

# Technical Reference Manual

Application: Foothills Property R&R Wealth Planner

Version: v22 (Survivor & Dynamic Tax Edition)

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## 1. Core Architecture

The Wealth Planner utilizes a **Time-Step Simulation Engine**. Unlike simple "Average Return" calculators, this application runs a discrete, year-by-year simulation.

### The Yearly Loop

For every year of the projection (from Current Age to Plan Until), the engine performs the following operations:

1. **Timeline Sync:** Calculates the current age of both the Primary User and Spouse.
2. **Survivor Check (New in v22):** Checks if the current year exceeds the Spouse Plan Until age.
  - *If Spouse Deceased:* Household income and tax filing status are immediately adjusted.
3. **Growth Calculation:** Applies the specific Growth Rate to the Start Balance.
4. **Income Aggregation:** Sums active income sources (Salary, Pension, Adjusted Social Security).
5. **Expense Indexing:** Calculates inflation-adjusted cost of living (in Nominal Dollars).
6. **Gap Analysis:** Determines "Surplus" (Net Positive) or "Deficit" (Net Negative).
7. **Tax & Drawdown Logic:** Calculates the "Gross Withdrawal" required to cover expenses and the resulting specific tax liability for that year's specific filing status.

## 2. The Dynamic Tax Engine (v22 Update)

The application features a proprietary **Multi-Year Tax Algorithm**.

### A. Tax Year Modeling

- **2025 & 2026:** The engine utilizes **Official IRS Bracket Data** and Standard Deductions for these years.
- **Future Projections (2027+):** If a future tax year model is selected, the engine projects brackets using a user-configurable **Tax Adjustment Factor** (Default: 3.0%).

- *Formula:*  $\$Bracket_{\{Future\}} = Bracket_{\{Base\}} \times (1 + AdjustmentRate)^{\{Years\}}$

## B. State Tax Exemptions

The engine now supports specific state-level income exclusions.

- **North Carolina (NC):** The engine explicitly exempts Social Security income from the state tax base calculation, resulting in a lower effective tax rate for NC retirees compared to fully taxable states.

## C. The "Gross-Up" Withdrawal Method

When expenses exceed guaranteed income, the tool calculates the "Gross Withdrawal" needed from pre-tax assets.

1. **Identify Net Need:** (e.g., Need \$50,000 for bills).
2. **Recursive Solve:** The engine iteratively calculates the withdrawal amount ensuring that *after* Federal and State taxes are paid, exactly \$50,000 remains for spending.

## 3. Survivor & Widowhood Logic (v22 New)

Version 22 introduces specific logic to model the financial impact of the death of a spouse ("The Widow's Penalty").

**Trigger:** This logic activates when the simulation year > Spouse Plan Until (Age).

### 1. Income Step-Down (Survivor Benefit)

- The standard "User + Spouse" Social Security sum is replaced.
- *Logic:* Household SS = MAX(User Benefit, Spouse Benefit).
- The lower of the two Social Security checks ceases immediately.

### 2. Tax Filing Status Change

- The tax engine switches from "**Married Filing Jointly**" to "**Single**".
- *Impact:* The Standard Deduction is roughly halved (e.g., from ~\$32k to ~\$16k), and tax brackets compress significantly, often resulting in a higher effective tax rate despite lower household income.

## 4. Portfolio Mechanics

- **Weighted Return:** Calculates a blended return rate based on the asset mix (401k/Brokerage/Cash).
- **Return Stages:** Allows overriding the blended rate for specific age ranges (e.g., to model a market crash).
- **Bankruptcy Protocol:** The engine enforces a floor at **\$0**. It prevents "Negative Wealth" artifacts, providing a realistic "Out of Money" signal.

## 5. Disclaimer

*This application is for educational and simulation purposes only. Results are projections based on user assumptions. Tax calculations are estimates based on 2025/2026 Federal Brackets and simplified effective State rates. It does not constitute professional financial advice.*

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