

HOME AFFORDABLE MODIFICATION PROGRAM

BASE NET PRESENT VALUE (NPV) MODEL v3.0 MODEL DOCUMENTATION

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I. Overview

A central element of the Home Affordable Modification Program (HAMP) is the use of a net present value (NPV) model. An NPV model will be used by servicers participating in the HAMP as a tool for deciding whether to modify a troubled mortgage that is eligible for subsidies under the program.

The base NPV model described in this paper meets the specifications put forward under the Making Home Affordable Program. It is anticipated that servicers will use the base NPV model to develop and, to some extent, customize their own NPV model based on their individual portfolio experience.

The documentation of the base NPV model methodology, provided herein, provides servicers standardized guidelines as they develop NPV models for use in the program.

The base NPV model assesses borrower and loan information for HAMP eligibility and determines whether a proposed modification under the program tests NPV positive or negative. The test result is NPV positive when the total discounted value of expected cash flows for the modified loan is higher than the total discounted value of expected cash flows for no loan modification. A negative NPV test result occurs when the opposite is true – the expected value of the cash flows for the modified loan is lower than that for no loan modification. If the result of the NPV test is positive, then it is beneficial to an investor to modify the loan. The base NPV model and proprietary servicer NPV models are designed to guide this assessment for all servicers participating in HAMP.

The NPV test will be required for each loan that is in imminent default or is at least 60 days delinquent under the MBA delinquency calculation. If a modification that follows the HAMP program guidelines is NPV positive, the servicer participating in this program is required to perform a HAMP modification.

This document discusses the base NPV model calculation logic, model inputs and outputs, as well as the base model components and equations. It also outlines the requirements for customizing the base model for servicers that are eligible for such customization. The final section reviews the waterfall logic that generates the modification terms, which is incorporated in an NPV output “Waterfall Check” to provide a reasonableness check on the modification terms submitted by servicers.

II. Significant Model Changes from Version 2.0 to Version 3.0

In response to servicer feedback and planned model enhancements, the following updates have been made to the base NPV model.

Home Price Decline Protection Incentive (p7, p26-Model Equations)

- The Home Price Decline Protection (HPDP) incentive will be effective beginning 9/1/2009. Supplemental Directive 09-04, issued on 7/31/2009, contains the detailed policy guidelines for the HPDP program.

Prepayment Model (p16-17, p29-Model Equations)

- The coefficients for the prepayment model have been adjusted.
- The refinance incentive value bounds have been adjusted.

Model Versioning Requirements (p33)

- Servicers are required to use the same major NPV version, related supplement data, and PMMS weekly rate as used for the initial NPV run to determine subsequent NPV results.

Test Consistency Requirements (p34)

- Servicers are required to use borrower and loan information that was initially reported correctly to determine subsequent NPV results.

Term Extension (p37)

- Loans with current remaining terms greater than 480 months should skip the term extension step. Amortization term after modification should equal the remaining term. Re-amortize and extend the loan to a maximum 40-year term in monthly increments to reach as close to the target 31% DTI without going under.

De-seasonalized Home Price Index (p18)

- Beginning Q32009, the home price index has been adjusted to remove the seasonal affects of home prices and reduce the index's impact on the Home Price Decline Protection Payment.

Clarification to the Model Documentation from Version 2.0 to Version 3.0

- ***Escrow Shortage (p13)***: Include any future monthly escrow shortage payments to the "Association Dues/Fees Before Modification" field.
- ***ARM/IO Reset or Recast (p16)***: For ARM/IO recast that will happen within the next four months, front-end DTI is calculated using PITIA based on the greater of the "Principal and Interest Payment before Modification" input field and the fully amortizing payment using the note reset rate using the index value as of the date of the evaluation.

Timing of the Investor Incentive (II) and Government Subsidy (GS) incentive in the equations for the Mod Cure and Mod Default cash flows (p26 -27): The II payment for the trial period will be made in period 3 and the three GS payments for the trial period will remain in period 4.

III. Considerations for Cash Flows in the Base NPV Model

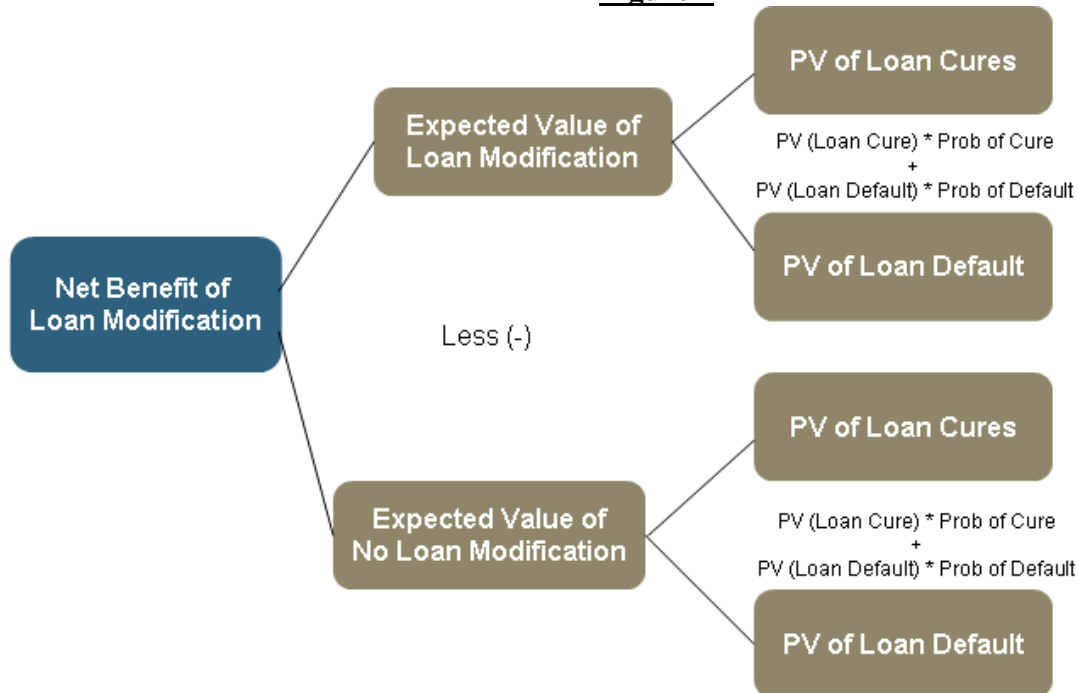
This section briefly summarizes the cash flows considered in the base NPV model calculation. In addition to the cash flows from the principal and interest of the loan, government incentives are provided to the investors under the HAMP program. The timing and amount of these incentives are specified below.

The reduction in monthly payment provided by the modification affects (1) the borrower’s intent and capacity to repay the loan, and (2) the timing and nature of subsequent loss mitigation or resolution activities. The modification reduces the cash flows (principal and interest) to the investor through interest-rate reduction, term extension, principal forbearance, and/or principal forgiveness. However, the modification also reduces the borrower’s monthly debt burden, which is expected to improve loan performance by reducing the probability of default.

Each loan has a probability of default and cure in both the no-modification and modification scenarios. (For purposes of the NPV test, default is defined as an event that ends in foreclosure and property disposition, and therefore has no possibility of cure; the NPV model assumes some rate of cure for loans in any stage of delinquency.) The default model of the base NPV model predicts four probabilities of default and cure:

1. Probability of cure for a loan that is not modified
2. Probability of default for a loan that is not modified
3. Probability of cure for a modified loan
4. Probability of default for a modified loan

Figure 1



The present value of each scenario is calculated and weighted by the scenario's probability. The probability-weighted present values of the two "no mod" scenarios are added to calculate the total expected present value of the "no mod" decision. The probability-weighted present values of the two "mod" scenarios are added to calculate the total expected present value of the "mod" decision. The expected present value of the "no mod" decision is compared against the expected present value of the "mod" decision to determine whether the proposed modification is NPV positive or negative. If the expected value of the "mod" decision is greater than the expected value of the "no mod" decision, the servicer is required to proceed with loan modification.

The servicer must provide the input data required by the base NPV model – essentially, current financial information for the borrower, the existing loan terms, and the terms of the proposed modification.

Incentive Payments Included in the Base NPV Model Calculation

Payment Reduction Cost Share for Investor

For every month the borrower is in the HAMP (including a successfully completed trial period), the U.S. Treasury, acting through Fannie Mae as its fiscal agent, reimburses the investor 50% of the cost of lowering monthly payments from a level consistent with a 38% debt to income ratio (DTI)¹ ratio to that consistent with the target DTI of 31%, for up to five years. If the borrower's DTI before the modification is below 38%, the subsidy is equal to 50% of the smaller payment reduction needed to achieve a 31% DTI. If the DTI after the modification is higher than 31%, the loan is not eligible for HAMP and receives no subsidy. While the servicer may reduce the payment to achieve a DTI ratio below 31%, the subsidy payments will only be calculated based on the reduction between 38% DTI and 31% DTI.

$$\text{Payment Reduction Cost Share Incentive} = 50\% [\text{MIN}(38\% \text{ or current DTI}) - 31\% \text{ DTI}]$$

\$1,500 Non-delinquency Modification Incentive for Investor

If the borrower is current at the beginning of the trial period *and* current at the end of the trial period, the investor will be paid \$1,500 by the HAMP Program.

Borrower Pay-for-Performance Success Payments

Borrowers who make timely monthly payments are eligible to accrue up to \$1,000 of reduction in principal each year for five years, or a maximum total of \$5,000 over five years, in the HAMP. The borrower's mortgage payment must be made on time in order to accrue the monthly Pay-for-Performance Success Payment. Annual principal balance reductions will start 12 months after entering the trial period, provided the borrower remains eligible for the program. The payment will be applied by the servicer to reduce the principal balance by up to \$1,000 a year for five years, provided the borrower remains eligible. The payment will be calculated as the lesser of (i) \$1,000 (\$83.33/month), or (ii) one-half of the reduction in the borrower's annualized monthly payment to the 31% DTI payment.

¹ For the purposes of the base NPV model calculation, DTI refers to the front-end ratio. Front-end DTI is the ratio of principal, interest, taxes, insurance (including homeowners' insurance and hazard and flood insurance), and homeowners' association and/or condominium fees (PITIA) to gross monthly income. Mortgage insurance is excluded from the PITIA calculation.

For borrowers who do not default, the base NPV model assumes the full amount of the success payments is accrued annually. This amount is applied to reduce the principal for that program year.

Home Price Decline Protection Incentive (HPDP)

HPDP is an investor incentive to offset some of the investors’ risk of loss exposure due to near-term negative momentum in the local market home prices. The HPDP incentive is effective beginning 9/1/2009, and loans tested for modification eligibility on or after that date may qualify for HPDP payments.

The HPDP payment data is used as an input to the NPV calculation. A HPDP payment table is calculated every quarter to show the full HPDP payment for each MSA and unpaid principal balance (UPB) quintile. The quarter for which the payment is used in the NPV calculation is set on the “NPV Date” – the date the loan was run through the NPV model to determine trial modification eligibility. The “NPV Date” is an input to the NPV submission spreadsheet on the portal.

The HPDP incentive payments are calculated based upon the following three characteristics of the mortgage loan receiving a HAMP modification:

- (i) An estimate of the cumulative projected home price decline over the next year, as measured by changes in the home price index over the previous two quarters in the applicable local market (MSA or non-MSA region) in which the related mortgaged property is located;
- (ii) The UPB of the mortgage loan prior to modification under HAMP; and
- (iii) The mark-to-market loan-to-value ratio (MTM-LTV) of the mortgage loan based on the UPB of the mortgage loan prior to modification under HAMP.

The first characteristic, the cumulative projected home price decline over the next year, expressed in percentage points (projected home price decline), is related to recent momentum in local market home prices. The projection is calculated from the percentage changes in the local home price index in the most recent previous two quarters for which data is available..

The second characteristic, the UPB of the mortgage loan prior to modification under HAMP, involves assignment of the loan to one of five UPB quintiles. The quintile assignments determine the dollar payment per percentage point of projected price decline. Quintile assignments will not change over the course of the program.

Quintile	UPB Prior to Modification	Quintile Payment per Percentage Point Decline in House Price Index
1	\$0 – \$73,000	\$200
2	greater than \$73,000 – \$116,000	\$300
3	greater than \$116,000 – \$169,000	\$400
4	greater than \$169,000 – \$259,000	\$500

5	greater than \$259,000	\$600
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The third characteristic, the MTM-LTV of the mortgage loan prior to modification under HAMP is used to determine the weighting factor that is applied to the HPDP payment. The weighting factor is multiplied by the HPDP payment assigned to the MSA/quintile for which the loan is attributed to.

MTM-LTV	Weighting Factor
less than 70%	0
at least 70% but less than 80%	1/3
at least 80% but less than 90%	2/3
90% or greater	1

An investor will accrue 1/24th of the total HPDP incentive payment for every month in which the borrower remains in good standing under HAMP. The accrual starts at the beginning of the trial period. If the trial period is not completed successfully, no HPDP incentives will be paid to an investor. Payments of accrued HPDP incentives will be made on an annual basis on each of the first anniversary and the second anniversary of the trial period start date.

De Minimis Requirement

To qualify for the \$1,500 Non-delinquency Modification Incentive payment to investors, the \$1,000 borrower Pay-for-Performance Success Payments, and the Home Price Decline Protection Incentive, the modification must meet a “de minimis” test. Based on the proposed new mortgage payment – including principal, interest, taxes, insurance, and any homeowner association or condo fees (PITIA) – the modification must result in a payment that is at least 6% lower than the current PITIA payment. (There is no de minimis test to be eligible for the Payment Reduction Cost Share.)

Treatment of Mortgage Insurance

For loans that have mortgage insurance (MI) coverage, the value of a mortgage insurance claim is included in the base NPV model calculation, based on the value of the claim in the event of a default of the loan – both with a modification and without a modification.

In the event of a negative NPV result, the case may be referred to the appropriate MI company. The MI company will review the case and propose a partial claim payment as well as document any proposed refinements to borrower and loan information based on MI company review. All new borrower and loan information must be consistent with HAMP guidance and based on more thorough examination of the case than the initial servicer underwriting analysis. Base NPV model assumptions such as discount rate risk premium and default/re-default equations will not be adjusted.

The base NPV model can then be re-run with any updated borrower and loan information, and with the incorporation of any proposed partial claim payment.

IV. Base NPV Model Components

Overall Process

The servicer makes contact with the borrower and determines whether he/she qualifies for the HAMP. The servicer obtains borrower information such as current gross income and mortgage-related and non-mortgage-related debt. If the borrower meets basic eligibility criteria, the servicer runs the loan through the HAMP waterfall and determines the modification terms. The NPV test is performed to determine whether the modification has a positive NPV for the investor.

Base NPV Model Inputs

The base NPV model determines the present value of a loan’s cash flows under two scenarios: 1) no modification, 2) modification under HAMP. The model uses the following inputs in its equations:

- a) “User Inputs” – Such as borrower and loan information – data typically already in the servicer’s system (columns A-AG, AQ, AR from the table below).
- b) “Servicer Defined Inputs” – Servicer input of the risk premium, modification fees, and mortgage insurance partial payment amount (columns AH-AJ from table below).
- c) The terms of the proposed modification (columns AK-AP from the table below).

Base NPV Model Inputs

Column	Label	Data Dictionary	Field Type	Field Validation
A	Investor Code	A code identifying the investor in the loan.	Enumerated List	1 – Fannie Mae 2 – Freddie Mac 3 – Private 4 - Portfolio 5 - GNMA
B	Servicer Loan Number	A unique identifier assigned by the servicer which is associated with a loan secured by a property.	Character	Maximum Length 30
C	GSE Loan Number	Fannie Mae or Freddie Mac Loan Number.	Character	Conditionally required – GSE loans only. Maximum Length 30
D	HAMP Servicer Number	A unique identifier assigned to each servicer that is participating in the HAMP.	Character	Maximum Length 9
E	Data Collection Date	The date on which the UPB and associated remaining term data was collected.	Date	Valid date is not in the future of the NPV Date and within the last 90 days from the NPV Date.
F	Property - Number of Units	The total number of dwelling units included in the property.	Number	Allowable values: 1,2,3,4
G	First Payment Date at Origination	The estimated date the first payment was made on the loan	Date	Valid date between 12/31/1960 and

		after origination.		03/01/2009 (exclusive)
H	Unpaid Principal Balance at Origination	The face value on the note at origination (i.e., the amount borrowed by the mortgagor). Report 2 decimal places.	Number(2)	Greater than 0
I	Amortization Term at Origination	The number of months between the scheduled first payment due date and the maturity date of the mortgage, expressed in months.	Integer	Greater than 0
J	Interest Rate at Origination	The interest rate of the loan at origination. Report 5 decimal places.	Percent(5)	Greater than or equal to 0 and less than or equal to 25.00000%
K	LTV at Origination (1st Lien only)	The ratio between the original loan amount and the lesser of the sales price or the appraised value, for first mortgages.	Percent(5)	Greater than or equal to 0 and less than or equal to 150.00000%.
L	Product before Modification	The general classification of the loan.	Enumerated List	Must be a valid product type code from the list. 1- ARM, 2 - Fixed Rate, 3 - Step Rate, 4 - One Step Variable, 5 - Two Step Variable, 6 - Three Step Variable, 7 - Four Step Variable, 8 - Five Step Variable, 9 - Six Step Variable, 10 - Seven Step Variable, 11 - Eight Step Variable, 12 - Nine Step Variable, 13 - Ten Step Variable, 14 - Eleven Step Variable, 15 - Twelve Step Variable, 16 - Thirteen Step Variable, 17 – Fourteen Step Variable Numeric(4,0)
M	Next ARM Reset Rate	The expected interest rate on an ARM loan at the next ARM reset date given the reset date is	Percent(5)	Conditionally required – ARM/IO product types only.

		within the next 4 months. Use the latest available reset rate at the time of submission. If the reset date is outside of 4 months, the use current note rate before modification.		Greater than or equal to 0 and less than or equal to 25.00000%
N	ARM Reset Date	The date on which the next ARM reset is due to occur.	Date	Conditionally required – ARM/IO product types only. Valid date greater than 01/01/1900
O	Remaining Term (# of Payment Months Remaining)	Scheduled remaining term of the loan in months. Equivalent to the amortization term minus the time since the first payment after origination to the date that the payment information (i.e., UPB) was obtained; regardless of months delinquent. Example: First payment date for a 360-month term loan was 5/1/08. The current payment information (i.e., UPB) was reported as of 4/30/09. Remaining terms for this loan is (360-12 = 348).	Integer	Greater than 0
P	Unpaid Principal Balance Before Modification	The unpaid balance as of the last paid installment date. Does not include arrearage. Report 2 decimals.	Number(2)	Greater than 0
Q	Interest Rate Before Modification	The interest rate on the loan before the modification. Report 5 decimals.	Percent(5)	Greater than or equal to 0 and less than or equal to 25.00000%
R	Principal and Interest Payment Before Modification	The sum of the principal and interest payments before modification. If the loan is an IO loan in the interest only period, enter only the interest amount. If the loan is a neg-am, enter the payment amount received (without escrow) at the most recent payment date. Report 2 decimals.	Number(2)	Greater than 0
S	Current Borrower Credit Score²	The current credit score of the borrower.	Integer	Greater than or equal to 250 and

² Credit score variable is based on FICO® scores. Users of other credit scoring systems must transform the mean and the standard derivation of that credit score to put it on a comparable scale to FICO.

				less than or equal to 900.
T	Current Co-borrower Credit Score	The credit score of the co-borrower. If not applicable, leave blank.	Integer	Conditionally required – Loans with co-borrowers. Greater than or equal to 250 and less than or equal to 900
U	Property - Zip Code	The five digit zip code of the property.	Integer	5 digits
V	Property - State	The two letter state code of the property.	Enumerated List ³	Must be a valid state code from the list: AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, GU, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VA, VI, VT, WA, WI, WV, WY
W	Association Dues/Fees Before Modification	Monthly HOA or condo fees; also include any future monthly escrow shortage.	Number(2)	Greater than or equal to 0
X	Monthly Hazard and Flood Insurance	Monthly hazard and flood insurance coverage amount.	Number(2)	Greater than or equal to 0
Y	Monthly Real Estate Taxes	Monthly real estate taxes.	Number(2)	Greater than or equal to 0
Z	MI Coverage Percent	Current non-investor primary mortgage insurance coverage percentage. Report 5 decimals.	Percent(5)	Greater than or equal to 0 and less than or equal to 100.00000%
AA	Property Valuation As-is Value	Property value collected through an AVM, BPO, or appraisal.. Report 2 decimals.	Number(2)	Greater than 0
AB	Mark-to-Market LTV	Current UPB divided by current property value. Truncate the value to 5 decimal places. Do	Percent(5)	Greater than or equal to 0 and less than or equal to

³ Note that DC is in the code, but is not a state; PR is in the code and is a commonwealth; Northern Mariana Islands is a commonwealth but not in the code; American Samoa is a territory and is not in the code; Guam is a territory and is in the code.

		<p>not round. For example, for MTM-LTV =66.666612%, truncate the value to 5 decimal places and report 66.66661%. If you are pasting the value, it should be 0.6666661.</p> <p>Another example, for MTM-LTV =79.999998%, truncate the value to 5 decimal places and report 79.99999%. If you are pasting the value, it should be 0.7999999.</p>		999.99999%
AC	Months Past Due	Number of months between the reporting date and the last paid installment date if the first paid installment date is the first day of the month. If the first paid installment date is not the first day of the month, then Months Past Due is the number of months between the reporting date and the last paid installment date, minus one month.	Integer	Greater than or equal to 0
AD	Advances/Escrow	Required escrow advances already paid by the servicer and any required escrow advances from the servicer that are currently due and will be paid by the servicer during the Trial Period. Report 2 decimals.	Number(2)	Greater than or equal to 0
AE	Borrower's Total Monthly Obligations	Total monthly expenses as reported by the borrower. Report 2 decimals.	Number(2)	Greater than or equal to 0
AF	Monthly Gross Income	Total monthly gross income as reported by the borrower. Report 2 decimals.	Number(2)	Greater than or equal to 0
AG	Imminent Default Flag	If a current or 30-day delinquent borrower is considered in imminent default, then this flag receives the value "Y." Otherwise, it receives the value "N."	Character (Boolean)	Y/N
AH	Discount Rate Risk Premium	The rate at which the discount rate is greater than the Freddie Mac Primary Mortgage Market Survey (PMMS) weekly rate for the 30-year conforming loan. The default value is 0. However,	Percent(5)	Greater than or equal to 0 and less than or equal to 2.50000%

		a servicer can override the default rate and add up to 250 bps. No premium for Fannie and Freddie loans. Report 5 decimals.		
AI	Modification Fees	Fees that will be reimbursed by the investors, including notary fees, property valuation, and other required fees. Report 2 decimals.	Number(2)	Conditionally Required – If fees exist for reimbursement. Greater than or equal to 0
AJ	MI Partial Claim Amount	Amount paid by the MI at the time of the modification. Report 2 decimals.	Number(2)	Greater than or equal to 0
AK	Unpaid Principal Balance After Modification (Net of Forbearance & Principal Reduction)	UPB prior to the modification plus interest arrearage, taxes, insurance, HOA amounts, and other costs capitalized at the time of the modification. Report 2 decimals.	Number(2)	Greater than 0
AL	Interest Rate After Modification	The interest rate on the loan in the month after modification. Report 5 decimals.	Percent(5)	Greater than or equal to 0 and less than or equal to 25.00000%.
AM	Amortization Term After Modification	The amortization period of the loan after modification. Reported in months. This period includes the term extension as defined in the HAMP modification waterfall.	Integer	Greater than 0
AN	Principal and Interest Payment after Modification	The sum of the principal and interest payments in the month after the modification. Report 2 decimals.	Number(2)	Greater than 0
AO	Principal Forbearance Amount	The amount of principal forbearance applied at the modification. Report 2 decimals.	Number(2)	Greater than or equal to 0
AP	Principal Forgiveness Amount	The amount of principal forgiveness applied at the modification. Report 2 decimals.	Number(2)	Greater than or equal to 0
AQ	Property Valuation Type	A code that denotes the type of estimate of the value of the real estate property.	Enumerated List	1 – AVM 2 – Exterior BPO / Appraisal (as is value) 3 – Interior BPO / Appraisal (as is value)
AR	NPV Date	Date of the NPV run used to determine trial modification eligibility. This should be the same NPV Date reported for the	Date	Valid date must be greater than or equal to 4/15/09 but not after current

		trial modification setup. Use today's date if running the loan for the first time.		date
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The Servicer Defined Inputs (columns AH-AJ from table above) are prescribed as follows:

- **Discount Rate Risk Premium** – Default value is the weekly Freddie Mac Primary Mortgage Market Survey (PMMS) weekly rate for 30-year fixed-rate conforming loans. Servicer can override the default discount rate by adding a risk premium of no more than 250 basis points to the PMMS weekly rate. With respect to loans that are not owned or guaranteed by Fannie Mae or Freddie Mac, the servicer may apply a maximum of two discount rates, one for loans in its own portfolio and another for loans serviced for investors. With respect to loans owned or guaranteed by Fannie Mae or Freddie Mac, the servicer must follow Fannie Mae and Freddie Mac guidance.
- **Modification Fees** – Fees that will be reimbursed by the investors, including notary, property valuation, and other required fees.
- **MI Partial Claim Amount** – This is the amount the MI agrees to pay subsequent to a negative NPV and MI insurer review, if this choice is made.

Base NPV Model Assumptions

- **Current Market Rate** – Freddie Mac's PMMS weekly rate for 30-year fixed-rate conforming loans.
- **Probability of Default/Re-default Rate** – See the *Base Model Equations* section, below. The re-default rates on modified loans will vary with a number of parameters particular to the loan. In general, however, the re-default rate is assumed to vary based on four key indicators:
 - Credit quality of the borrower(s);
 - MTM-LTV of the home at the time of modification;
 - Timing of the modification (earlier or later in the delinquency cycle); and
 - Front-end DTI ratio before and after modification.
 The default/re-default rate model will be updated over time as more information becomes available.
- **Time to Re-default** – The base NPV model assumes that those loans that do fail after modification will become delinquent six months after the initiation of the trial period and subsequently default.
- **Imminent Default Loans** – Current loans and loans that are delinquent 59 days or less that are flagged as “imminent default” are treated as if they have the default and re-default probabilities of loans that are 60 days or more delinquent.
- **Prepayment Rate** – See the *Base Model Equations* section for detailed information on the prepayment model. The prepayment rate for loans with modification or without modification is calculated based on a variety of parameters. The key variables are:
 - MTM-LTV for each period the prepayment rate is estimated
 - Home price growth in the previous 12 months for each period the prepayment rate is estimated
 - Current credit score
 - Original loan amount
 - Refinance incentive

- **ARM/IO Reset or Recast (*Used to calculate DTI for eligibility and incentives*)** – ARMs and IO loans with a payment scheduled to reset or recast in the next four months will be based on the reset payment. This base NPV model simplifies the interest rate assumption per the following terms:
 - If the ARM/IO loan *will not* reset or recast in next four months, amortize the loan using the current interest rate, current UPB, and the remaining term plus the months past due. In this instance, the “Principal and Interest Payment before Modification” input field plus taxes, insurance, and association fees (PITIA) is used to calculate the front-end DTI.
 - If the ARM/IO loan *will* reset or recast in next four months, amortize the loan using the reset interest rate, current UPB, and the remaining term plus the months past due. Front-end DTI is calculated using PITIA based on the greater of the “Principal and Interest Payment before Modification” input field and the fully amortizing payment using the note reset rate using the index value as of the date of the evaluation.
- **Par Value Approach (*Used for No Mod Cure Cash Flow*)** – Due to the difficulty of predicting future interest rate paths for adjustable rate mortgages, we are making a simplifying assumption to calculate the cash flows by using a par value approach. This will only apply to the no mod cure cash flow for all loans except fixed rate mortgages. This includes interest-only loans (adjustable-rate and fixed-rate), and option-ARM loans. We set the present value of the cash flow equal to P&I arrearage plus UPB.
- **REO Discount for AVM** – REO Discount represents the difference between the sale price of a foreclosed property and the sale price of comparable properties that are not foreclosures. The measure is expressed as a percentage of the non-foreclosure sales price. An Automated Valuation Model (AVM) was used to determine the estimated non-foreclosure sale price based upon combined data on Fannie Mae and Freddie Mac sale prices of foreclosed single-family properties. This discount reflects the deterioration in value that often occurs as a home goes through the foreclosure sale process. This discount varies by property location and value. The state-level median discounts are provided separately for properties that are above and below \$100,000 in value.
- **REO Discount for BPO and Appraisal** – Servicers can submit exterior or interior broker price opinion (BPO) or appraisal in lieu of AVM valuation. Because an exterior valuation is presumably more accurate than an AVM valuation, and an interior valuation is presumably more accurate than an exterior valuation, we adjust the REO discount numbers for each valuation type. The REO discount for an exterior valuation will be 75% of the AVM discount. The REO discount for an interior valuation will be 25% of the AVM discount. For example, if the AVM REO discount is 12%, the exterior valuation discount would be 9% ($=.75*12%$); the interior valuation discount would be 3% ($=.25*12%$).
- **Home Price Projection** – A 110 local markets (MSA or non-MSA regions) home price projection is used for all home-price related calculations. The projection is based on an autoregressive model using the previous two quarters’ data. We used data from all Fannie Mae and Freddie Mac mortgage transactions, and data from outside vendors including deed transactions associated with many jumbo loans, loans in private-label securities, government loans, and loans held by lenders in portfolio. The projections are updated quarterly with new data, and the models supporting the projections may be updated to improve their accuracy. Unlike the FHFA House Price Index, this home price projection includes non-GSE transactions. Projections are based on both long- and short-term trends. The assumption is that prices tend to return to their long-term trends and that short-term trends continue, but at a

diminishing rate. The forecasting model considers projected income, population growth, and short-term macroeconomic drivers like housing starts. Beginning Q32009, the home price index (history and projection) has been adjusted to remove the seasonal affects of home prices and reduce the index's impact on the Home Price Decline Protection Payment.

▪ **Foreclosure, REO, and Disposition Timing and Costs**

- Foreclosure timeline data is calculated on all defaults (including pre-foreclosure sales, third-party sales, REO, and all other cases) that had their liquidation date in the preceding four quarters. Foreclosure timeline extends from the date of last paid installment date (LPI) to loan liquidation date.
- REO timeline data is calculated on all GSE REO disposed as direct sales in the preceding four quarters. Borrower redemptions, lender repurchases, etc., are not included in the REO timeline calculation, but auctions and bulk sales do count as direct sales. The REO timeline begins at the REO acquisition date and ends at the REO disposition date, and includes any redemption periods or other periods that may delay sale of the property.
- Foreclosure & REO costs are calculated based on GSE REO cases in the preceding four quarters on a weighted-average basis for each state. Settlement costs are calculated based on GSE REO direct-sale cases only in the preceding four quarters on a weighted-average basis for each state. Costs are calculated excluding all taxes, large repairs (greater than \$3,000) that would significantly change a property's value, homeowners' insurance premiums, homeowners' association fees, and condominium fees. (These expenses are dealt with separately in the base NPV model framework).

1. Foreclosure & REO costs are the sum of:

- a) Attorney and Trustee Fees
- b) Possessory and Eviction Fees and Expenses
- c) Bankruptcy Expenses
- d) Servicer Liquidation Expenses
- e) MI Premium
- f) Flood Insurance Premium
- g) Title Insurance
- h) Appraisal Fees
- i) Property Inspection
- j) Utilities
- k) Property Maintenance/Preservation
- l) Other Foreclosure and Holding Costs
- m) Total Repairs (capped at \$3,000 to exclude discretionary repairs)
- n) Participation Expenses
- o) Foreclosure Costs that are paid out at property sale (from HUD-1)

Calculation: Weighted average of ((Sum of costs "a" through "o" above) / Loan UPB at Default), with the weight on the UPB at default.

2. Settlement Charges are the sum of:

- a) Discount Points
- b) Loan Origination Fees
- c) Broker's Bonus

- d) Broker Commission Fees
- e) Buyer's Closing Costs (paid by seller only—not total buyer's closing costs)
- f) Title Fee Cost
- g) Seller's Closing Costs
- h) Assessments
- i) FHA/VA Non-Allowable Costs
- j) Other Costs
- k) Wire Fees
- l) Subtract miscellaneous revenues received at property sale:
 - i. Per diem amount
 - ii. Other rent/interest amount
 - iii. Prepaid interest amount

Calculation: Weighted average of ((Sum of costs “a” through “l” above) / Gross Sale Price), with the weight on the Gross Sale Price.

Note: The “foreclosure costs” on the HUD-1 document are paid out at property sale. That value is included in the calculation of the Foreclosure & REO costs rather than Settlement Charges. Although they are paid at the property sale, they are conceptually part of the Foreclosure & REO costs category.

Base NPV Model Outputs

The base NPV model produces two types of output – Waterfall Check (see Section VI) and NPV Results. The Waterfall Check is an indicator to the servicer as to whether the modification terms fall within the guidelines of the HAMP. The proposed terms of the modification are not provided in the output. The NPV Results display the total expected cash flows of the modification scenario and the no-modification scenario.

1. Waterfall Check

- **Waterfall Test (Y/N)** – The Waterfall Check compares the modified loan terms and forbearance provided by the servicer with those calculated by an NPV model. The result of the Waterfall Check does not attest to whether the terms of the modification follow the HAMP waterfall guidelines, nor does it attest to whether the terms of the modification violate the standard waterfall guidelines. Because certain nuances may exist in the interpretation and implementation of the waterfall guidelines, this flag is simply informational. It is the responsibility of the servicer to make sure the terms of the modification follow the HAMP guidelines.

For the test, the code checks that the waterfall outputs are within the following range:

- Interest Rate After Modification must be within 12.5 basis points of the interest rate calculated by the base NPV model. Minimum rate is 2%.
- Amortization Term After Modification must be within 12 months of the term calculated by the base NPV model. If the current remaining term is greater than 480 months, the Amortization Term After Modification must equal current remaining terms.

- Forbearance amount must be within \$1,000 of the amount calculated by the base NPV model.
- **De Minimis (Y/N)** – Whether the loan meets the “de minimis” test to qualify for annual servicer and borrower Pay-for-Performance Success Payments – at least 6% reduction in monthly PITIA payment. Also, whether the Pay-for-Performance Success Payments are no larger than half the reduction in the borrower’s annualized monthly payment to the borrower’s 31% DTI payment.
- **Forbearance Flag (Y/N)** – The forbearance flag signifies whether the loan exceeded the maximum allowable forbearance amount. Only NPV negative loans have a cap in forbearance amount. In cases where the forbearance flag is “Y,” the loan after modification is NPV negative and the amount forborne makes the interest-bearing UPB less than the market value of the property. Forbearance flag “N” means the loan did not exceed allowable forbearance amount.

2. NPV Results

- **HAMP Servicer Loan Number**
- **Servicer Loan Number** – Unique loan number
- **NPV Value No Mod** – NPV value of not modifying the loan
- **NPV Value Mod** – NPV value of modifying the loan
- **NPV Test**– Result of the NPV test (Positive/Negative)
- **NPV Run Successful?** – “Y” or “N” flag indicates whether the loan was able to run through the base NPV model. The data field is populated with a “Y” flag if the loan runs through the base NPV model successfully. If the loan does not run through the base NPV model successfully due to a data error or other issue, the field will be populated with an “N” flag, followed by a code(s) indicating the error. For example, N: 1; 5; d. The list of codes and descriptions is provided below. If the loan is not run through the base NPV model successfully, NPV values will not be available – please correct the data and resubmit.
- **Run Date** – Date the NPV test was run
- **Code Version** – The version of the base NPV model that was used in the assessment, where applicable
- **Freddie PMMS Rate** – The Freddie Mac weekly PMMS rate for 30-year conforming loans used in the NPV calculation.

Codes returned in the “NPV Run Successful?” field when the run is not successful are:

NPV Run Successful? "N" Error Code	DESCRIPTION
1	Invalid or missing Investor Code
2	Missing Servicer Loan Number
3	Missing HAMP Servicer Number
4	Missing Data Collection Date
5	Missing First Payment Date at Origination
6	Missing Unpaid Principal Balance at Origination
7	Missing Amortization Term at Origination
8	Missing Interest Rate at Origination

NPV Run Successful? "N" Error Code	DESCRIPTION
9	Missing LTV at Origination
10	Invalid or missing Product before Modification
11	Missing Remaining Term
12	Missing Unpaid Principal Balance Before Modification
13	Missing Interest Rate Before Modification
14	Missing Principal and Interest Payment Before Modification
15	Missing Current Borrower Credit Score
16	Missing Property - Zip Code
17	Missing Property - State
18	Missing Association Dues/Fees Before Modification or Monthly Hazard and Flood Insurance or Monthly Real Estate Taxes
19	Missing Property Valuation As-is Value
20	Missing Mark-to-Market LTV
21	Missing Months Past Due
22	Missing Monthly Gross Income
23	Missing Unpaid Principal Balance After Modification
24	Missing Interest Rate After Modification
25	Missing Amortization Term After Modification
26	Missing Principal and Interest Payment After Modification
27	Invalid or missing Imminent Default Flag
28	Invalid or missing Property Valuation Type
29	Data Collection Date is more than 90 days ago from the NPV Date or is in the future of the NPV Date
30	Unpaid Principal Balance Before Modification is over the allowed maximum for the specified Property – Number of Units
31	Invalid or missing Property - Number of Units
32	First Payment Date at Origination is outside the range of [Jan 1st 1960, Mar 1st 2009)
33	Unpaid Principal Balance at Origination outside the range of [0,\$10,000,000]
34	Amortization Term at Origination is 0 or less
35	Interest Rate at Origination outside the range of [0, 25%]
36	LTV at Origination outside the range of [0,150%]
37	Next ARM Reset rate outside the range of [0,25%]
38	ARM Reset Date is before the First Payment Date at Origination
39	Error code “39” no longer used
40	Unpaid Principal Balance Before Modification is less than 0
41	Interest Rate Before Modification is outside the range of [0,25%]
42	Principal and Interest Payment Before Modification is less than 0
43	Current Borrower Credit Score/ Current Co-borrower Credit Score is outside the range of [250,900]
44	Property - State is not in list of US states and territories
45	Association Dues/Fees Before Modification or Monthly Hazard and Flood Insurance or Monthly Real Estate Taxes is less than 0

NPV Run Successful? "N" Error Code	DESCRIPTION
46	MI Coverage Percent is outside the range of [0,100%] or missing
47	Mark-to-Market LTV is outside the range of [0,999.99999%]
48	Months Past Due is greater than age of the loan
49	Discount Rate Risk Premium is greater than 2.5%
50	Modification Fees is less than 0
51	MI Partial Claim Amount is less than 0 or missing
52	Unpaid Principal Balance After Modification is less than 0
53	Interest Rate After Modification is outside the range of [0,25%]
54	If Remaining Term is greater than 480 months, Amortization Term After Modification must be equal to Remaining Term. If Remaining Term is 480 months or less, Amortization Term After Modification must be less than or equal to Remaining Term.
55	MTM-LTV provided in the input file is inconsistent with the MTM-LTV calculated by dividing UPB before modification by property value; must report 5 decimal places (truncate the value to 5 decimal places - do not round)
56	ARM or IO Loan and missing ARM Reset Date
57	ARM or IO Loan and missing ARM Reset Rate
58	Invalid zip code
59	Missing NPV Date; or the NPV Date is in the future or before 4/15/09
a	Ineligible for HAMP mod - Current DTI already below 31%
b	Monthly Taxes & Insurance > Monthly Gross Income
c	Interest Rate After Modification is the smaller of the floor rate and Interest Rate Before Modification
d	Error code "d" no longer used
e	The new front-end DTI is greater than the current front-end DTI
f	Ineligible for HAMP mod - Excessive Forbearance on NPV Negative Loan
g	Ineligible for HAMP mod - DTI after modification is greater than or equal to 32%

Subsidy Ineligibility

There are four scenarios in which the modified loan is ineligible for subsidy.

1. If the borrower is not current at the end of the trial period.
2. If the new payment at 31% DTI is not at least 6% lower than the current payment, the loan is not eligible for the \$1,500 investor initiation incentive, the \$1,000 per year servicer pay-for-success incentive, the \$1,000 per year borrower Pay-for-Performance Success Payment, or the Home Price Decline Protection incentive. However, the investor is entitled to the Payment Reduction Cost Share.
3. If the NPV for the modification is negative and the investor does not want to continue with the HAMP program, the loan is not eligible for program subsidy.
4. If the NPV for the modification is negative, the forbearance amount has already reduced the interest-bearing UPB to the market value of the property, and the loan has not achieved 31% DTI, the loan is not eligible for program subsidy.

V. Base NPV Model Equations

Below we describe the calculations for the no-modification (NPV_{NOMOD}) and modification (NPV_{MOD}) scenarios respectively.

When $NPV_{MOD} > NPV_{NOMOD}$, the modification is said to be NPV positive. Below we describe the calculations for NPV_{NOMOD} and NPV_{MOD} respectively.

Each NPV is calculated as:

$$NPV = (1 - p) \cdot NPV \{ \text{Loan Cures} \} + p \cdot NPV \{ \text{Loan Defaults} \}$$

where p is the lifetime default probability.⁴

Discounted Future Cash Flows – Four Cases

1. No Mod: NPV{Loan Cures}

In the case where the loan is fixed rate and there is no change in the principal and interest payment over the life of the loan, we calculate the present value using a cash flow model. However, for adjustable-rate loans, interest-only loans (adjustable-rate and fixed-rate), and option ARM loans the approach we take is a par value methodology.

Cash Flow Model (Fixed-Rate Mortgage Only)

For each month i , we assume that the full UPB is collected if the loan prepays. If the loan does not prepay, then the investor collects principal and interest. Note that loans that cure may have an arrearage that also must be accounted for. Here we make the simplifying assumption that the P&I arrearage is paid immediately and we approximate the arrearage as:

$$\text{P\&I Arrearage} \approx MDLQ (P + I)$$

Hence,

$$PV \{ \text{Loan Cures} \} = \sum_{i=1}^T \frac{1}{(1 + \delta)^i} \left\{ [\text{UPB}_{i-1} - P_i] \left[\prod_{k=1}^{i-1} (1 - \text{SMM}_k) \right] - \prod_{k=1}^i (1 - \text{SMM}_k) \right\} + [P_i + I_i] \prod_{k=1}^{i-1} (1 - \text{SMM}_k) + MDLQ (P_0 + I_0)$$

where:

MDLQ – Months delinquent

T – Remaining term⁵

δ – Monthly discount rate

UPB – Unpaid principal balance⁶

P – Principal

I – Interest

SMM_k – Single month mortality (SMM) in month k ⁷

⁴ Default equations are defined at the end of this section.

⁵ The remaining term includes the trial period.

⁶ Note that the notation assumes that UPB_0 is equal to the UPB amount after delinquent loans have been cured.

⁷ SMM equations are defined at the end of this section.

Par Value Methodology

For ARM loans, IO loans and Option ARM loans we set the present value equal to P&I arrearage plus UPB. Note that the UPB used is the amount after delinquent loans have been cured.⁸

2. No Mod: NPV{Loan Defaults}

The model utilizes a simplified approach to the timing of default. For the non-modification scenario, the model assumes that if the loan defaults, it makes no further payments and proceeds to default according to state-level foreclosure (FCL) timelines.

$$\begin{aligned} \text{Months to FCL} &= \text{Max}(1, \text{Average State Level FCL timeframe} - \text{MDLQ}) \\ S \equiv \text{Months to REO Sales} &= \text{Months to FCL} + \text{Average State Level REO timeframe}^9 \end{aligned}$$

There are two components to this default cash flow: T&I (outflow) and REO sales proceeds (inflow).

$$PV\{Loan\ Defaults\} = \sum_{j=1}^S \left[\frac{-C}{(1+\delta)^j} \right] + \frac{NPDV}{(1+\delta)^S}$$

where :

C – Taxes and Insurance and Homeowners' Association fees

NPDV – Net Property Disposition Value

Net Property Disposition Value (NPDV)

We assume that all disposition-related cash flows occur on the date of REO Sale. These include FCL costs, REO disposition costs, MI proceeds, and Net REO Sales proceeds. The components of NPDV are estimated as follows:

a. **Foreclosure/REO Costs** – State-level average costs are used. Note that these are based on the current UPB before modification.

b. **Settlement Charges** – State-level charges as a percentage of the gross REO sales proceeds, including broker fees.

c. **MI Proceeds**^{10, 11}

$$= \text{Min}((\text{MI CoveragePct} * \text{UPB} * 1.15), \text{Max}(\text{UPB} * 1.15 - \text{Net REO Sales Proceeds}, 0))$$

d. **Net REO Sales Proceeds** – The sales price of the REO property is calculated by marking forward a current property value¹² to the projected REO Sales date using the local market level

⁸ It is equal to UPB_0 in the cash flow model above.

⁹ For each of the two timeline components we divide the number of days provided in the Foreclosure and REO Disposition Timeline and Costs tables by 30 and set the number of months equal to the next highest integer for both. We then add the two (rounded up) monthly timeline components together to derive S.

¹⁰ The servicer may choose to exclude MI coverage with investor consent. The 15% gross-up of UPB approximates accrued interest and foreclosure/disposition costs.

¹¹ For the loan modification case, the relevant UPB will be the post-modification UPB that includes arrearages.

¹² The current property value is provided by the servicer and may be obtained through an approved Automated Valuation Model (AVM) such as Freddie Mac's Home Value Estimator (HVE) or Fannie Mae's Automated Property Service (APS), a broker price opinion (BPO), or appraisal. For BPOs and appraisals, the "as is value" should be used.

home price projection¹³. In addition, a state-level REO stigma discount is applied to reflect REO sales.¹⁴

Thus:

$$\text{Net REO Sales Proceeds} = \text{MTMVal} * (1 - \text{Abs(REO Discount)}) * \text{HPForecast} * (1 - \text{Settlement Charges})$$

In summary:¹⁵

$$\text{NPDV} = (\text{Net REO Sales Proceeds}) - \text{Foreclosure/Disposition Costs} + \text{MI Proceeds}$$

3. Mod: NPV{Loan Cures}

For each period i the full UPB is collected if the loan prepays. If the loan does not prepay, then the investor collects principal and interest, subsidy and incentives.

$$\begin{aligned} PV\{LoanCures\} = & \sum_{i=1}^T \frac{1}{(1+\delta)^i} \left\{ [\text{UPB}_{i-1} - P_i + F] \left[\prod_{k=1}^{i-1} (1 - \text{SMM}_k) - \prod_{k=1}^i (1 - \text{SMM}_k) \right] + [P_i + [I_i + \text{GS}_i]] \prod_{k=1}^{i-1} (1 - \text{SMM}_k) \right\} \\ & + \frac{I_i}{(1+\delta)^3} \prod_{k=1}^2 (1 - \text{SMM}_k) + \frac{(3 * \text{GS}_4)}{(1+\delta)^4} \prod_{k=1}^3 (1 - \text{SMM}_k) + \sum_{j=1}^5 \left\{ \frac{M}{(1+\delta)^{(12*j)}} \prod_{k=1}^{12*j-1} (1 - \text{SMM}_k) \right\} \\ & + \left[\frac{\frac{1}{12} * 0.5 * \text{HPDP}}{(1+\delta)^{12}} \right] \sum_{j=1}^{12} \left(\prod_{k=1}^j (1 - \text{SMM}_k) \right) \\ & + \left[\frac{\frac{1}{12} * 0.5 * \text{HPDP}}{(1+\delta)^{24}} \right] \left[\prod_{k=1}^{12} (1 - \text{SMM}_k) \right] \sum_{j=13}^{24} \left(\prod_{k=13}^j (1 - \text{SMM}_k) \right) \\ & - \text{Mfee} + \text{MIPartialClaim} + \left[\frac{F}{(1+\delta)^T} \right] \prod_{k=1}^T (1 - \text{SMM}_k) \end{aligned}$$

Where:

$$\text{UPB}_i = \text{UPB}_{i-1} - P_i - t_i(M) \text{ and } t_i(M) = \begin{cases} M & \text{if } i = 13, 25, 37, 49, 61 \\ 0 & \text{otherwise} \end{cases}$$

M = Borrower incentive paid for five years at the end of each year if the loan is current. It is the lesser of \$1,000 or half the reduction in the borrower's annualized monthly payment to the borrower's 31% DTI payment.

GS_i – Government Subsidy

$$\text{GS}_i = 0.5 * [\text{Min}(\text{PAY}_{\text{DTI}=38}, \text{PAY}_{\text{DTI_START}}) - \text{PAY}_{\text{DTI}=31}] \text{ for } 4 \leq i \leq 60$$

$$\text{Otherwise } \text{GS}_i = 0$$

¹³ When converting from S (in months) divide by three and round *down* to the nearest integer.

¹⁴ Each component is described in detail in the next section.

¹⁵ We cap the NPDV so that $\text{NPDV} = \text{Current UPB} + \text{MI Proceeds}$ in cases where $\text{NPDV} > (\text{Current UPB} + \text{MI Proceeds})$.

Note that in the fourth month, a government subsidy payment is made for the trial period. This is contingent on the successful completion of the trial period. We denote this payment as $3 * GS_4$ because it covers the three months of the trial period.¹⁶

Π_1 – Non-Delinquency Modification Incentive for the Investor = \$1,500 if modified loan was current at the beginning of, and throughout, the trial period and the payment is decreased by $\geq 6\%$.

HPDP – Home Price Decline Protection Incentive

Half of the HPDP is allocated for payment 12 months after the start of the trial modification. The other half is allocated for payment 24 months after the start of the trial modification.

HPDP is calculated on the NPV Date at the start of the trial period using the formula:

$$\text{HPDP} = \text{Quintile Base} * [1.6 * \text{HPD}(q-1) + 1.0 * \text{HPD}(q-2) - 1] * \text{MTMLTV Factor}$$

The Quintile Base is equal to \$200, \$300, \$400, \$500 and \$600 for loans that fall in quintiles 1, 2, 3, 4 and 5 respectively. Quintile assignment is based on the unpaid principal balance (UPB) of the loan prior to modification.¹⁷

$(q-1)$ refers to the most recent quarter for which data is available. The HPDP payment table is updated on the first day of each quarter on a two quarter lag. For example, if the NPV Date is 9/1/2009, then $(q-1)$ refers to the home price index for 2009Q1 (since 2009Q2 data is not yet available). On the other hand, if the NPV Date is 10/1/2009, then $(q-1)$ refers to 2009Q2.

$\text{HPD}(q-1)$ = percentage **decline** rounded to the nearest full percentage point. For example, if the decline was 5.3%, then $\text{HPD}(q-1) = 5$. If there was a growth of 5.5%, then $\text{HPD}(q-1) = -6$.

$\text{HPD}(q-2)$ = percentage **decline** rounded to the nearest full percentage point. For example, if the decline was 4.9%, then $\text{HPD}(q-2) = 5$. If there was a growth of 5.5%, then $\text{HPD}(q-2) = -6$.

Continuing with the first example, if the NPV Date is 9/1/2009, $\text{HPD}(q-2)$ refers to 2008Q4.

The MTM-LTV Factor is a weighting factor based on the UPB of the loan prior to modification. It is equal to 0 if the MTM-LTV is less than 70%; it is equal to 1/3 if the MTM-LTV is at least 70% but less than 80%; it is equal to 2/3 if the MTM-LTV is at least 80% but less than 90%; and it is equal to 1 if the MTM-LTV is greater or equal to 90%.

¹⁶ Fannie Mae current loans require a four month trial period and the payment would be denoted as $4 * GS_5$.

¹⁷ Details on the UPB quintile thresholds are provided in Exhibit 1 of the Supplemental Directive 09-[04].

If $HPDP < 0$ then we set the incentive to 0.

F – Forbearance amount that is ballooned without interest.

Mfee – Modification fee to be reimbursed to the servicer by the investor (i.e., notary fee, property valuation, and other required fees).

Note that $MIPartialClaim$ is set to zero except when the model is used to evaluate an MI company partial claim offer subsequent to a negative NPV result and MI insurer review.

4. Mod: NPV{Loan Defaults}

For the modified loan default scenario, we assume that the loan fails six month after the initiation of the trial period. This has the effect of resetting the foreclosure process at the end of the sixth month, thus delaying the eventual REO disposition.

$S \equiv$ Months from LPI until REO Sale

$$\begin{aligned}
 PV\{Default\} = & \left[\sum_{i=1}^6 \frac{1}{(1+\delta)^i} \left\{ [UPB_{i-1} - P_i + F] \left[\prod_{k=1}^{i-1} (1 - SMM_k) \right] - \prod_{k=1}^i (1 - SMM_k) \right\} + [P_i + [I_i + GS_i] \prod_{k=1}^{i-1} (1 - SMM_k)] \right] \\
 & + \frac{H_1}{(1+\delta)^3} \prod_{k=1}^2 (1 - SMM_k) + \frac{(3 * GS_4)}{(1+\delta)^4} \prod_{k=1}^3 (1 - SMM_k) \\
 & + \left[\sum_{j=7}^{S+6} \left[\frac{-C}{(1+\delta)^j} \right] + \frac{NPDV - MIPartialClaim}{(1+\delta)^{S+6}} \right] \prod_{k=1}^6 (1 - SMM_k) \\
 & + \left[\frac{\frac{1}{12} * 0.5 * HPDP}{(1+\delta)^{12}} \right] \sum_{j=1}^8 \left(\prod_{k=1}^j (1 - SMM_k) \right) - Mfee + MIPartialClaim
 \end{aligned}$$

Here the first term reflects the six months of cash flows resulting from the timely payments of P&I during the trial period. The second term defines the incentive payment made after the end of the trial period. The third term defines the cash flows from the default that is set into motion in month seven and concludes with REO Sale in month $S+6$.

Base NPV Model for Determining Probability of Default

The NPV model contains a simple and intuitive model for determining the probability of default – both without modification and with modification. The model was estimated using historical data and, given the lack of experience with modifications that substantially reduce monthly payments, supplemented by expert judgment. The variables determining default probability are the current mark-to-market LTV (MTM-LTV) of the first-lien mortgage, the borrower’s current credit score, the borrower’s front-end DTI before the modification, and the delinquency status of the loan. Loan modification lowers the DTI and affects the default prediction of the model through a payment relief term specified as the difference between the original DTI and the

program target DTI of 31%. Predicted default rates increase with higher MTM-LTV levels, lower credit scores, and higher original DTI levels. Predicted re-default rates do not increase monotonically with original DTI. Higher DTI means the borrower is at greater risk of default, but it also means a larger reduction in monthly payments, which reduces the chance of re-default; the net effect depends on the sizes of the coefficients in the D30, D60, and D90 equations. The equations for the model are shown below. These equations are based upon logistic regressions with separate equations by loan status (current, D30, D60, D90+). Current loans and loans that are delinquent 59 days or less that are flagged as “imminent default” are treated as if they have the default and re-default probabilities of loans that are 60 days or more delinquent.

To calculate the probabilities the anti-logit transformation must be applied. That is, for each Z listed below:

$$\text{Probability of Default} = \text{Exp}(Z) / (1 + \text{Exp}(Z))$$

Current Loan Equation

$$Z = -2.95 + 0.0494 * \text{MTM_LTV} - 0.00568 * \text{CREDIT SCORE} + 0.01 * \text{DTI_START} - 0.275 * \text{LN}(\text{DTI_START} - (\text{DTI_MODIFIED} - 1)) * \text{REDEF_IND}$$

30 Days DLQ Equation

$$Z = -2.25 + 0.0425 * \text{MTM_LTV} - 0.00495 * \text{CREDIT SCORE} + 0.015 * \text{DTI_START} - 0.365 * \text{LN}(\text{DTI_START} - (\text{DTI_MODIFIED} - 1)) * \text{REDEF_IND}$$

60 Days DLQ Equation

$$Z = -1.98 + 0.0375 * \text{MTM_LTV} - 0.00332 * \text{CREDIT SCORE} + 0.025 * \text{DTI_START} - 0.555 * \text{LN}(\text{DTI_START} - (\text{DTI_MODIFIED} - 1)) * \text{REDEF_IND}$$

90+ Days DLQ Equation

$$Z = -1.15 + 0.0255 * \text{MTM_LTV} - 0.00195 * \text{CREDIT SCORE} + 0.045 * \text{DTI_START} - 0.745 * \text{LN}(\text{DTI_START} - (\text{DTI_MODIFIED} - 1)) * \text{REDEF_IND}$$

where:

MTM_LTV – Mark-to-market LTV; value ranges from 0 to 300 (of the first lien but not junior liens). Multiply 100 by the input variable column AB in the NPV input spreadsheet.

Credit Score – Current credit score or equivalent (minimum of borrower and co-borrower)

DTI_START – Front-end ratio before the modification, must be 31 or above; value ranges from 0 to 100

DTI_MODIFIED – Front-end ratio after the modification; value ranges from 0 to 100

REDEF_IND – Binary indicator set to 1 for calculating the re-default probability and set to 0 for default probability

The model coefficients were set to be consistent with observed default rates on a broad loan population using data selected from GSE seasoned loans along with ABS/MBS data from First American CoreLogic. Coefficients will be updated as performance data from the modification program becomes available.

Prepayment Model for Determining Single Month Mortality (SMM)

A logistic regression model is used to estimate prepayment rate. The model has the following structure:

$$\text{SMM}_k = \text{Exp}(P_k) / (1 + \text{Exp}(P_k))$$

Where SMM_k is the monthly prepayment rate in month k and P_k is the predicted value from the regression.

The model has the same structure but different coefficients for loans with different delinquency status (current, D30, D60, D90+). There are no separate models for loans in the mod and no mod scenarios. The impacts of loan modifications on prepayment rate are captured through the explanatory variables in the model. The explanatory variables used in the model are: Refinancing incentive, 12-month home price growth rate,¹⁸ mark-to-market LTV,¹⁹ current credit score, and original loan amount.

Before we examine the regression coefficients we define in detail the refinancing incentive variable (“INCT”).

$$\text{INCT} = \text{WAC} - \text{effective refinancing rate} - \text{adjustments}$$

WAC = Current note rate or the modified note rate.

Effective Refinancing Rate – Freddie Mac’s PMMS weekly rate for 30-year fixed-rate conforming loans. For purposes of the model we use the current PMMS weekly rate for all periods.

The “adjustments” refer to the modification incentives available to the borrower that affect the borrower’s incentive to prepay. The two financial incentives are the \$1,000 in annual principal reduction upon performance (or half the reduction in the borrower’s annualized monthly payment, if lower) and the interest on the principal that is in forbearance. In rate terms, the first incentive is given by:

¹⁸ The house price growth is at the MSA or non-MSA region level. As in the HPD there are 110 possible paths. Note that values are provided for the last four quarters and 3 years into the future. At the end of the third year, we use a “flat lined” value equal to an annual growth rate of 4.5%. To convert the quarterly data into monthly data we assume that the index in the quarter corresponds to the index for the last month in the quarter. We further assume that the growth is the same for each month in the quarter. That is, if the quarterly growth rate is x , then the monthly growth is equal to $[(1+x)^{1/3} - 1]$.

¹⁹ The mark-to-market LTV is calculated using the UPB from the previous period. The value is taken as the property value in the previous period multiplied by the house price growth from the last period to the current period.

$$adj_1(t) = \sum_{j=1}^5 \frac{k(t, j) * M}{(1 + \delta)^{(12*j-t)}} \frac{1}{UPB(t)} \frac{1}{m}$$

Where t is number of months the loan has been in the modification, M is the Borrower Pay-for Success incentive paid for five years at the end of each year if the loan is current. It is the lesser of \$1,000 or half the reduction in the borrower’s annualized monthly payment. This incentive adjustment is also contingent upon the modification meeting the de minimis test. $k(t, j) = 1$ if $t \leq 12*j$, and 0 otherwise. m is the effective “multiple” to translate points to rates. We use $m=6$.

The second incentive measured rate term is analogously:

$$adj_2(t) = \frac{((1 + WAC / 12)^{(T-t)} - 1) * F}{(1 + \delta)^{(T-t)}} \frac{1}{UPB(t)} \frac{1}{m}$$

Where T is the remaining term of the loan at the time of the loan modification, and F is the forbearance amount that is ballooned without interest.

The following table shows the logistic prepayment model parameters. Note that all coefficients include five decimal places.²⁰

Category	Coefficient				Variable
	Current	D30	D60	D90+	
Intercept	-6.53418	-6.32201	-6.17936	-4.21361	1
12 Month HPI growth I	4.20400	3.19578	2.56488	2.11653	MIN(-0.2, hpag)
12 Month HPI growth II	1.20280	0.19740	0.80500	0.00000	MAX(-0.2, MIN(-0.1, hpag))-(-0.2)
12 Month HPI growth III	3.34370	6.21320	4.50000	2.72610	MAX(-0.1, MIN(0, hpag))-(-0.1)
12 Month HPI growth IV	1.52310	4.32870	4.25000	6.33720	MAX(0, MIN(0.1, hpag))-(0)
12 Month HPI growth VI	1.00200	1.73040	1.98990	1.20390	MAX(0.1, MIN(0.2, hpag))-(-0.1)
12 Month HPI growth VII	1.65990	2.68370	2.11510	2.46250	MAX(0.2, hpag)-0.2
INCT I	0.71370	0.72510	0.24045	0.52020	MIN(-1.5, inct)
INCT II	0.05490	0.06370	0.05883	0.08613	MAX(-1.5, MIN(-1, inct))-(-1.5)
INCT III	0.91180	0.45198	0.34893	0.22795	MAX(-1, MIN(0, inct))-(-1)
INCT IV	2.08100	0.71020	0.37760	0.12720	MAX(0, MIN(0.5, inct))-0
INCT V	1.19200	0.62190	0.19970	0.01860	MAX(0.5, MIN(1, inct))-0.5
INCT VI	0.51590	0.05750	0.06870	0.00000	MAX(1, MIN(1.5, inct))-1
INCT VII	0.17970	0.10540	0.11150	0.14470	MAX(1.5, MIN(2, inct))-1.5
INCT VIII	0.05280	0.12610	0.00000	0.05130	MAX(2, MIN(2.5, inct))-2
INCT IX	0.00000	0.00000	0.00000	0.00000	MAX(2.5, inct)-2.5
MTMLTV I	0.00400	-0.00246	-0.00763	-0.01408	MIN(50, MIN(mltv, 180))
MTMLTV II	-0.00300	-0.01425	-0.01718	-0.02603	MAX(50, MIN(70, mltv)) - 50
MTMLTV III	-0.02160	-0.02580	-0.03090	-0.03555	MAX(70, MIN(80, mltv)) - 70
MTMLTV IV	-0.01660	-0.01938	-0.01915	-0.02178	MAX(80, MIN(90, mltv)) - 80
MTMLTV V	-0.11490	-0.11260	-0.11230	-0.11010	MAX(90, MIN(100, mltv)) - 90

²⁰ Note that we bound the values of the independent variables as follows:

- If “hpag” is less than -0.5 it is set equal to -0.5 and if it is greater than 0.5 it is set equal to 0.5
- If “inct” is less than -5 it is set equal to -5 and if it is greater than 3 it is set equal to 3
- If “mltv” is less than 40 it is set equal to 40 and if it is greater than 180 it is set equal to 180
- If “credit score” is less than 400 it is set equal to 400 and if it is greater than 800 it is set equal to 800
- If “amt” is less than 50 it is set equal to 50 and if it is greater than 500 it is set equal to 500

Category	Coefficient				Variable
	Current	D30	D60	D90+	
MTMLTV VI	-0.03110	-0.03640	-0.06010	-0.06130	MAX(100, mltv) - 100
Credit Score I	0.00160	0.00257	0.00227	0.00145	MIN(640, Credit Score)
Credit Score II	0.00160	0.00556	0.00395	0.00307	MAX(640, MIN(700, Credit Score)) - 640
Credit Score III	0.00160	0.00546	0.00466	0.00394	MAX(700, MIN(760, Credit Score)) - 700
Credit Score IV	0.00000	0.00000	0.00000	0.00000	MAX(760, Credit Score) - 760
Original Amount I	0.01240	0.01026	0.00940	0.00671	MIN(80, amt)
Original Amount II	0.00717	0.00615	0.00426	0.00501	MAX(80, MIN(140, amt)) - 80
Original Amount III	0.00336	0.00201	0.00082	0.00012	MAX(140, MIN(220, amt)) - 140
Original Amount IV	0.00178	0.00089	0.00010	-0.00019	MAX(220, MIN(300, amt)) - 220
Original Amount V	0.00000	0.00000	0.00000	0.00000	MAX(300, amt) - 300

To clarify how to calculate the predicted value, P_k , we provide an example. Suppose in month k the HPI growth is -5% (i.e., $hpag=-0.05$), $inct=1$, $mtlv=60$, $Credit\ Score=720$ and the original amount was \$100,000 ($amt=100$). For a current loan:

$$\begin{aligned}
P_k = & -6.53418 + [4.20400*(-0.2) + 1.20280*0.1 + 3.34370*0.05] + \\
& [0.71370*(-1.5) + 0.05490*0.5 + 0.91180*1 + 2.08100*0.5 + 1.19200*0.5] + \\
& [0.00400*50 + (-0.00300)*10] + [0.00160*640 + 0.00160*60 + 0.00160*20] + \\
& [0.01240*80 + 0.00717*20] = -3.124917
\end{aligned}$$

Thus, $SMM_k = \text{Exp}(P_k) / (1 + \text{Exp}(P_k)) = 4.2091\%$

VI. Requirements for Customization and Implementation of the Base NPV Model by Servicers

Servicers with at least a \$40 billion servicing book may choose to build and implement proprietary NPV models for use in the HAMP or to implement the base model on their own systems. Servicer-developed and implemented NPV models must adhere to the guidelines and framework outlined in this document. Servicers must use standard model inputs for the following variables:

- Discount Rate – The current Freddie Mac PMMS weekly rate for 30-year fixed-rate conforming loans; the servicer may choose to add a risk premium of up to 250 bps. With respect to loans that are not owned or guaranteed by Fannie Mae or Freddie Mac, the servicer may apply a maximum of two discount rates, one for loans in its own portfolio and another for loans serviced for investors. With respect to loans owned or guaranteed by Fannie Mae or Freddie Mac, the servicer must follow Fannie Mae and Freddie Mac guidance. When performing loan-level NPV calculations, the discount rate must be applied consistently to all cash flows. This means the discount rate applied to the no-modification cash flow will be the same as that applied to the modification cash flow.
- Prepayment Rate – See the Base Model Equations section. The prepayment rate for loans with modification or without modification is calculated based on a variety of parameters. The key variables are:
 - Mark-to-market loan-to-value ratio (MTM-LTV) for each period the prepayment rate is estimated
 - Home price growth in the previous 12 months for each period the prepayment rate is estimated
 - Current credit score
 - Original loan amount
 - Refinance incentive
- REO Discount – [Servicer](#) must use the REO discount table used by the base NPV model
- Home Price History and Projection – Servicers must use the 110 MSA/region level home price history and projection used by the base NPV model
- Foreclosure & REO Disposition Time Lines – Servicers must use the state level Foreclosure & REO Disposition Timelines table used by the base NPV model
- Foreclosure & REO Expenses and Settlement Charges – Servicers must use the state level Foreclosure & REO Expenses and Settlement Charges table used by the base NPV model
- Post-modification time to re-default – the base NPV model assumes re-default will occur six months after modification. This includes performance during the three-month trial period and in the subsequent three months. The loan then becomes 30 days delinquent at month seven and 90 days delinquent at month nine.
- Model version control – Each major model version, as defined by www.HMPAdmin.com, must be maintained so that borrowers are tested and retested on only one model version. All models must access market inputs from the date of the borrower’s first NPV test.

Foreclosure timelines and costs, REO Discount, and home-price projection are used to calculate the property value in the no-modification and modification default scenarios. These calculations are provided under *Base Model Equations* in Section IV above.

The prepayment rate model applied in the base NPV model calculations is detailed in the *Base Model Equations* section.

Servicer-Specific NPV Model Inputs

Servicers with proprietary NPV models are allowed to use their own internal data-driven models of default to determine default rates in the no-modification and modification scenarios. For purposes of the NPV calculation, default is defined as an event that ends in foreclosure and property disposition, with no possibility of cure, because the test assumes some rate of cure for loans in any stage of delinquency. The default model a servicer uses to establish these rates should take into account the variables determining the probability of default included in the default model used in the NPV model – current MTM-LTV, current DTI, current credit score, delinquency status, as feasible, and any other relevant variables the servicer identifies. Servicer judgment regarding the effect of DTI is expected, given the limited data available and the likelihood that the new program will materially reduce the modification re-default rate. However, all assumptions must be tested as program data become available and revised as appropriate.

The no-modification and modification default equations must be uniform across all loans. These equations may not distinguish between loans in portfolio and investor pools. In the modification default scenario, the model must assume the loan performs for six months, then becomes delinquent and defaults.

Loans at risk of imminent default (those that meet the test of imminent default the servicer employs along with the verification requirements in the Home Affordable Modification Program Guidelines) are treated as having the same level of default risk as a loan 60 days or more past due.

Model Versioning Requirements

Servicers should test the borrower using the same major version of the NPV model that was used to test the loan for trial modification eligibility. Major version refers to the first significant digit in a version number. For example, v1.1, v1.2, and v1.3 are all treated as version 1. The HMPadmin portal will use the best release of each major version to satisfy the versioning requirement. For example, v1.52 will become version 1, v2.01 will become version 2. New applicants should be tested using the latest available version of the NPV model. In deciding which version of the NPV model to use for subsequent re-runs, the servicer should use the model version that corresponds to the NPV Date.

Servicers also should use the same supplement data tables and discount rate that were used for the trial modification eligibility run. This includes the Freddie Mac PMMS weekly rate, REO Discount rate, Home Price Index, Home Price Decline Payment table, and Foreclosure/REO Timeline and Cost table.

Test Consistency Requirements

Servicers should keep as much borrower information constant between tests as possible. The only NPV inputs that should be updated when the borrower is retested are those that were incorrect on the date of the initial NPV evaluation and have since been corrected based on the borrower's income documentation. Inputs that have changed in the interim but were correct on the date of the initial NPV evaluation should be held constant.

In the version of the NPV model available at www.HMPAdmin.com, servicers should not change the "Data Collection Date" or the associated UPB and remaining term information for retests. This information should be reported for the retest as it was in the initial NPV evaluation.

Compliance Requirements

Servicers electing either to implement the NPV model on their own systems or, where eligible, to create a customized version must first successfully pass an NPV output test to ensure that the servicer's NPV model outputs are consistent with those of the Base NPV Model v3.0.

Servicers who plan to begin using their own NPV Model v3.0 by September 1, 2009 are required to conduct and pass the NPV output test before that date. Servicers planning to implement or customize the NPV model *after* September 1, 2009 must pass an output test before they begin using that model.

The MHA Compliance Agent (Freddie Mac) will administer and evaluate the results of all servicer NPV output tests and provide the necessary clearance for servicers to begin using their own NPV models. The test will involve running a dataset of sample modifications against the servicer's NPV model. To pass the test, the servicer NPV model results for the entire dataset of sample modifications must be consistent with the corresponding base NPV model results, within a defined threshold of acceptable variance. Additional instructions regarding the NPV output test will be provided to servicers upon request.

Subsequent to the test, servicers electing to use a customized version of the NPV model will be asked to provide documentation on methodology and key assumptions, as well as evidence that the servicer has instituted adequate controls and governance procedures with respect to the model.

NPV compliance testing will be conducted on an ongoing basis for the life of the HAMP program, and will be triggered both by changes to the base NPV model and by servicer-driven changes, such as migration to new systems, subsequent decisions to use servicer-specific default rates (where permitted) or to change those rates, and other related factors.

Servicers of Fannie Mae and Freddie Mac loans must follow the respective GSE's guidance regarding building the NPV model into their own platform/system or customizing the NPV model.

VII. Calculation Logic for the HAMP Waterfall

This section discusses the waterfall logic described in the HAMP term sheet. The servicer is responsible for verifying program eligibility and the modification terms.

Eligibility

Eligible loans must be originated on or before January 1, 2009. New borrowers will be accepted until December 31, 2012. Program payments will be made for up to five years after the date of entry. The mortgage loan must be secured by a one- to four-unit property, one unit of which is the borrower's principal residence. Cooperative-share mortgages and mortgage loans secured by one-unit condominiums and manufactured homes²¹ are eligible for the HAMP. Investor properties, second homes, vacant, and condemned properties are not allowed. There is no minimum or maximum current LTV ratio for eligibility purposes.

Current UPB limits (pre-modification and pre-capitalization) are as follows:

- 1 Unit \$729,750
- 2 Units \$934,200
- 3 Units \$1,129,250
- 4 Units \$1,403,400

The servicer must apply the standard waterfall (depicted in Figure 2) to all loans that meet the basic eligibility requirements. This waterfall adjusts the borrower's current loan terms in order to achieve a target front-end DTI of 31%. The waterfall step that results in a front-end DTI closest to 31% (without going below 31%) will satisfy the front-end DTI target. There is no restriction on reducing front-end DTI below 31%, but any portion of the reduction below 31% will not be compensated by the government. Government compensation will be based on verified borrower income.

Step 1: Calculate Current Debt to Income (DTI)

Calculate the borrower's front-end DTI based on current mortgage payment and gross monthly income. If the loan is an adjustable-rate mortgage (ARM) or interest-only mortgage (IO) and the interest rate is expected to reset or recast within four months, DTI is calculated using the greater of the payment using the reset rate or current scheduled payment. Otherwise, DTI is calculated using the current scheduled payment.

Step 2: Capitalize Arrearage

If the loan has any arrearage, the arrearage is capitalized to determine the new UPB. Items that may be capitalized include accrued interest, past-due real estate taxes, insurance premiums, delinquency charges paid to third parties and not retained by the servicer or its affiliate, and any required escrow advances. Late fees are not capitalized.

Step 3: Principal Forgiveness

There is no requirement to use principal reduction under the program, and it is not a formal step in the HAMP Standard Waterfall process. However, servicers may forgive principal to achieve

²¹ For complete guidance on eligible property types, refer to Supplemental Directive 09-01.

the front-end DTI target. Principal forgiveness can be used on a stand-alone basis or before steps 4, 5, or 6 in the Standard Waterfall process. Principal forgiveness is applied to the UPB, and subsequent steps in the Standard Waterfall are carried out until 31% target DTI ratio is achieved. If principal is forgiven and the interest rate is not reduced, the rate will be frozen at its existing level and treated as a modified rate for the purposes of the interest rate cap.

In the event of principal forgiveness, the Payment Reduction Cost Share continues to be based on the change in the borrower's monthly payment from 38% to 31% front-end DTI ratio and is limited to five years.

Step 4: Rate Reduction

Reduce note rate in increments of 0.125% to get as close to the target DTI of 31% as possible, without reducing the borrower's DTI below 31%. The new rate cannot be lower than 2%. If the target DTI is met and the resulting interest rate is higher than the interest rate cap²², then the resulting rate will be the note rate for the life of the modification and the payment (P&I) will be fixed for the life of the loan. If the resulting rate is below the interest rate cap, the reduced rate will be in effect for the first five years followed by annual increases of one percentage point per year (or a lesser amount as needed) until the interest rate reaches the interest rate cap. Borrower's monthly installment will be revised annually, if and when there is an interest rate reset, based on the statement above. If the target DTI cannot be reached at the 2% rate floor, term extension is considered.

Step 5: Term Extension

Re-amortize and extend the loan to a maximum 40-year term in monthly increments to reach as close to the target 31% DTI without going under. The modification term should not be lower than the current remaining term. If the loan's current remaining term is greater than 480 months, use the remaining term as the modification term. No term extension should be given. If the target DTI cannot be reached with the maximum term extension, then principal forbearance is considered.

Step 6: Principal Forbearance

Principal is forborne until the target DTI is achieved. The forbearance amount is added as a balloon payment to the end of the loan and no interest is collected on the forbearance amount. If the option to defer is selected, the servicer/lender shall forbear on collecting the deferred portion of the Capitalized Balance until the earlier of:

- maturity of the modified loan,
- a sale of the property, or
- a pay-off or refinancing of the loan

If the modification is NPV negative and the servicer chooses to modify the loan, forbearance can be no more than the difference between the unpaid balance and the current property value. If the target DTI cannot be reached with principal forbearance, principal forgiveness can be considered.

²² See definition in Supplemental Directive 09-01. The "Interest Rate Cap" is the Freddie Mac Weekly Primary Mortgage Market Survey (PMMS) weekly rate for 30-year fixed-rate conforming loans, rounded to the nearest 0.125 percent, as of the date that the modification agreement is prepared.

Figure 2

HAMP Logic Flow

