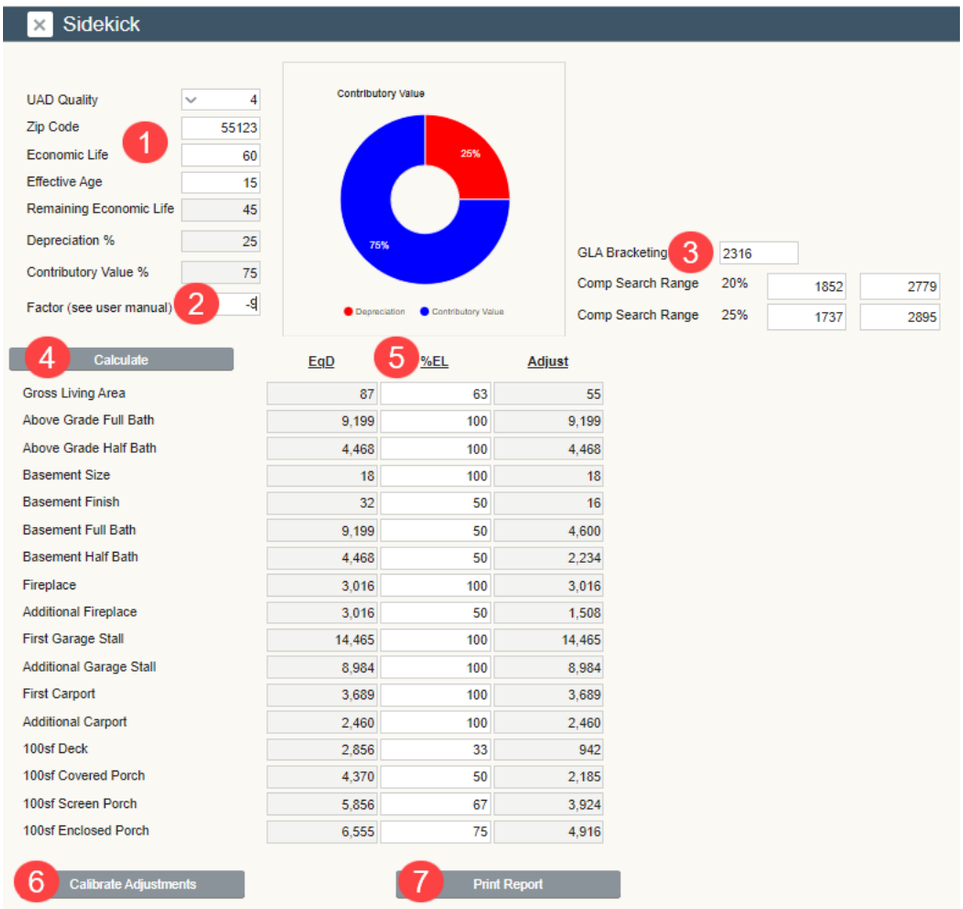
Survey results can be found at https://www.peerconsensus.com/survey-results/ These survey results are used to power the Secondary Data calculator.

[9] The Appraisal of Real Estate 15th Edition p373

Sidekick (Solomon Plus only)

1. Sidekick calculates depreciated cost adjustments from the appraiser's quality rating, zip code and estimates of Economic Life and Remaining Economic Life.

2. Cost data is comprised of a base cost, area modification factor and other factors. Solomon uses the term Zip Code Multiplier for area modification factor. These are costs related to climate, material costs and labor rates that vary across the county. To bypass this cost modification, enter base instead of entering a zip code.



Other cost modifications are related to multiple builds, masonry construction etc. This is the quotation from National Building Cost:

"Note: Tract work and highly repetitive jobs may reduce the cost 8 to 12%. Add 4% to the square foot cost of floors above the second-floor level. Work outside metropolitan areas may cost 2 to 6% less. When the exterior walls are masonry, add 9 to 10% for class 2 and 1 structures and 5 to 8% for class 3, 4, 5 and 6 structures."

Solomon interpretation follows:

Quality Rating	1	2	3	4	5	6
Multiple Builds	-12	-11	-10	-9	-8	-8
Masonry Construction	10	9	8	7	6	5

3. Enter subject GLA to get +/- 20% and +/- 25% MLS search criteria.

4. Click Calculate to see results.

5. %EL means percent of economic life. The default percentages shown work well for previously owned houses. Change these to fit your market.

6. Click Calibrate Adjustments for results.

7. Click Print report or screen shot to archive your calculations.

Sidekick works as follows:

1. Marginal Cost is extracted from unbiased 3rd party cost data for the appraiser's choice of quality rating.

2. Marginal Cost is matched to location and other factors by use of a Multiplier.

3. The percentage of Contributory Value is extracted from the appraiser's estimates of Economic Life and Effective Age.

4. Marginal Cost x % Contributory Value is the adjustment rate. These results are shown in the EqD column.

Note: The economic life of individual components of a building have different economic life than the building as a whole. Short lived items depreciate more quickly. For example, a deck has 20-year lifespan. This is 33% of 60 years, so the appraiser can account for this by entering 33 in the %EL column. Another example is a basement

bath which may have functional depreciation. %EL numbers are pre-filled in Sidekick but can be altered by the user.

“In applying the concepts of economic life, effective age, and remaining economic life expectancy, appraisers consider all elements of depreciation in one calculation. Therefore, the effective age estimate includes not only physical wear and tear but also any loss in value for functional and external considerations. This type of analysis is characteristic of the market extraction and economic age-life depreciation methods.”[10]

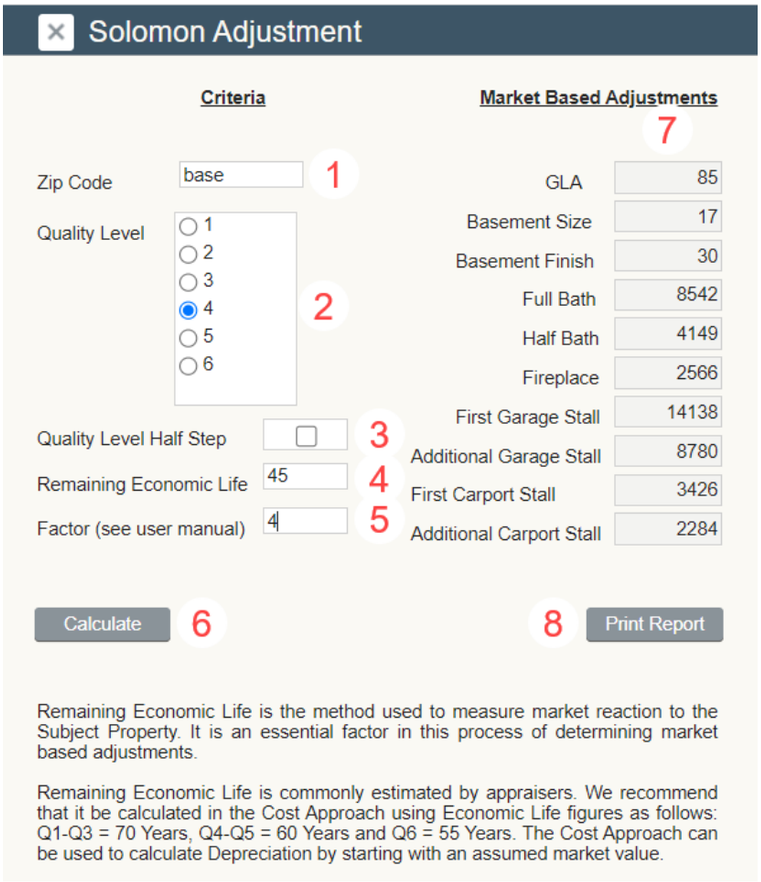
Explaining your adjustments:

Edit as necessary: “Building categories such as GLA, bath, basement, garage stall etc. are developed using the depreciated cost method. Marginal cost is extracted from unbiased, third-party cost data. Contributory value differs from cost due to depreciation. The contributory value percentage is developed from Effective Age and Economic Life. See Depreciated Cost Analysis Calculations page attached.” Use a screen capture tool to save the Sidekick calculations as a page in your report or in your workfile. Sidekick also provides the option of a pdf report.

[10] The Appraisal of Real Estate 15th Edition p561

Solomon Adjustment

Solomon Adjustment calculates depreciated cost adjustments from the appraiser's estimate of remaining economic life.



1. Enter 'base' if you do not want to use the published zip code multiplier. Otherwise, enter subject zip code.

2. Select subject quality rating. Q1 is highest and Q6 is lowest as in the UAD system. See page 27 for more on quality rating assumptions.

3. Click the box for a quality rating between two ratings. If you select Q3 and check the box, the calculator uses cost between Q3 and Q4.

4. Enter remaining economic life estimate. If you are doing a desktop on a 20-year-old Q4 that is rated average by the inspector, a remaining economic life of 40 is inferred by the scope of work and cost data. The cost data is built on the assumption of 60-year economic life for a Q4.

5. Enter a factor if you want to fine-tune cost per guidance from the cost data publisher. See page 5.

6. Click calculate, and values are shown at right. (7.)

8. Click Print Report to generate a dated report than can be printed or saved as a pdf.

Explaining your adjustments:

Edit as necessary: "Building categories such as GLA, bath, basement, garage stall etc. are developed using the depreciated cost method. Marginal cost is extracted from unbiased, third-party cost data. Contributory value differs from cost due to depreciation. The contributory value percentage is developed from Remaining Economic Life. See Depreciated Cost Analysis Calculations page attached." Use a screen capture tool to save the Solomon Adjustment calculations as a page in your report or in your workfile. Solomon Adjustment also provides the option of a pdf report.

Solomon Cost

1. Enter an estimate of market value. You are likely to change this number later in the process. Think of this as a hypothesis to be tested in the sales grid. If you are better able to estimate Effective Age, use Sidekick. If you are better able to estimate Remaining Economic Life, use Solomon Adjustment.

2. Enter your opinion of Site Value. One way to estimate site value is to extract it from the market using Solomon Site.

3. Enter "As-is" Value of Site Improvements. Refer to Survey Results for guidance.

4. Enter Zip Code. The cost data publisher lists local cost multipliers for most zip codes. The multiplier includes local labor, material and climate conditions that impact cost. The zip code multiplier can be bypassed by entering base for base cost.

5. Select quality rating. The licensed data includes 11 ratings which we include as 1, 1.5, 2, 2.5, 3 etc. One is highest and 6 is lowest.

6. Enter GLA square feet.

7. Select Yes or No for central air. If No is selected, complete fields 8 and 9 to indicate the square footage of heated space and cooled space.

10. Enter basement square feet.

11. Enter basement finish square feet.

12. Enter basement full bath count. GLA cost data includes bathrooms. Basement finish does not, so it is added separately.

13. Enter basement half bath count. GLA cost data includes bathrooms. Basement finish does not, so it is added separately.

14. Enter fireplace count including all fireplaces, above and below grade.

15. Enter total square footage of all decks. Decks are assumed to be a framed structure on a post foundation.

16. Enter total square footage of all covered porches. Covered porches have roof systems similar to the house.

17. Enter total square footage of all screen porches. Screen porches have roof systems similar to the house and are enclosed with screen.

18. Enter total square footage of all enclosed porches. Enclosed porches have roof systems similar to the house and are enclosed with windows.

19. Enter total square footage of garage, regardless of how many garage doors. Do not include accessory buildings such as a pole barn. A garage is oriented toward residential car storage. A pole barn with garage doors is an accessory building and classified as a site improvement.

20. Enter total square footage of all carports.

21. The Factor field is used to account for cost difference beyond the zip code multiplier.

Quoting from our licensed source of cost data, “National Building Cost”:

“Note: Tract work and highly repetitive jobs may reduce the cost 8 to 12%. Add 4% to the square foot cost of floors above the second-floor level. Work outside metropolitan areas may cost 2 to 6% less. When the exterior walls are masonry, add 9 to 10% for class 2 and 1 structures and 5 to 8% for class 3, 4, 5 and 6 structures.”

Solomon interpretation follows:

Quality Rating	1	2	3	4	5	6
Multiple Builds	-12	-11	-10	-9	-8	-8
Masonry Construction	10	9	8	7	6	5

In this case, -9 is used to account for 9% lower cost for repetitive builds in a subdivision.

22. Add a description for an additional feature together with its cost. Use this for items the owner has added such as an elevator, second kitchen, wet bar, sauna etc. These are features inside the house. Exterior features are considered site improvements.

23. Click the links for details on integration of Solomon and ClickFORMS.

24. Click Calculate and the Cost Approach appears top right.

25. Site value transfers from appraiser’s input in 2.

26. Dwelling is calculated from appraiser’s input for Zip Code 4, Quality 5, GLA 6 and Factor 21.

27. Basement total cost is calculated from 10-13.

28. Additional features are calculated as a total of 14 through 18.

29. Garage/Carport total cost is calculated from 19-20.
30. Total Estimate of Cost New is the sum of 26 through 29.
31. Depreciation is the difference between Total Estimate of Cost New 30 and Depreciated cost 32.
32. Depreciated Cost is Market Value 1 less Site Value 2 less Site Improvements 3.
33. As is Value - Site Improvements transfers from appraiser's input in 3.
34. Market Value Estimate transfers from appraiser's estimate of Market Value 1.
35. Economic Life corresponds to Quality rating in National Building Cost.
36. Effective Age is (Depreciation 31 /Total estimate of Cost New 30) x Economic Life. (90,098/350,098) x 60 = 15
37. Remaining Economic Life is Economic Life 35 less Effective Age 36. 60 – 15 = 45
38 Depreciation Percentage is Effective Age 36 divided by Economic Life 35. 15/60 = 25%
39. Percent Contributory Value is Remaining Economic Life 37 divided by Economic Life 35. 45/60 = 75%
40. Dwelling sf is Dwelling 26 / GLA sf 6. 225,123 / 1,400 = $160.80
41. Basement sf is Basement 27 divided by Basement sf 10. 82,144 / 1,400 = 58.67
42. Garage Carport sf is Garage/Carport 29 divided by Garage/Carport sf 19. 26,400 / 440 = 60.00

43. Default adjustments assume that all components of the house depreciate at the same rate. In this case, the contributory value is 75% of cost 39. Depreciated cost is 75% of Cost New. Remaining Economic Life is 75% of Economic Life.

44. The % of Econ Life column gives the appraiser the flexibility to account for components with lower economic life. If you agree with NAHB that a deck has a 20-year lifespan, use 33 (20 years is 33% of 60 years) to account for faster depreciation due to exposure to the elements (physical).

Remember that all forms of depreciation are included in the effective age of the house. If you believe that a basement bath has functional depreciation making it worth 50% of a GLA bath, enter 50.

The % of Econ Life fields are set according to my estimates in the Minneapolis / St Paul market. Change these percentages to fit your market.

The GLA percentage of 63 is based on a survey result of appraisers who use Solomon. GLA includes 20-year roof, 10 year paint, 10 year carpet, 25 year HVAC etc. so it makes sense that GLA depreciates faster than the structure as a whole.

45. Calibrated Adjustment is Default adjustment 43 x % Econ Life 44.

46. Click Print Report for a hard copy or pdf of the calculator results.

Explaining You Adjustments

“Adjustments for building characteristics are developed with the depreciated cost method. See page three Adjustment Calculations and the Depreciated Cost Adjustments summary attached.”

Page 3 Additional Comments.

Adjustment Calculations: Adjustments for building cost categories such as GLA, bath count, basement size, basement finish sf, garage count and fireplace count are based on the amount they contribute to value.

Depreciated replacement cost is the amount that the building contributes to site value. Depreciation is x%, so the market is paying y% of replacement cost for the buildings. See Depreciation Calculation attached which includes the y% factor applied to relevant cost categories.

I include a screenshot of Solomon Cost calculations by inserting a page titled “Depreciated Replacement Cost Adjustment Calculations”.

People have asked how depreciated cost adjustments show market reaction. When depreciation is extracted from the market, depreciated cost adjustments are market based.

Solomon Cost New

Solomon Cost New is designed for new construction assignments where there is no depreciation.

1. Enter site value, site improvements and building characteristics.

2. Enter Builder Sale Price.

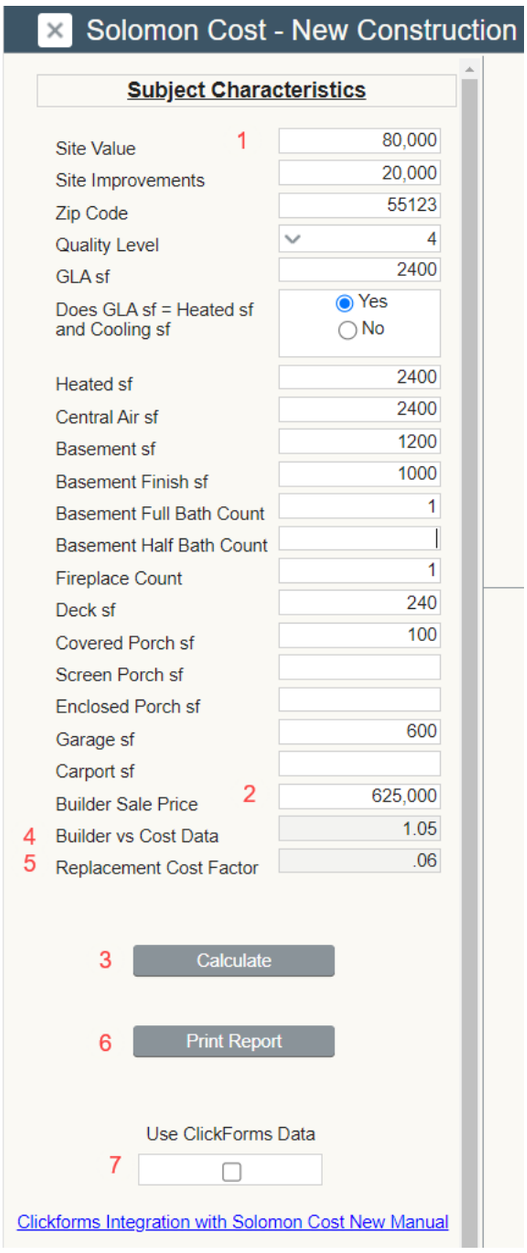
3. Click Calculate to get results.

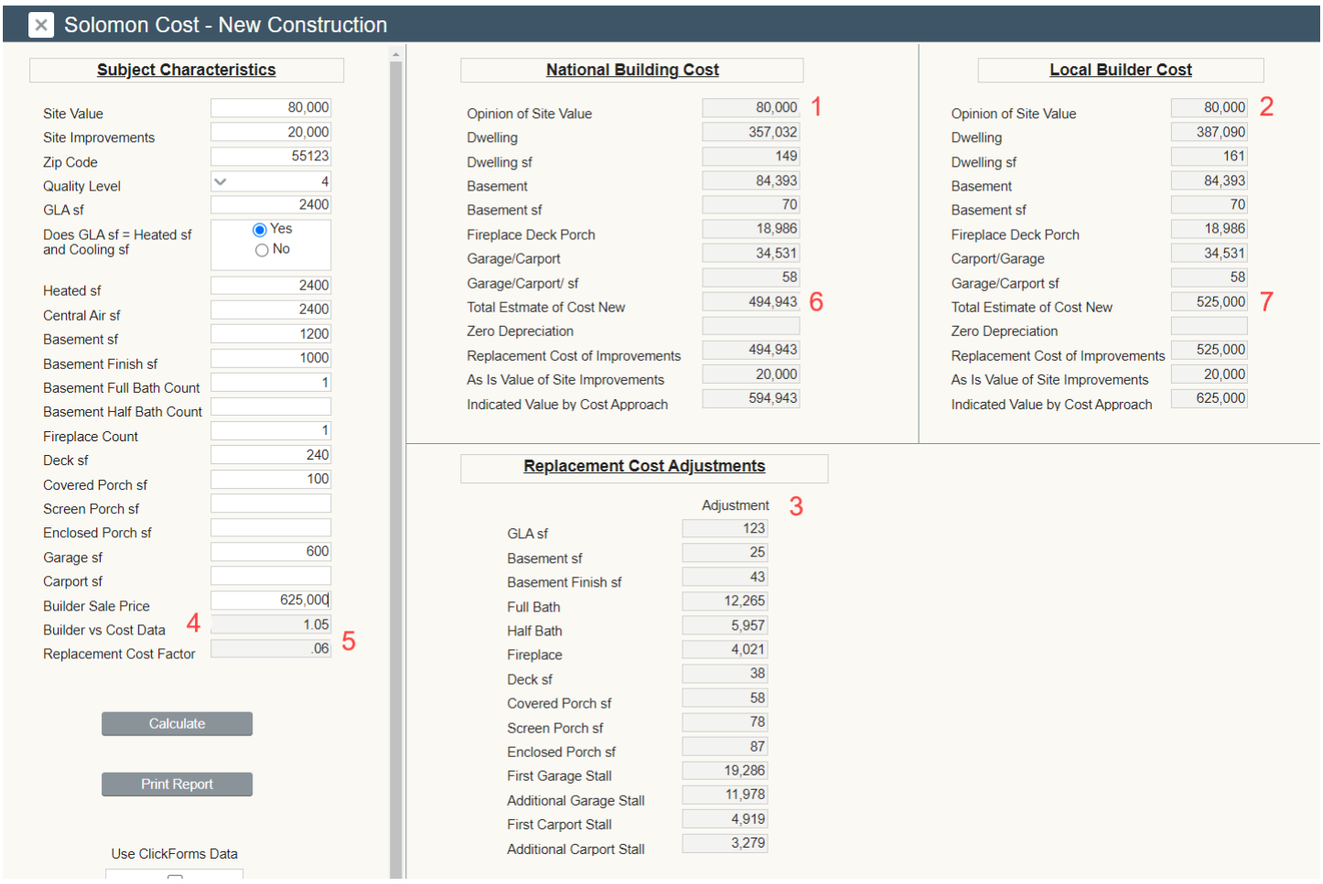
4. In this case, the Builder Sale Price is 105% of published replacement cost data. We license cost data from National Building Cost. Following are their comments about the accuracy and intended use of the data: "Costs in the tables include all construction costs: labor, material, equipment, plans, building permit, supervision, overhead and profit." "This manual will be a useful reference for anyone who must develop budget estimates or replacement costs for buildings. Anyone familiar with construction estimating understands that even very competent estimators with complete working drawings, full specifications and precise labor and material costs can disagree on the cost of a building. Frequently exhaustive estimates for even relatively simple structures can vary 10% or more. The range of competitive bids on some building projects is as much as 20%. Estimating costs is not an exact science and there's room for legitimate disagreement on what the "right" cost is. This manual cannot help you do in a few minutes what skilled estimators may not be able to do in many hours. This manual will help you determine a reasonable replacement or construction cost for most buildings. It is not intended as a substitute for judgment or as a replacement for sound professional practice but should prove a valuable aid to developing an informed opinion of value." Builders do not use cost data to establish selling prices. The market sets the selling price.

5. Difference in replacement cost (no site or site improvements).

6. Click to print a pdf file you can save in your workfile on paper or digitally.

7. Solomon Cost New integrates with ClickFORMS by pulling building characteristics into Solomon Cost New.





Neither the Builder nor the market use published cost data. Rather, cost data is compiled from builder survey data, permit data of completed projects and other sources. The calculator will show 1004 Cost Approach data two ways. Top center 1 you will see cost approach data straight from the National Building Cost Manual. On the right, 2 you will see the National Building Cost Manual Data reconciled to the local builder cost. The Local Builder Cost data is used to calculate replacement cost adjustments bottom center 3.

Builder vs Cost Data 4 is the percentage of published cost plus site and site improvements at which the builder is performing.

Replacement Cost Factor 5 is the percentage difference between replacement cost from National Building Cost 6 and Local Builder Cost 7.

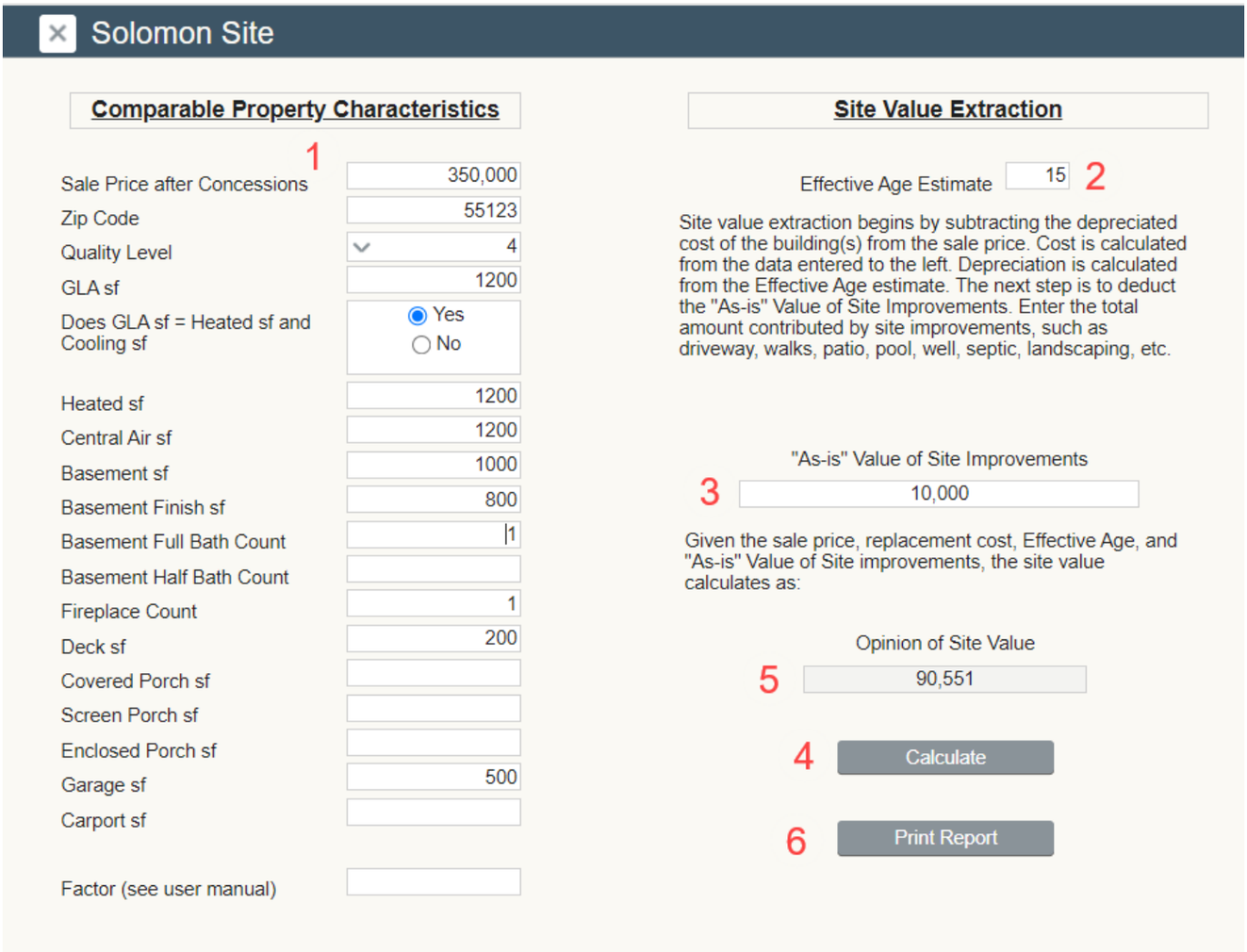
The Replacement Cost Factor 5 can be used as a cost multiplier from your market, keeping your cost calculations up to date and local.

Explaining Your Adjustments

Adjustments for building categories are developed by extracting marginal cost from published average cost data. Marginal cost is the cost of one more unit of production such as one more square foot, one more bath, one more garage stall etc.

Solomon Site

Solomon Site is a market extraction tool. The idea is to choose a comparable sale with similar site characteristics and subtract the depreciated cost of the improvements. You will be left with the total of Site Value and “As-is” Value of Site Improvements. Subtract site improvements and you have site value. Depreciated cost of the improvements is replacement cost after depreciation has been deducted. Depreciation is calculated from the appraiser’s estimate of effective age.



1. Enter the property characteristics of the comparable sale on the left.

2. Enter your estimate of effective age.

3. Enter your estimate of the “As-is” Value of Site Improvements.

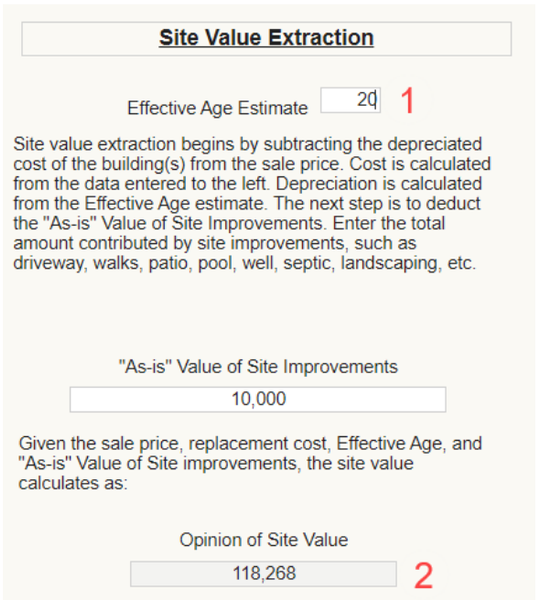
4. Click Calculate

5. The assumptions will resolve to the site value.

6. Click Print Report for a hard copy or pdf.

The Opinion of Site Value is very sensitive to your Estimate of Effective Age.

Notice how a change from 15 to 20 years effective age 1 results in a change of nearly $27,717 in site value.



Explain your opinion of Site Value

The opinion of site value is developed by subtracting estimated depreciated cost and “As-is” Value of Site Improvements from (comps address), which is judged to have similar site value.

Solomon Manufactured

Solomon Manufactured uses the appraiser's estimate of remaining economic life to calculate seven adjustments.

1. Enter subject zip code.

2. Select Quality rating. See Appendix C on page 26 for illustrations of five quality categories.

3. Select Quality Rating Half Step if the property is low in the quality range.

4. Enter remaining economic life. Note that economic life values are lower than traditional construction.

5. Enter deck size.

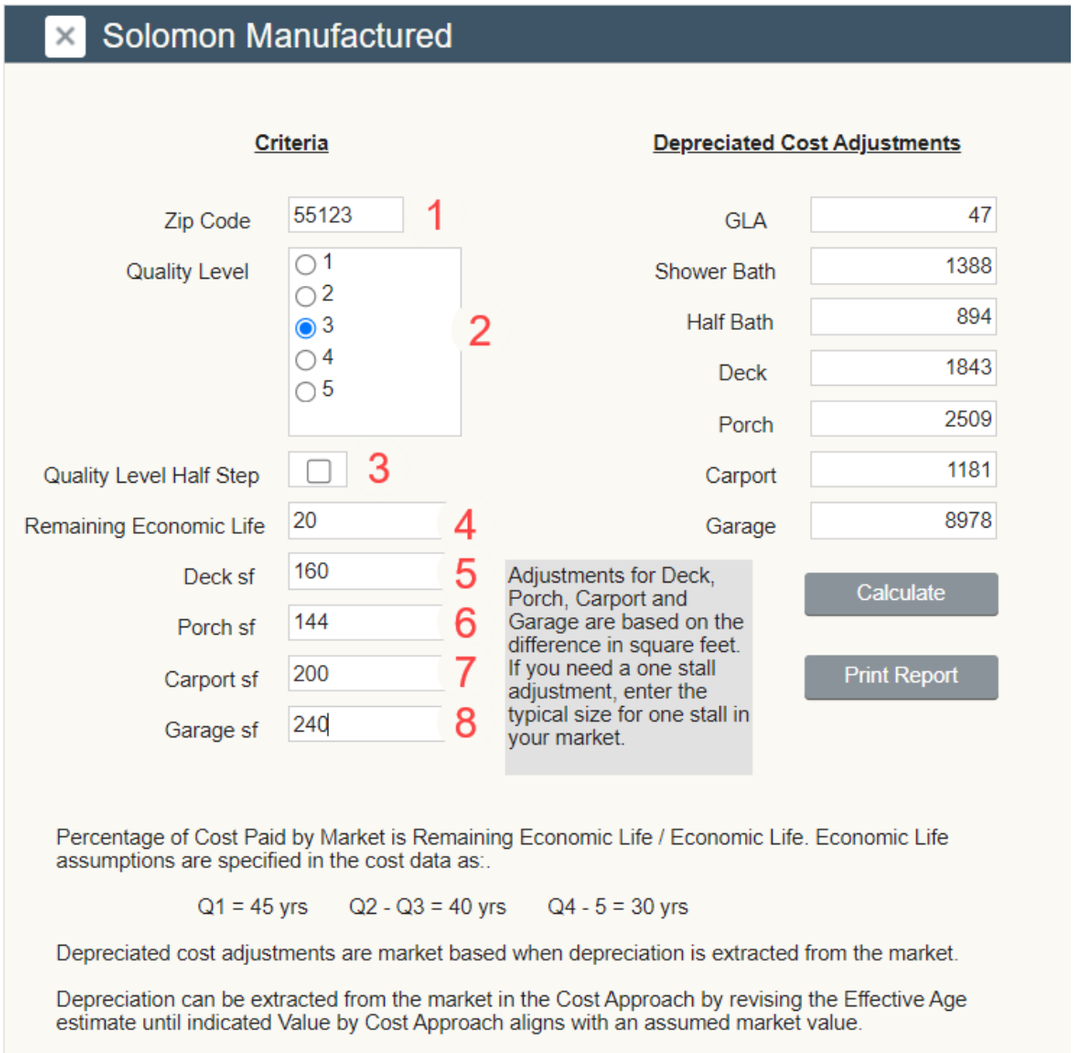
6. Enter Porch size.

7. Enter Carport size.

8. Enter garage size in square feet, not the number of car stalls.

9. Click Calculate.

10. The GLA adjustment is a square foot adjustment. All other adjustments are unit adjustments. A 160sf deck is $2000. A 240sf garage is $7200 etc.

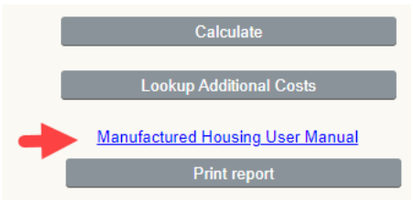


Explaining Your Adjustments

Adjustments for building characteristics are developed with the depreciated cost method.

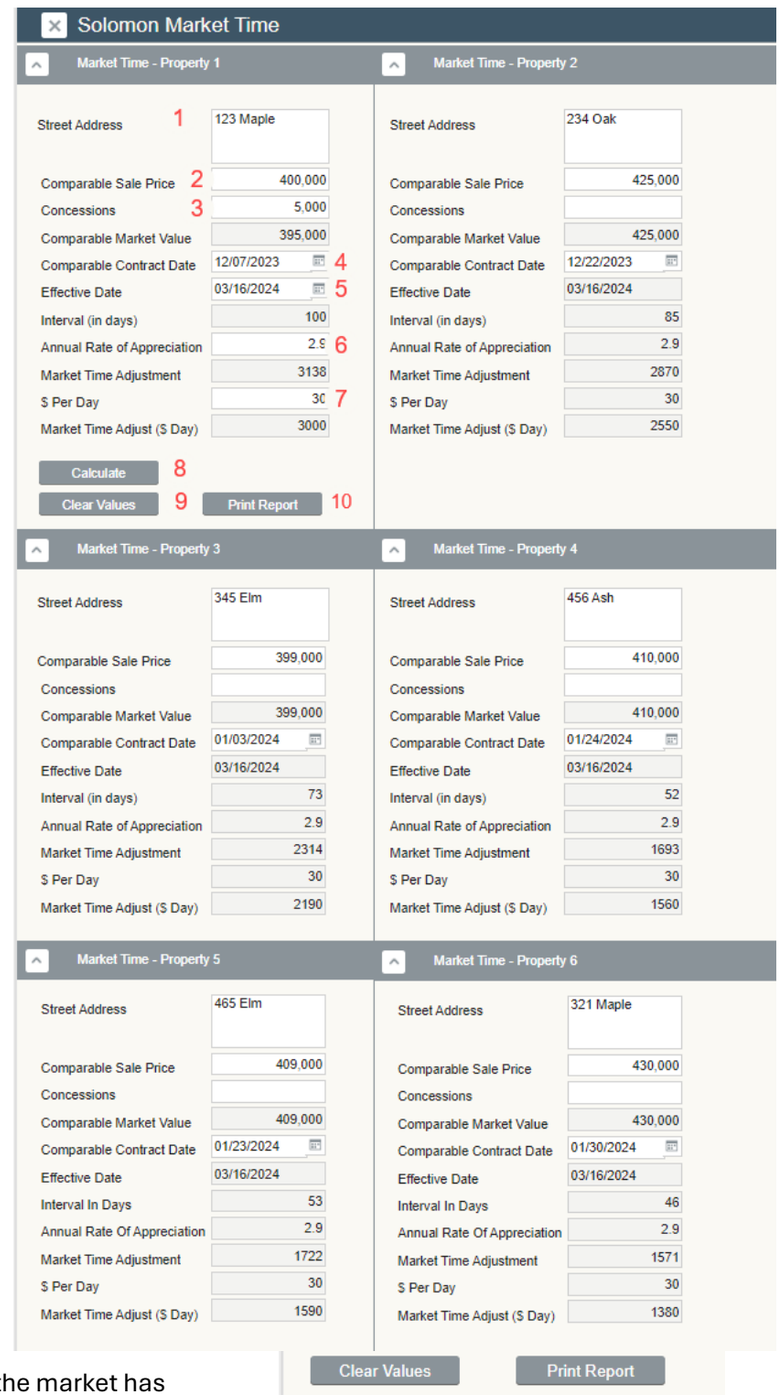
Solomon MH

Solomon MH is a cost approach solution for manufactured housing. Solomon MH is part of the Solomon Plus subscription only. There is a separate User Manual linked in the application. The link to the user manual is in the lower right portion of the application.



Solomon Market Time

Solomon Market Time quickly applies an annual rate of change and/or $ per day rate of change to the interval in days between the contract date (or closed sale date) of the comparable and the effective date of the report. Up to six comparables can be calculated on the same page.



1. Enter the street address of the comparable properties for which you will calculate a market time adjustment. This is an optional field to enhance your reporting.

2. Enter the sale price of the comparable properties for which you need a market time adjustment.

3. Enter the amount of seller concessions if the concessions result in a sale price that is higher than market value.

Repeat for up to six properties.

4. Click on the calendar icon and select contract date for each comparable. In this case, December 7, 2023. This date will transfer to all properties in the calculator.

5. Click on the calendar icon and select the effective date of the report for each property.

6. Enter the annual percentage of change in the market. If the market is up 2.9%, enter 2.9. Use negative number for a decline. When using grouped data for a market time adjustment, a minimum of 30 observations are required for both time periods. The effective date transfers to all properties in the calculator.

7. If you know how to extract a $ Per Day rate of change in the market, enter that amount and it will transfer to all properties in the grid. The dollar per day method may be more accurate if the market has fluctuated during the year. In this example, 30 is used.

8. Click Calculate. Calculations are made that result in a market supported time adjustment.

Concessions are subtracted from Sale Price to show Comparable Market Value.

Comparable Contract date is subtracted from Appraisal Effective Date to show the Interval in Days between the two dates.

Market Time Adjustment is calculated by applying the annual rate of change to the interval in days.

If the annual rate is 2.9%, and the interval is 73 days, the result is $2314.

$ per day adjustments are made by multiplying the interval in days by the $ per day rate.

Explaining Your Adjustments

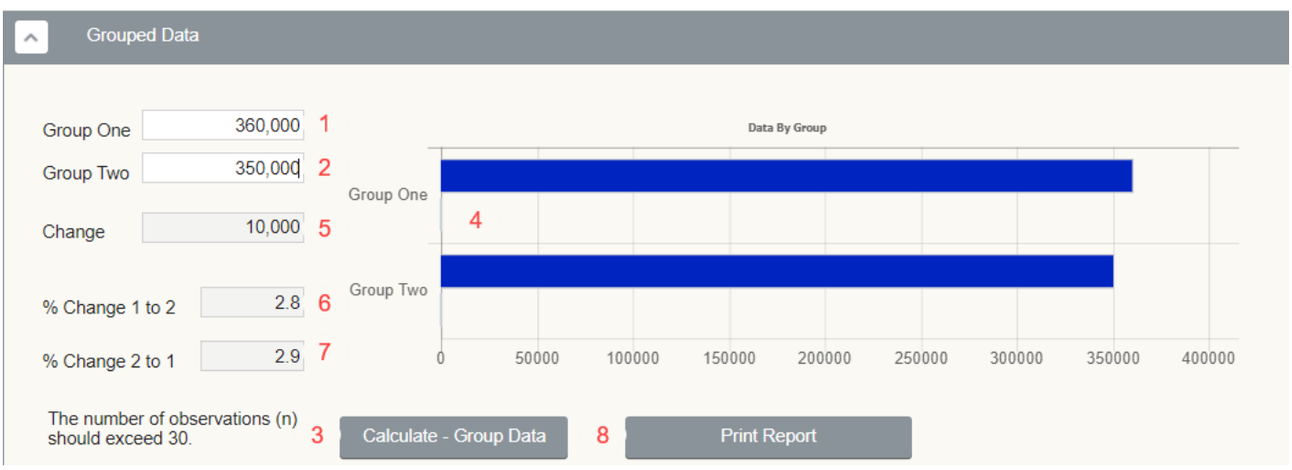
The market time adjustments are developed by applying the x % annual rate of change to the interval between comp contract date and report effective date. Edit as necessary.

The market time adjustments are developed by applying a rate of $x per day to the interval in days between comp contract date and report effective date. Edit as necessary.

Solomon Grouped Data

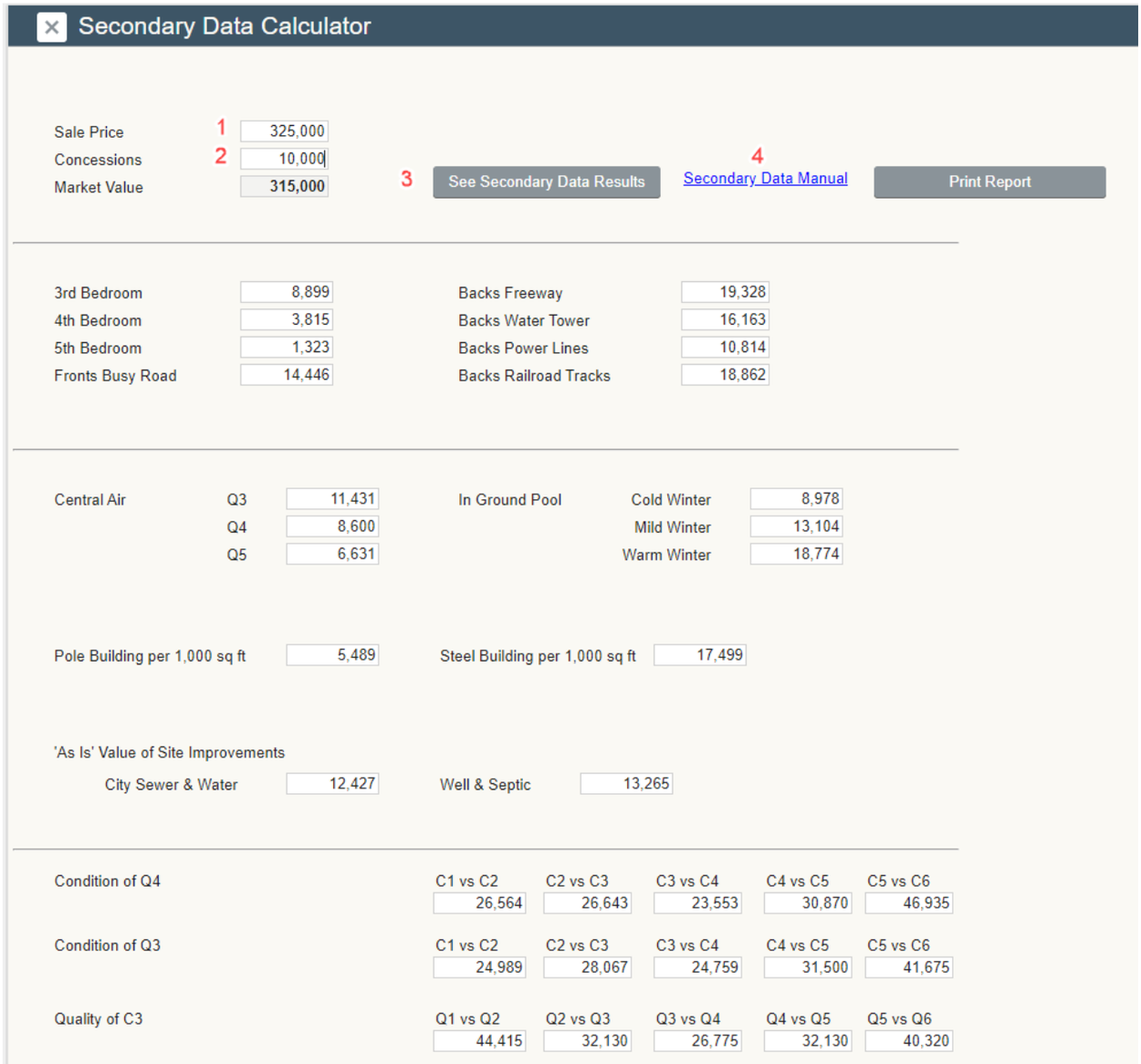
1. Use an MLS search to find the mean value of a group properties similar to the subject.
2. Change one variable and enter the mean (average) value of the second group of properties.
3. Click Calculate
4. The bar chart is a data visualization of the difference that results from changing the variable under analysis.
5. Absolute difference between group one and group two.
6. Percentage change from group one to group two.
7. Percentage change from group two to group one.
8. Print a pdf of the calculation to document your adjustment calculation. You may also use a screen shot tool to add the calculation to a workfile document.

Grouped Data is included in Solomon Market Time because it is an accepted way to develop a market to market adjustment by comparing one time period to another to find the rate of change. "Grouped data analysis extends the logic of paired data analysis to larger datasets. In this technique, comparable sales are grouped by an independent variable such as date of sale and then the groups are studied as pairs." The Appraisal of Real Estate 15th Ed. P373



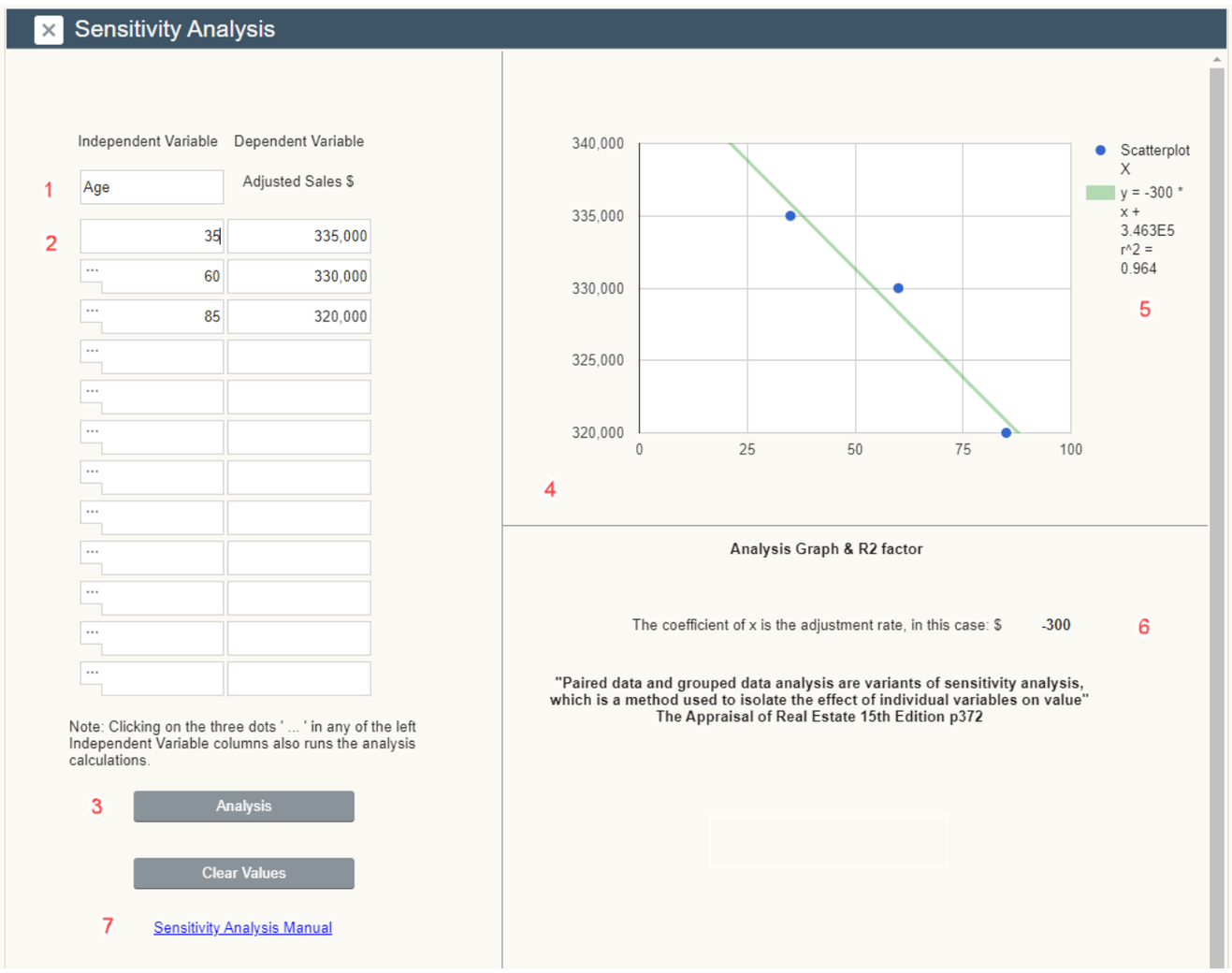
Secondary Data

1. Enter Comp Sale Price
2. Enter Concessions
3. Click to see results
4. Click to view complete information about the nature of secondary data, methodology, and survey data.



Sensitivity Analysis

1. Enter an adjustment category. In this case, Age.
2. Enter the value of the category for Comps 1-3 etc., in this case years. Enter adjusted sale price for each Comp.
3. Click Analysis.
4. Scatter plot appears showing relationship between the independent variable and adjusted sale price.
5. The r^2 value shows the Coefficient of Determination. In this case, 96% of change in adjusted sale price is due to change in age.
6. The coefficient of x is the adjustment rate. In this case, each year of age reduces adjusted sale price $300.
7. Click to see how Sensitivity Analysis can be used for subjective adjustments such as View.



To save your results for your workfile or as a page in your report, click the Print Report button

8. For a pool adjustment, use 1 as the independent variable for a house with no pool and 2 for a house with a pool.

The software cannot use 0 as an independent variable.

Forecast Analysis

1. Enter the element of comparison. If the element of comparison is subjective, use a ranking system such as 1 to 5 with 3 being average, 5 being highest and 1 being lowest.

2. Enter the adjusted sale price of the comparable.

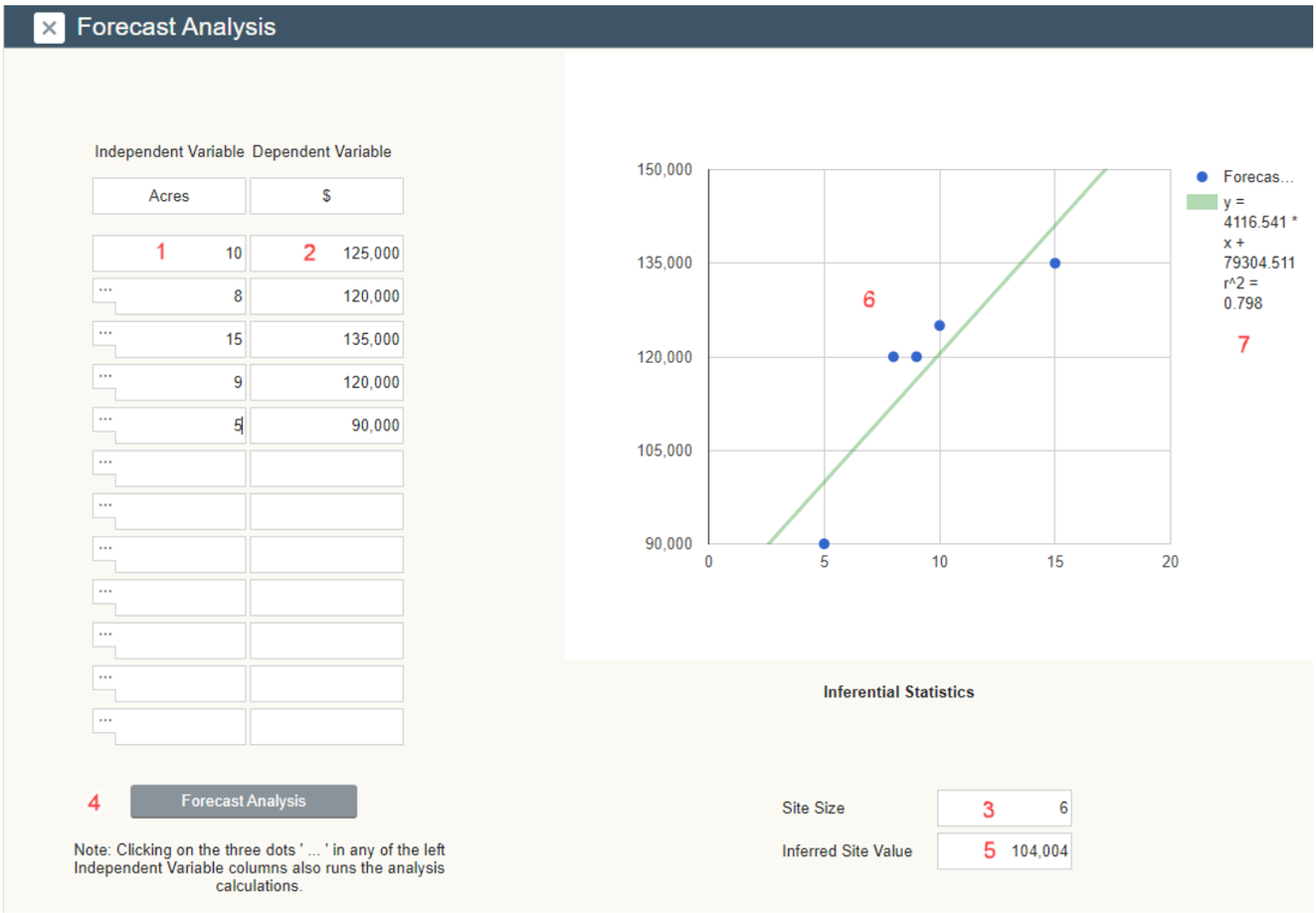
3. Enter the element of comparison of the subject.

4. Click Forecast Analysis.

5. Inferred value is calculated.

6. Scatter plot graph provides a visual representation of the strength of the correlation between element of comparison and price.

7. The r^2 value shows the Coefficient of Determination. In this case, 80% of change in sale price is due to change in element of comparison.



To save your results for your workfile or as a page in your report, click the Print Report button.

Reporting

Report the findings of the calculators on three pages of a 1004 report.

1. Insert a page in the report titled Depreciated Cost Adjustment Calculations with a screen capture of Solomon Cost.

2
Adjustment Calculations: Adjustments for building cost categories such as GLA, bath count, basement size, basement finish sf, garage count and fireplace count are based on the amount they contribute to value. By definition, depreciated replacement cost is the amount that the building contributes to site value. Depreciation is xx%, so the market is paying xx% of replacement cost for the buildings. See Depreciation Calculation attached which includes the xx% factor applied to relevant cost categories.
COST APPROACH TO VALUE (not required by Fannie Mae)

2. Add commentary at the bottom of page 3 of the 1004 with this statement:

Adjustment Calculations: Adjustments for building cost categories such as GLA, bath count, basement size, basement finish sf, garage count and fireplace count are based on the amount they contribute to value. Depreciated replacement cost is the amount that the building contributes to site value. Depreciation is x%, so the market is paying y% of replacement cost for the buildings. See Depreciated Cost Adjustments summary attached which includes the y% factor applied to relevant cost categories.

3. On page 3 in the Summary of Sales Comparison Approach, I use comments like these:

“The Date of Sale / Time adjustments are developed by applying the x.x% appreciation rate (or $/day) to the interval between comp contract date and report effective date. Adjustments for building characteristics are developed with the depreciated cost method. See page three Adjustment Calculations and the Depreciated Cost Adjustments summary attached.”

4. In the Support for the opinion of site value section begin with this and edit as necessary. If there are comparable site sales, summarize those and add attachments as necessary.

“There are no recent lot sales in this fully developed neighborhood. The allocation method applied at the 2023 assessor LTV ratio of xx% to the median price of $xxx,000 infers $xx. Assessor estimate is $xx. The extraction method applied to Comp x indicates $xx. Most weight is given the extraction method because it begins with a similar lot with similar improvements.

COST APPROACH TO VALUE (not required by Fannie Mae)
Provide adequate information for the lender/client to replicate the below cost figures and calculations.
Support for the opinion of site value (summary of comparable land sales or other methods for estimating site value) There are no recent lot sales in this fully developed neighborhood. The allocation method applied at the 2021 assessor LTV ratio of xx% to the median price of $xxx,000 infers $xx. Assessor estimate is $xx. The extraction method applied to Comp x indicates $xx. Most weight is given the extraction method because it begins with a similar lot with similar improvements.

5. Comments on Cost Approach should include National Building Cost Manual 2024 as the source of cost data. Don't report Solomon Cost as your source of cost data. Solomon Cost is a calculator that uses data from National Building Cost Manual 2024.

COST APPROACH	
	ESTIMATED ☐ REPRODUCTION OR ☒ REPLACEMENT COST NEW
	Source of cost data National Building Cost Manual 2023 5
	Quality rating from cost service 4 6 Effective date of cost data 2023 7
	Comments on Cost Approach (gross living area calculations, depreciation, etc.)
	Quality Class 4 Good Standard is used (p 7, 12, 27-30). "As-is" value of Site Improvements includes depreciation to those features. The Age-Life method of depreciation assumed in this report includes all elements of depreciation to the improvements in one calculation shown in the Physical category.. 8 Economic Life - Effective Age = Remaining Economic Life

6. Enter the Quality rating from cost service. If the subject is Q3.5, report Q3 or Q4. Q3.5 is a high Q4 or a low Q3.

7. Enter the Effective Date of the cost data.

8. In Comments on Cost Approach, I use this: Quality Class 4 Good Standard is used (p 7, 12, 27 - 30). "As -is" value of Site Improvements includes depreciation to those features. The Age -Life method of depreciation assumed in this report includes all elements of depreciation to the Improvements in one calculation shown in the Physical category. Economic Life - Effective Age = Remaining Economic Life.

The page numbers 7, 12, 27 - 30 apply to all quality ratings.

Appendix A

Glossary

Age-Life Method: a method of estimating depreciation in which the ratio between the effective age of a building and its total economic life is applied to the current cost of the improvements to obtain a lump sum deduction; also known at the economic age-life method – The Dictionary of Real Estate Appraisal 6th Ed p 6

Depreciation: a loss in property value from any cause; the difference between the cost of an improvement on the effective date of the appraisal and the market value of an improvement on the same date – The Dictionary of Real Estate Appraisal 6th Ed p 63

Economic Age-Life Method: see Age-Life Method (above) – The Dictionary of Real Estate Appraisal 6th Ed p 91.

Economic Life: the period over which improvements to real property contribute to property value. – The Dictionary of Real Estate Appraisal – 6th Ed p 72

Effective Age: The age of a property that is based on the amount of observed deterioration and obsolescence it has sustained, which may be different from chronological age. - The Dictionary of Real Estate Appraisal 6th Ed p 74

Iteration: a problem-solving or computational method in which a succession of approximations, each building on the one preceding, is used to achieve a desired degree of accuracy – Dictionary.com

Remaining Economic Life: the estimated period over which existing improvements are expected to continue to contribute economically to property value – The Appraisal of Real Estate 15th Ed p 565

Marginal Cost: the cost of one additional unit of any item produced or bought in quantity - "marginal cost". Dictionary.com Unabridged. Random House, Inc. 17 Apr 2017.

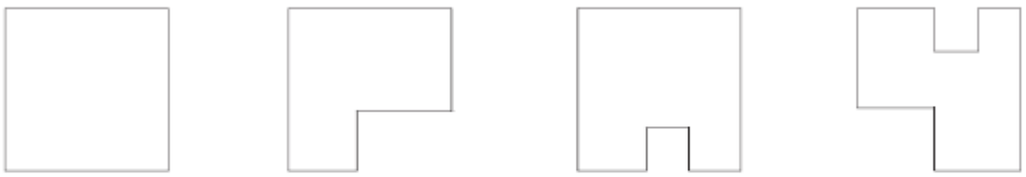
Appendix B

Single Family Quality Classification Assumptions

National Building Cost Manual	Solomon	UAD
Class 1 Luxury	1	1
1&2	1.5	
Class 2 Semi Luxury	2	2
2&3	2.5	
Class 3 Best Standard	3	3
3&4	3.5	
Class 4 Good Standard	4	4
4&5	4.5	
Class 5 Average Standard	5	5
5&6	5.5	
Class 6 Minimum Standard	6	6

Complexity Assumptions:

National Building Cost Manual uses building shapes to categorize complexity within a quality classification.



4 corners 6 corners 8 corners 10 corners

Solomon assumes Q1 is 10 corners, Q2 is 8 corners, Q3 is 6 corners and Q4-6 are 4 corners.

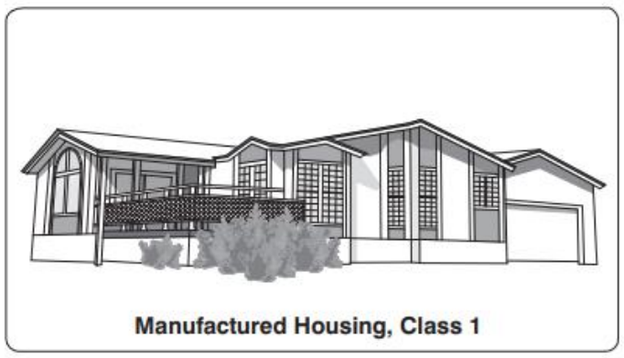
See next page for description of Quality Classifications.

Quality Classification

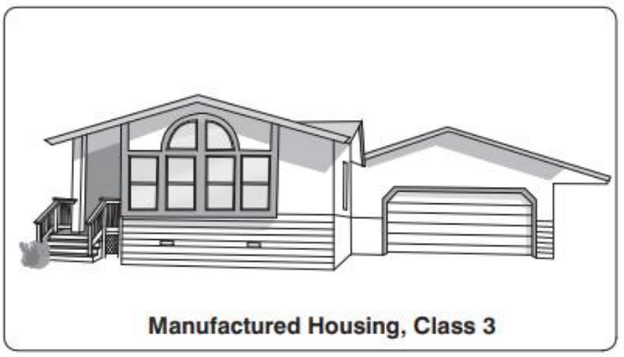
	Class 1 Luxury	Class 2 Semi-Luxury	Class 3 Best Std.	Class 4 Good Std.	Class 5 Average Std.	Class 6 Minimum Std.
Foundation (9% of total cost)	Reinforced concrete.	Reinforced concrete.	Reinforced concrete.	Reinforced concrete or concrete block.	Reinforced concrete or concrete block.	Reinforced concrete.
Floor Structure (12% of total cost)	Engineered wood or steel exceeding code minimums.	Engineered wood or steel or reinforced concrete slab.	Engineered wood or steel or reinforced concrete slab.	Wood frame or slab on grade, changes in shape and elevation.	Standard wood frame or slab on grade with elevation changes.	Slab on grade. No changes in elevation.
Wall Framing and Exterior Finish (14% of total cost)	Wood or steel, very irregular walls, stone veneer, many architectural doors and windows.	Wood or steel, irregular shape, masonry veneer, better grade doors and windows.	Wood or steel, several wall offsets, wood or masonry accents, good grade doors and windows.	Wood or steel, stucco or wood siding, some trim or veneer, average doors and windows.	Wood or steel, stucco or wood siding, few offsets, commodity grade doors and windows.	Wood or steel, stucco or hardboard siding, minimum grade doors and windows.
Roof (10% of total cost)	Complex plan, tile, slate or metal, highly detailed.	Multi-level, slate, tile or flat surface, decorative details.	Multi-pitch, shake, tile or flat surface, large closed soffit.	Wood trusses, tile or good shingles, closed soffit.	Wood frame, shingle or built-up cover, open 24" soffit.	Wood frame, composition shingle cover, open soffit.
Floor Finish (5% of total cost)	Terrazzo, marble, granite, or inlaid hardwood or best carpet throughout.	Marble or granite entry, hardwood, good carpet or sheet vinyl elsewhere.	Simulated marble tile entry, good carpet, hardwood or vinyl elsewhere.	Better sheet vinyl and average carpet, some areas with masonry or tile.	Good sheet vinyl and standard carpet, small area with tile or hardwood.	Composition tile or minimum grade sheet vinyl.
Interior Wall and Ceiling Finish (8% of total cost)	Plaster or gypsum wallboard with artistic finish, many offsets and wall openings, decorative details in nearly all rooms.	Plaster on gypsum or metal lath or 2 layers of 5/8" gypsum wallboard, decorative details, many irregular wall openings.	Gypsum wallboard with putty or texture coat finish, some irregular walls, decorative details in living room, entry and kitchen.	1/2" gypsum wallboard with textured finish, several irregular walls and wall openings, some. decorative details.	1/2" gypsum wallboard with textured finish, most walls are rectangular, doors and windows are the only openings.	1/2" gypsum wallboard, smooth or orange peel finish. Nearly all walls are regular, no decorative details.
Interior Detail (5% of total cost)	Exposed beams or decorative ceiling, 12' to 16' ceiling in great room, many sky widows, built-in shelving and alcoves for art.	Great room has 12' to 16' ceiling, most rooms have windows on two sides, formal dining area, several framed openings.	Cathedral ceiling at entry, one or more floor level changes, several wall openings or pass-throughs, formal dining area.	8' or 9' ceiling throughout, walk-in closet in master bedroom, separate dining area, some decorative wood trim.	8' or 9' ceiling throughout, sliding mirrored closet doors, standard grade molding and trim, breakfast bar or nook.	Drop ceiling in kitchen, other rooms have 7'6" to 8' ceiling, minimum grade molding and trim.
Bath Detail (4% of total cost)	Custom large tile showers, separate elevated spa in master bathroom.	Large tile showers, at least one bathtub, glass block or large window by each bath.	Tile or fiberglass shower, at least one built-in bathtub, window in bathroom.	Good plastic tub and shower in at least one bathroom, one small window in each bath.	Average plastic tub and shower in at least one bathroom.	Minimum plastic tub and shower in one bathroom.
Kitchen Detail (8% of total cost)	Over 30 LF of deluxe wall and base cabinets, stone counter top, island work area, breakfast bar.	Over 25 LF of good custom base and wall cabinets, synthetic stone counter top, desk and breakfast bar.	Over 20 LF of good stock wall and base cabinets, tile or acrylic counter top, desk and breakfast bar or nook.	Over 15 LF of stock standard grade wall and base cabinets, low-cost tile or acrylic counter top, breakfast nook.	Over 10 LF of stock standard grade wall and base cabinets, low-cost acrylic or laminated plastic counter top.	Less than 10 LF of low-cost wall and base cabinets, laminated plastic counter top, space for table.
Plumbing (12% of total cost)	4 deluxe fixtures per bathroom, more bathrooms than bedrooms.	4 good fixtures per bathroom, more bathrooms than bedrooms.	3 good fixtures per bathroom, as many bathrooms as bedrooms.	3 standard fixtures per bathroom, less bathrooms than bedrooms.	3 standard fixtures per bathroom, less bathrooms than bedrooms.	3 minimum fixtures per bathroom, 2 bathrooms.
Special Features (3% of total cost)	10 luxury built-in appliances, wet bar, home theater, pantry, wine cellar.	8 good built-in appliances, wet bar, walk-in pantry, central vacuum.	6 good built-in appliances, walk-in pantry, wet bar, central vacuum.	5 standard built-in appliances, sliding glass or French doors, laundry room.	4 standard grade kitchen appliances.	4 minimum grade kitchen. appliances.
Electrical System (10% of total cost)	Over 100 recessed or track lights, security system, computer network.	80 to 100 recessed lighting fixtures. security system, computer network.	Ample recessed lighting on dimmers, computer network, multiple TV outlets.	Limited recessed lighting on dimmers, multiple TV outlets.	12 lighting fixtures, switch-operated duplex plug outlets in bedrooms.	10 or less lighting fixtures, switch-operated plug outlets in most rooms.
If Exterior Walls are Masonry	Reinforced split face concrete block or brick with face brick veneer.	Reinforced block or brick with masonry veneer or stucco coat.	Textured or coated concrete block or good quality detailed brick.	Colored or coated concrete block or good quality brick.	Colored concrete block or painted common brick.	Painted concrete block or common-brick.

Note: Use the percent of total cost to help identify the correct quality classification.

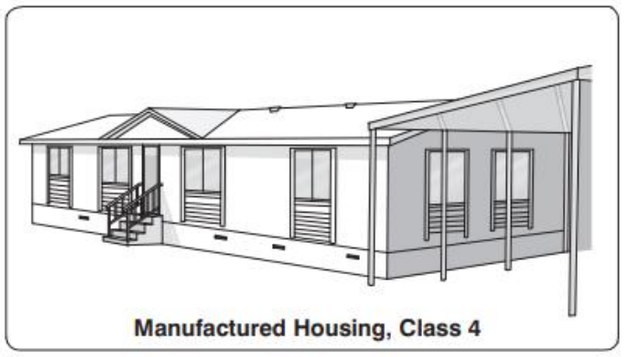
Appendix C



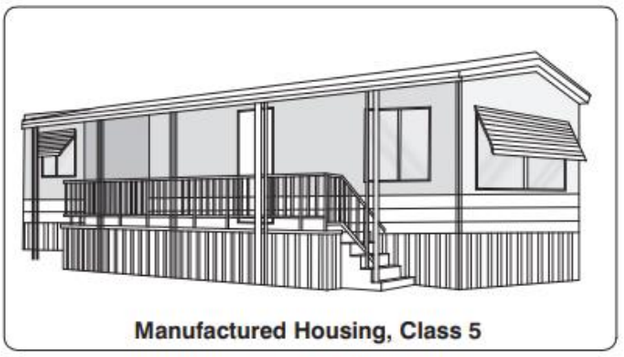
Manufactured Housing, Class 1



Manufactured Housing, Class 3



Manufactured Housing, Class 4



Manufactured Housing, Class 5

See next page for Quality Classifications of Manufactured Housing.

Manufactured Housing

Quality Classification

	Class 1 Best Quality	Class 2 Good Quality	Class 3 Average Quality	Class 4 Low Quality	Class 5 Lowest Quality
Design	Indistinguishable from site-built construction, good floor plan and sight lines, superior fit and finish	Comparable to site-built construction, good floor plan, shelves and alcoves, good fit and finish	Clearly manufactured housing but with good design and materials, adequate fit and finish	Mobile home design, utilitarian floor plan, commodity-grade materials	Poor design, often sold unfinished, common only in Sun Belt states
Roof (12% of total cost)	Complex roof line, 30-year architectural shingles, roof pitch at least 4" in 12", good overhang on all sides, R-38 insulation	Decorative roof line, gable accents, 25-year shingles, 4" in 12" pitch, 12" overhang on all sides, R-33 insulation	Gable accents, 25-year shingles, 4" in 12" pitch, 8" to 12" overhang front and back, R-21 insulation	Simple roof line, less than 4" in 12" pitch, small overhang front and back, R-19 insulation	Straight roof line, minimum pitch, little or no overhang, minimum roof cover, R-7 insulation
Exterior Walls (18% of total cost)	Good fiber-cement siding, 9' to 10' high, decorative trim, 6" exterior walls, R-19 insulation, 7/16" plywood sheathing	Painted fiber cement siding, 9' high, some trim, 6" exterior walls, R-15 insulation, 7/16" OSB sheathing	Good foam-backed vinyl siding, 8' to 9' high, 4" exterior walls, R-13 insulation, 7/16" OSB sheathing	Vinyl siding, 8' high, 4" exterior walls, R-11 insulation, 3/8" plywood sheathing	Hardboard or economy siding, 7' high, 4" exterior walls, R-7 insulation
Doors and Windows (9% of total cost)	Two 36" wide insulated steel panel exterior doors, solid core wood panel interior doors, good hardware, large insulated low-E vinyl sash windows, recessed entry	Two 36" wide insulated steel exterior doors, hollow core wood interior doors, good hardware, good insulated low-E vinyl sash windows, recessed entry	36" wide steel front door with deadbolt, hollow core wood interior doors, average hardware, insulated vinyl windows, recessed entry	36" wide steel front door, hollow core wood interior doors, economy hardware, smaller dual glazed vinyl windows, 6' sliding bedroom door	34" or 32" wide aluminum exterior doors, hollow core wood interior doors, economy hardware, aluminum windows with storm sash
Interior (5% of total cost)	Hardwood paneling or ½" gypsum board with good workmanship and trim throughout, coffered/ vaulted/beamed ceilings, plank-type acoustical tile, mirrored walls, built-in buffet cabinets, custom drapes, skylights, window sills, good drapes with sheers throughout	Pre-finished hardwood paneling and trim or ½" gypsum board in all rooms, vaulted/beamed, ceiling in main rooms, good floor to ceiling drapes over sheer underlays in living room and dining room, several wall mirrors, some acoustic treatments	Pre-finished and grooved hardwood, plywood paneling or ½" gypsum board, no exposed fasteners, coordinated drapes in all rooms except kitchen and baths, one vaulted ceiling, acoustic tile, pre-finished wood trim	Pre-finished fire rated plywood paneling or 3/8" gypsum board, some exposed fasteners, acoustical tile ceiling, economy drapes in living room, dining room, and bedrooms, vinyl on composition molding.	Stapled 3/8" vinyl-covered wallboard with battens at seams and corners, exposed fasteners or holding strips, unit may have been sold with interior finishing incomplete.
Floors (8% of total cost)	Hardwood or ceramic tile entry, 30-50 oz. carpet, good vinyl in utility and guest bath. Good vinyl or hardwood in kitchen.	26-30 oz. carpet with 1/2" pad in all rooms except guest bath and utility, vinyl in kitchen, utility, and guest bath	22-26 oz. carpet with 1/2" rebond pad in all rooms except baths and kitchen, vinyl in kitchen and baths	16- 22 oz. carpet with 5 lb. pad in living, dining and bedrooms, economy vinyl sheet or tile in other areas	Glued or stapled foam-backed carpet in living room and bedroom, economy vinyl elsewhere
Heating (7% of total cost)	110,000 BTU upflow air-condition-ready forced air furnace with exterior access door, metal ducting to all rooms, fireplace, dual-zone heating	80,000 to 110,000 BTU upflow or downflow air-condition-ready furnace with exterior access door, metal ducting to all rooms, fireplace	80,000 BTU upflow or downflow forced air condition-ready furnace, ducting to all rooms, simulated fireplace	Forced air furnace, fiberglass attic ducting to all rooms, under-door return vents, ready for air conditioning unit.	Forced air furnace, minimum taped fiberglass duct, registers at the room center, return vents under doors
Kitchen (23% of total cost)	18± LF of 25" wide stone or ceramic counter, 4" splash, luxury cabinets, roller drawers, dropped luminous ceiling, island work space, walk-in pantry, name-brand fixtures, cast iron sink, wet bar	16± LF of tile or Corian counter, 4" splash, quality wood cabinets, dropped luminous ceiling, island work space, walk-in pantry, good quality fixtures, stainless or integrated 8" deep sink	14± LF of Corian counter, 2" splash, average quality wood-face cabinets and hardware, built-in range and oven with hood and fan, pantry cabinet, 7" deep stainless or porcelain sink	12± LF laminate counter, smaller commodity-grade cabinets with wood raised panel doors, no lining, built-in range and oven, hood and fan, add for dishwasher if present	10± LF of 24" wide laminate counter, plastic-faced MDF cabinets, stapled and glued, economy range and oven, minimum grade sink and fixtures, add for dishwasher if present
Baths and Plumbing (14% of total cost)	2 to 2¾ baths, 8 fixtures, master bath with two basins, sunken 60" tub, fiberglass shower with glass door, quality medicine cabinets, 6± feet of mirror over 8± feet of cultured marble or ceramic tile lavatory top, decorative faucets, 40-gal. water heater, separate commode closet	2 baths, vent fans, master bath will have two basins, sunken 60" tub and stall shower, quality medicine cabinets and fixtures, cultured marble vanities, good cabinets, 60" one-piece shower in guest bath, 30- to 40-gallon water heater, separate commode closet	2 baths, vent fans, fiberglass shower with glass or plastic door, fiberglass 60" tub, acrylic round toilets, 6 to 8 LF cultured marble vanity in each bath, twin basin master bath with 4± foot mirror, good cabinets, 30- to 40-gallon water heater	1¾ baths, fiberglass shower with plastic door, fiberglass one-piece 54" tub, acrylic round toilets, 4 to 5 linear foot cultured marble vanity with single basin, average quality cabinets and hardware, 30-gallon water heater	1¼ baths, fiberglass 54" one-piece tub and shower with curtain, acrylic round toilets, small 4' plastic marble vanity, minimum quality cabinets and hardware, 20-gallon electric water heater, plastic supply and drain pipe
Bedrooms (4% of total cost)	9 to 14 linear foot floor-to-ceiling sliding mirrored wardrobe doors, or large walk-in closets, phone and cable TV jacks	9 to 14 linear foot floor-to-ceiling mirrored sliding wardrobe doors in master bedroom or walk-in closets, phone and cable TV jacks	10± linear foot wardrobe, floor-to-ceiling mirrored sliding doors in master bedroom, cable TV jacks	8± linear foot wardrobe, pre-finished and grooved plywood doors, mirrored wardrobe door in master bedroom	Five to six linear foot wardrobe, plain plywood sliding doors

Building Cost Historical Index

Use this table to find the approximate current dollar building cost when the actual cost is known for any year since 1957. Multiply the figure listed below for the building type and year of construction by the known cost. The result is the estimated 2024 construction cost.

Year	Masonry Buildings	Concrete Buildings	Steel Buildings	Wood-Frame Buildings	Agricultural Buildings	Year of Construction
1957	16.85	17.39	15.69	13.02	13.20	1957
1958	16.37	16.74	14.93	12.98	15.75	1958
1959	15.86	16.21	14.58	12.43	12.62	1959
1960	15.49	15.91	14.35	12.25	12.38	1960
1961	15.17	15.85	14.10	12.02	12.33	1961
1962	14.83	15.38	13.76	11.88	12.15	1962
1963	14.61	14.98	13.60	11.66	11.02	1963
1964	14.19	14.81	13.41	11.25	11.57	1964
1965	13.73	14.42	12.95	11.01	11.27	1965
1966	13.11	14.00	12.45	10.53	10.95	1966
1967	12.81	13.33	11.64	10.02	10.51	1967
1968	12.28	12.60	11.11	9.47	10.05	1968
1969	11.60	12.04	10.74	9.12	9.48	1969
1970	11.14	11.51	10.20	8.67	9.00	1970
1971	10.44	10.54	9.47	7.47	8.39	1971
1972	9.71	9.76	8.85	7.49	7.81	1972
1973	8.87	9.25	7.86	6.91	7.33	1973
1974	7.89	8.48	7.38	6.46	6.80	1974
1975	7.17	7.49	6.63	6.07	6.06	1975
1976	6.72	7.14	6.29	5.85	5.75	1976
1977	6.26	6.70	5.98	5.43	5.41	1977
1978	5.83	6.26	5.51	4.99	4.89	1978
1979	5.35	5.57	4.93	4.57	4.63	1979
1980	4.85	5.06	4.39	4.10	4.19	1980
1981	4.56	4.77	4.03	3.92	3.91	1981
1982	4.43	4.56	3.91	3.78	3.78	1982
1983	4.22	4.43	3.83	3.61	3.56	1983
1984	3.94	4.15	3.65	3.34	3.46	1984
1985	3.83	3.94	3.55	3.24	3.40	1985
1986	3.73	3.92	3.49	3.19	3.33	1986
1987	3.72	3.83	3.45	3.13	3.30	1987
1988	3.65	3.68	3.39	3.10	3.25	1988
1989	3.56	3.62	3.22	3.04	3.14	1989
1990	3.35	3.48	3.06	2.82	3.00	1990
1991	3.62	3.43	2.91	2.67	2.84	1991
1992	3.24	3.39	2.87	2.66	2.82	1992
1993	3.16	3.35	2.77	2.62	2.77	1993
1994	3.09	3.13	2.67	2.52	2.57	1994
1995	2.93	2.85	2.47	2.37	2.43	1995
1996	2.83	2.81	2.41	2.32	2.39	1996
1997	2.73	2.73	2.31	2.27	2.33	1997
1998	2.60	2.60	2.22	2.17	2.30	1998
1999	2.51	2.51	2.16	2.15	2.26	1999
2000	2.44	2.44	2.07	2.07	2.18	2000
2001	2.37	2.37	2.04	1.99	2.13	2001
2002	2.31	2.31	1.99	1.97	2.08	2002
2003	2.27	2.27	1.94	1.95	2.05	2003
2004	2.17	2.17	1.89	1.90	1.99	2004
2005	2.01	2.01	1.69	1.71	1.95	2005
2006	1.90	1.90	1.56	1.53	1.74	2006
2007	1.84	1.84	1.49	1.42	1.62	2007
2008	1.72	1.72	1.41	1.36	1.53	2008
2009	1.71	1.71	1.36	1.36	1.53	2009
2010	1.67	1.67	1.28	1.35	1.52	2010
2011	1.70	1.70	1.32	1.37	1.56	2011
2012	1.67	1.67	1.18	1.32	1.53	2012
2013	1.60	1.60	1.26	1.25	1.43	2013
2014	1.59	1.59	1.25	1.23	1.41	2014
2015	1.56	1.56	1.24	1.22	1.40	2015
2016	1.55	1.55	1.36	1.23	1.37	2016
2017	1.50	1.50	1.38	1.24	1.37	2017
2018	1.43	1.43	1.19	1.13	1.28	2018
2019	1.34	1.34	1.25	1.08	1.22	2019
2020	1.32	1.32	1.19	1.10	1.21	2020
2021	1.28	1.28	1.26	1.09	1.21	2021
2022	1.22	1.22	1.10	1.01	1.13	2022
2023	1.07	1.07	0.89	0.92	1.01	2023
2024	1.00	1.00	1.00	1.00	1.00	2024