

# Business Rules Extracted from COBOL Source Code

---

## Purpose

This document catalogs the detailed business rules extracted from the Cook County property tax extension COBOL codebase. Each rule is identified by its source program, the code section where it is implemented, and its functional meaning.

---

## 1. Equalization Factor Rules

### BR-EQ-01: Equalization Factor Validation (CLREB020)

- **Rule:** Equalization factor input records must have: numeric year > 0, numeric factor > 0, and valid quad value (1-4).
- **Source:** CLREB020.cbl, paragraphs 200-EDIT-YEAR-QUAD and validation logic
- **Implementation:** Input is an 80-character card record with year (2 digits), quad (1 digit), and factor (5 digits = 9V9999 format). Invalid records are rejected with error messages.

### BR-EQ-02: Equalization Factor Sequence (CLREB020)

- **Rule:** Equalization factor records must arrive in ascending year+quad sequence. Out-of-sequence records trigger a fatal error (RETURN-CODE 16).
- **Source:** CLREB020.cbl, sequence checking logic

### BR-EQ-03: Equalization Factor Table (ASREA864, ASHMA850)

- **Rule:** The equalization factor table is indexed by a composite key of year (2 digits) and quad (1 digit), supporting up to 320 entries. Each entry stores a factor in 9V9999 format (1 integer digit, 4 decimal places).
  - **Source:** ASREA864.cbl (320-entry table), CLREB020.cbl (21-character output records)
- 

## 2. Property Valuation Rules

### BR-VAL-01: Type 1 Valuation -- Land (ASREA003)

- **Rule:** Land value = front-footage x unit-price x depth-factor x corner-factor x percent-assessed x extra-corner-factor x buff-no.
- **Source:** ASREA003.cbl, Type 1 calculation section

### BR-VAL-02: Type 2 Valuation -- Improvement (ASREA003)

- **Rule:** Improvement value = area x unit-price x condition x percent-assessed.
- **Source:** ASREA003.cbl, Type 2 calculation section

### BR-VAL-03: Type 3 Valuation -- Reproduction Cost with Class 288 Deduction (ASREA003)

- **Rule:** For class 288 (Homestead Improvement Exemption), the valuation subtracts a year-dependent threshold from the reproduction cost before applying condition and percent-assessed factors. The threshold tiers are:
  - Pre-1979: subtract \$15,000
  - 1979-1983: subtract \$25,000
  - 1984-1997: subtract \$30,000
  - 1998-2003: subtract \$45,000
  - Post-2003: subtract \$75,000
- **Source:** ASREA003.cbl, Type 3 calculation section with year-based IF/ELSE chain

#### BR-VAL-04: Type 4-5 Valuation (ASREA003)

- **Rule:** Valuation = condition x reproduction-cost x percent-assessed.
- **Source:** ASREA003.cbl, Type 4 and Type 5 calculation sections

#### BR-VAL-05: Minimum Valuation Floor (ASREA003)

- **Rule:** If calculated valuation is less than 1, set valuation to 1 (minimum floor of \$1).
- **Source:** ASREA003.cbl: `IF WS-VAL < 1, MOVE 1 TO WS-VAL`

#### BR-VAL-06: Y2K Year Windowing (ASREA003, ASREA740, ASHMA855)

- **Rule:** Two-digit years are converted to four-digit years using a windowing approach: years > 60 are treated as 19xx; years <= 60 are treated as 20xx.
- **Source:** ASREA003.cbl and ASREA740.cbl: `IF WS-YR > 60 MOVE 19 TO WS-CC ELSE MOVE 20 TO WS-CC`
- **Risk:** This windowing will produce incorrect results after 2060.

## 3. Property Classification Rules

#### BR-CLS-01: Residential Property Classification (ASHMA850)

- **Rule:** The following 88-level conditions define residential property subcategories:
  - `RESD-IMPV` (Residential Improvements): classes 202-213, 218, 219, 220, 221, 234, 278, 294, 295, 297, 299
  - `RESD-LAND` (Residential Land): classes 200, 241
  - `FARM-LAND`: class 239
  - `MIXED-USE`: class 236
  - `HIMP` (Homestead Improvement): class 288
- **Source:** ASHMA850.cbl, 88-level condition definitions in WORKING-STORAGE

#### BR-CLS-02: Residential Range Check (ASHMA839)

- **Rule:** For NPHE processing, properties must have a class code in the range 200-299 to be eligible for the full exemption calculation. Properties outside this range receive the low exemption value.
- **Source:** ASHMA839.cbl: class validation section, `IF NOT class 200-299, set NPHE to low value`

#### BR-CLS-03: Class 288 Special Handling (ASREA740)

- **Rule:** Class 288 properties receive special treatment in the frozen valuation pipeline. The system tracks both current year class 288 values and expired class 288 values separately in the Frozen Agency File.
  - **Source:** ASREA740.cbl (WS-288-IND-SW, WS-CLS-288 condition), CLRTM755 (FA-CURR-288, FA-EXPR-288 fields initialized when writing new frozen agency records)
- 

## 4. TIF Processing Rules

### BR-TIF-01: TIF Difference Computation (CLRTM757)

- **Rule:** TIF difference = current equalized value minus frozen base equalized value: `COMPUTE WS-TIF-DIFF = EQ-EQ-VAL - TFP-FRZEQVAL`
- **Source:** CLRTM757.cbl, paragraph 050-COMPUTE-TIF-DIFF

### BR-TIF-02: Negative TIF Difference Floor (CLRTM757)

- **Rule:** If the TIF difference is negative (current value is less than the frozen base), the difference is set to zero: `IF WS-TIF-DIFF LESS THAN ZERO MOVE ZEROS TO TD-TIFDIFF`
- **Source:** CLRTM757.cbl, immediately after the COMPUTE statement
- **Meaning:** Taxing agencies in a TIF district can never receive less than their frozen base -- a TIF district cannot generate a negative increment.

### BR-TIF-03: Three-File TIF Match/Merge (CLRTM757)

- **Rule:** TIF difference computation requires a three-way match/merge of prior TIF master, current TIF master, and equalized value file. All three files must be in ascending sequence by their composite key.
- **Source:** CLRTM757.cbl, main processing loop with three EOF switches and three read routines

### BR-TIF-04: TIF Record Structure (CLRTM757)

- **Rule:** Each TIF record contains: volume (3), property index (14), tax type (1), tax year (4), tax code (5), agency (9), and frozen equalized value (11). The composite key is volume + property + tax type.
- **Source:** CLRTM757.cbl, FD and COPY statements

### BR-TIF-05: TIF Parcel Removal (CLRTM356)

- **Rule:** TIF parcels are removed from the Assessment Master via a match/merge process. The match key is a 19-character composite: town (2) + volume (3) + property (14). Tax year is passed as a LINKAGE SECTION parameter.
- **Source:** CLRTM356.cbl, match/merge logic in PROCEDURE DIVISION

### BR-TIF-06: Frozen Agency TIF Accumulation (CLRTM759)

- **Rule:** The Frozen Agency File accumulates TIF values per agency: `ADD TD-FRZEQVAL TO FA-TIFAV` (TIF assessed value) and `ADD TD-TIFDIFF TO FA-TIFEV` (TIF equalized value difference). If no frozen agency record exists, a new one is created with all fields initialized to zero.
  - **Source:** CLRTM759.cbl, paragraphs 050-UPDATE-FROZ-AGCY and 060-WRITE-FROZ-AGCY-REC
- 

## 5. Senior Freeze Exemption Rules

### BR-SF-01: Base Year Value Tax Difference (ASHMA850)

- **Rule:** The Senior Freeze benefit is calculated as a tax difference between the current year equalized value and the base year equalized value. The base year is the year a senior citizen first qualified for the exemption.
- **Source:** ASHMA850.cbl, core calculation paragraphs

### BR-SF-02: Base Year Counter Tracking (ASHMA850)

- **Rule:** The system maintains individual year counters for base years 1993 through 2018 (26 separate counters). Each counter tracks the number of properties with that base year.
- **Source:** ASHMA850.cbl, WORKING-STORAGE counter definitions
- **Risk:** No counters exist for years after 2018. Processing newer base years requires source code modification.

### BR-SF-03: Class-Table Based Calculation Branching (ASHMA850)

- **Rule:** The Senior Freeze calculation uses a 12-element class table to determine the calculation path based on combinations of prior year and current year assessment conditions. The table entries drive branching for different property types and assessment scenarios.
- **Source:** ASHMA850.cbl, class table definition and evaluation logic

### BR-SF-04: Equalization Factor Application (ASHMA850)

- **Rule:** The processing year equalization factor is passed as a parameter (PARAM-REC) along with CICV checkpoint value, processing year, and from/to year and base year ranges.
- **Source:** ASHMA850.cbl, PARAM-REC definition in WORKING-STORAGE

### BR-SF-05: IMS Database Access Pattern (ASHMA850)

- **Rule:** ASHMA850 accesses the IMS hierarchical database via `ENTRY 'DLITCBL' USING IO-PCB, PI-PCB1`. This is an IMS batch program that requires checkpoint/restart support.
- **Source:** ASHMA850.cbl, ENTRY statement and PCB references

### BR-SF-06: Certificate of Error Base Year Recalculation (ASHMA855)

- **Rule:** When a COE record has status 6, 7, or 8 and type 20 or 21, the system recalculates the Senior Freeze base year value using:  $\text{base\_year\_value} = (\text{reassessed\_value} \times \text{equalization\_factor}) - \text{senior\_freeze\_value}$ . If the result is zero or negative, it is flagged as an error.
- **Source:** ASHMA855.cbl, paragraph 100-MAINLINE: `COMPUTE WS-BASE-YEAR ROUNDED = ((C515-RASSVAL * EQ-FACTOR) - C515-RSF-VALUE)`

### BR-SF-07: COE Equalization Factor Lookup (ASHMA855)

- **Rule:** For COE processing, the equalization factor is looked up using the processing year and quad = 1 (hardcoded): `MOVE C515-PROCYR TO EQ-YEAR, MOVE 1 TO EQ-QUAD`.
- **Source:** ASHMA855.cbl, paragraph 100-MAINLINE

---

## 6. Non-Primary Homeowner Exemption (NPHE) Rules

## BR-NPHE-01: Geographic Division Routing (ASHMA839)

- **Rule:** NPHE computation routes through different calculation paths based on the property's township location:
  - **City of Chicago** (townships 70-77): Uses NPHE-HI-VAL-CITY
  - **Northwest suburbs** (townships 10, 16-18, 20, 22-26, 29, 35, 38): Uses NPHE-HI-VAL-NRWS
  - **Southwest suburbs** (townships 11-15, 19, 21, 27-28, 30-34, 36-37, 39): Uses NPHE-HI-VAL-SWWS
- **Source:** ASHMA839.cbl, 88-level conditions CITY-TOWN, NORTHWEST, SOUTHWEST

## BR-NPHE-02: NPHE Value Clamping (ASHMA839)

- **Rule:** The computed NPHE amount is clamped between a minimum (NPHE-LO-VAL) and a geographic-specific maximum (NPHE-HI-VAL-CITY, NPHE-HI-VAL-NRWS, or NPHE-HI-VAL-SWWS). Currently all values are set to 10,000.
- **Source:** ASHMA839.cbl, NPHE calculation paragraphs

## BR-NPHE-03: Prior Year Minimum and Multiplier (ASHMA839)

- **Rule:** The system applies a prior year minimum (WS-PRIOR-MINIMUM = 7,000) and a multiplication factor (PREV-MULTIPLY = 1.07) in the NPHE calculation to account for year-over-year assessment changes.
- **Source:** ASHMA839.cbl, WORKING-STORAGE definitions

## BR-NPHE-04: Senior Freeze Override (ASHMA839)

- **Rule:** If a property has a Senior Freeze benefit (M-VALUE(1) > 0), the NPHE is overridden to the low value (NPHE-LO-VAL) with status code 'SF'.
- **Source:** ASHMA839.cbl, Senior Freeze override logic

## BR-NPHE-05: Landmark Property Override (ASHMA839)

- **Rule:** If a property is identified as a landmark, the NPHE is overridden to the low value (NPHE-LO-VAL) with status code 'LN'.
- **Source:** ASHMA839.cbl, landmark property lookup logic

## BR-NPHE-06: Proration Handling (ASHMA839)

- **Rule:** NPHE amounts are subject to proration for properties with partial year ownership. Separate calculation paths exist for sales, COFE (Certificate of Error), and other proration types.
- **Source:** ASHMA839.cbl, division/proration routines

---

## 7. Tax Code and Agency Rules

### BR-TC-01: Tax Code to Agency Mapping (CLRTM752)

- **Rule:** Each property is assigned to a tax code. The system looks up the tax code in an indexed Tax Code File and copies up to 40 agencies from the tax code record to the Assessment Master record.

- **Source:** CLRTM752.cbl, paragraph 070-MOVE-AGENCIES: `PERFORM 070-MOVE-AGENCIES VARYING SUB FROM 1 BY 1 UNTIL SUB GREATER 40`

#### BR-TC-02: Tax Code Structure (CLRTM752, CLRTM750)

- **Rule:** The first 2 digits of a 5-digit tax code represent the township number. This is used to derive township from tax code: `MOVE FA-TXCD TO UNPK-TXCD, MOVE UP-TOWN TO CF-TOWN.`
- **Source:** CLRTM750.cbl, paragraph 030-READ-FROZEN-AGENCY

#### BR-TC-03: Township Number Classification (CLRTM750)

- **Rule:** Suburban townships have numbers 10-39; City of Chicago townships have numbers 70-77. The town name lookup uses different offset calculations: suburban = town\_number - 9; city = town\_number - 39.
- **Source:** CLRTM750.cbl: `IF SUBURBAN SUBTRACT 9 FROM SAVE-TOWN GIVING SUB ELSE SUBTRACT 39 FROM SAVE-TOWN GIVING SUB`

#### BR-TC-04: Agency Iteration Limit (CLRTM752, CLRTM753, CLRTM759)

- **Rule:** The system supports a maximum of 40 taxing agencies per tax code. All agency iteration loops use: `VARYING SUB FROM 1 BY 1 UNTIL SUB GREATER 40 OR agency = ZERO.`
- **Source:** Multiple CLRTM programs, consistently using 40 as the upper bound

## 8. Disconnected/Annexed Agency Rules

#### BR-DA-01: Agency Change Detection (CLRTM753)

- **Rule:** Disconnected and annexed agencies are identified by comparing prior year and current year agency lists for each division number. An agency in the prior list but not the current list is marked 'D' (disconnected). An agency in the current list but not the prior list is marked 'A' (annexed).
- **Source:** CLRTM753.cbl, paragraphs 5100-OLD-AGENCY-LOOKUP and 5200-NEW-AGENCY-LOOKUP

#### BR-DA-02: Disconnected/Annexed Valuation Adjustment (CLRTM755)

- **Rule:** For disconnected and annexed agencies, the valuation adjustment is computed as: `COMPUTE WS-DISC-VALUE ROUNDED = (equalized_value * percentage_change) / 100.` The percentage change is derived from the disconnected/annexed record.
- **Source:** CLRTM755.cbl, paragraphs 3250-OLD-ROUTINE and 3450-NEW-ROUTINE

#### BR-DA-03: Frozen Agency File Update for Disconnections/Annexations (CLRTM755)

- **Rule:** When a matching frozen agency record exists, disconnection values are added to FA-DISCONEV and annexation values are added to FA-ANNEXEDEV. When no match exists, a new record is created with all other fields initialized to zero.
- **Source:** CLRTM755.cbl, paragraphs 4300-READ-FROZEN-FILE, 6100-REWRITE-ROUTINE, 6200-WRITE-ROUTINE

#### BR-DA-04: Disconnect/Annex Table Size (CLRTM755)

- **Rule:** The disconnect and annex tables each support up to 50 entries (OCCURS 50 TIMES), compared to the 40-agency limit in other programs.
  - **Source:** CLRTM755.cbl: DISC-TABLE-ENTRY OCCURS 50 TIMES, ANNEX-TABLE-ENTRY OCCURS 50 TIMES
- 

## 9. New Property / PTELL Rules

### BR-PTELL-01: New Property EAV Computation (CLRTM756)

- **Rule:** New property equalized value is computed as:  $COMPUTE\ AEV-NEW-PROP-EQV = TC-EQVAL + TC-EXPINCEV$ . This combines the base equalized value with expired incentive equalized value.
- **Source:** CLRTM756.cbl, paragraph 300-UPDATE-REC

### BR-PTELL-02: Agency Equalized Valuation File Update (CLRTM756)

- **Rule:** The program updates a VSAM-indexed Agency Equalized Valuation File with new property EAV, annexed property EAV, disconnected property EAV, and disconnected TIF difference values per agency.
- **Source:** CLRTM756.cbl, paragraph 300-UPDATE-REC

### BR-PTELL-03: PTELL Report Categories (CLRTM749, CLRTM750)

- **Rule:** The PTELL report tracks five categories of values per agency: (1) New Property Equalized Value, (2) Annexed Property Equalized Value, (3) Disconnected Property Equalized Value, (4) Recovered Tax Increment Value, and (5) Expired Incentives Value.
- **Source:** CLRTM749.cbl heading definitions and accumulator fields

### BR-PTELL-04: Linkage Parameters (CLRTM749, CLRTM750)

- **Rule:** PTELL programs receive tax year (4 digits) and equalization factor (5 digits = 9V9999) via JCL PARM / LINKAGE SECTION. Both values are validated for numeric content and positive values; invalid parameters cause RETURN-CODE 16.
  - **Source:** CLRTM749.cbl and CLRTM750.cbl, LINKAGE SECTION and 010-HOUSEKEEPING validation
- 

## 10. Frozen Valuation Rules

### BR-FRZ-01: Frozen Valuation File Creation (ASREA740)

- **Rule:** The frozen valuation file for quad townships is created by comparing current year and base year (prior reassessment) Assessment Master records. The program computes 10 prior-year metrics (P1-P10) and 9 current-year metrics (C1-C9) for each division, tracking land and improvement valuations separately.
- **Source:** ASREA740.cbl, match/merge logic and accumulator fields (WS-P1 through WS-P10, WS-C1 through WS-C9)

### BR-FRZ-02: Assessment Master Record Structure (ASREA740)

- **Rule:** Assessment Master records are variable-length, ranging from 122 to 18,706 characters. This is a critical structural constraint.

- **Source:** ASREA740.cbl: RECORD CONTAINS 122 TO 18706 CHARACTERS

#### BR-FRZ-03: Frozen Valuation VSAM Access (ASREA740)

- **Rule:** The frozen valuation file is a VSAM indexed file accessed randomly by key. The program opens it in I-O mode for both reads and writes.
- **Source:** ASREA740.cbl: ORGANIZATION IS INDEXED, ACCESS IS RANDOM, RECORD KEY IS FV-KEY

#### BR-FRZ-04: Division Number Application (CLRTM751)

- **Rule:** Division numbers are applied to the equalized valuation file through a match/merge of the equalized value file and the division master file. Unmatched records (no division) use the property number as a fallback.
  - **Source:** CLRTM751.cbl, paragraph 400-MAINLINE
- 

## 11. Homestead EQ Valuation Rules

#### BR-HEQ-01: Homestead EQ Valuation Maintenance (ASREA864)

- **Rule:** The system supports add, change, and delete operations on homestead equalized valuation records. Output records are 130 bytes with COMP-3 packed decimal fields.
- **Source:** ASREA864.cbl, maintenance operation logic

#### BR-HEQ-02: Landmark Property Lookup (ASREA864)

- **Rule:** During homestead EQ valuation processing, the system performs a landmark property file lookup using VSAM indexed access. Landmark status affects exemption calculations.
- **Source:** ASREA864.cbl, VSAM landmark file access

#### BR-HEQ-03: HOMIN Parameter (ASREA864)

- **Rule:** The HOMIN value (5 digits) is passed via LINKAGE SECTION and represents the homeowner minimum value threshold used in the valuation computation.
  - **Source:** ASREA864.cbl, LINKAGE SECTION: year (4) + HOMIN (5)
- 

## 12. Error Handling Rules

#### BR-ERR-01: Fatal Error Return Code (All Programs)

- **Rule:** RETURN-CODE 16 indicates a fatal error condition across all programs. Common triggers include: file open/close failures, VSAM read/write errors, out-of-sequence input records, invalid linkage parameters, and IMS database errors.
- **Source:** Consistent pattern across all 70+ programs

#### BR-ERR-02: Sequence Checking (All Programs)

- **Rule:** All sequential file processing programs perform ascending sequence checking on their input files. The previous key is saved and compared against the current key on each read. Out-of-sequence conditions are treated as fatal errors.

- **Source:** Universal pattern; example from CLRTM757.cbl: `IF TD-KEY < PREV-KEY DISPLAY 'OUT OF SEQUENCE' MOVE 16 TO RETURN-CODE`

#### BR-ERR-03: VSAM File Status Handling (CLRTM755, CLRTM756, ASREA740)

- **Rule:** VSAM file operations check a two-part file status: the primary 2-digit status code (00=success, 23=not found, 10=EOF) and an extended status structure with return code, function code, and feedback code. Non-expected status values trigger RETURN-CODE 16.
- **Source:** Multiple programs with consistent pattern: `IF NOT GOOD-STATUS ... MOVE 16 TO RETURN-CODE`

#### BR-ERR-04: High-Value Sentinel on EOF (Multiple Programs)

- **Rule:** When a file reaches end-of-file during a match/merge operation, the key field is set to HIGH-VALUES (or 9999999...) to ensure the remaining file processes correctly through the merge.
- **Source:** CLRTM757.cbl, CLRTM751.cbl, and others: `MOVE HIGH-VALUES TO key-field` at READ ... AT END

## 13. Rounding Rules

#### BR-RND-01: COMPUTE ROUNDED (ASHMA855, CLRTM755)

- **Rule:** When computing equalized values from assessed values times equalization factors, the COBOL ROUNDED keyword is used, which rounds to the nearest integer (standard COBOL rounding = round half up).
- **Source:** ASHMA855.cbl: `COMPUTE SF-BVYEV ROUNDED = (C515-RASSVAL * EQ-FACTOR);`  
CLRTM755.cbl: `COMPUTE WS-DISC-VALUE ROUNDED = (equalized_value * pct_change) / 100`

#### BR-RND-02: Percentage Change as Decimal (CLRTM755)

- **Rule:** Percentage change values are stored as whole numbers and divided by 100 in computations: `(value * percentage) / 100`.
- **Source:** CLRTM755.cbl, paragraphs 3250-OLD-ROUTINE and 3450-NEW-ROUTINE