
DEVELOPMENT OF FIRE PROTECTION RATES

This memo outlines the methodology and assumptions used in the development of Fire Protection rates for Marina Coast Water District (District). The District engaged Carollo Engineers to perform a comprehensive financial plan and rate study for its water and sewer utilities. The study included the development of a five-year financial plan and cost-based water and sewer user charges, including fire protection services, through a comprehensive cost of service and rate design analysis.

The American Water Works Association's M1 Manual states that fire protection service is essentially a standby service that the utility makes available on demand. Although most fire hydrants and sprinkler connections are rarely used, the utility must be ready to provide adequate water quantities and pressures at all times throughout the distribution system. This additional service comes at a high cost to utilities.¹

In accordance with the M1 Manual, both direct and indirect fire protection costs were addressed in the comprehensive cost of service study. While a small amount of water is actually consumed for fire suppression, the water system is still designed to accommodate relatively large flows of water for short durations at suitable pressure. Therefore, when allocating O&M and capital expenses, a pro rata share of O&M and capital expenses is directly assigned to the fire protection category.

In this review, the costs associated with maintaining the supply, treatment, pumping, storage and distribution capacity for fire protection services including annual O&M costs and capital costs invested in facilities that are sized larger than necessary for non-fire fighting purposes were allocated to fire service. The actual allocation percentage between General Service and Fire Protection would normally require detailed engineering and technical analyses of the complete water system. However, where such engineering analyses are not available it is common to generate estimates based on industry standards and available records. As such, Carollo allocated 4% of staff expenditures (Admin) and 4% of existing debt service.

In aggregate 2.1% of Marina's and 2.3% of Ord's revenue requirements were apportioned to private fire protection. It is common to calculate fire protection costs of service (public and private) in the 5% to 10% range and sometimes higher for larger, more complex supply and delivery systems.² Other methodologies calculate fire protection costs between 6% and 30% of total water system expenditures.³

The costs allocated to fire protection service were then designed to be allocated equitably amongst existing users. Per billing records from the District, private fire protection service is

¹ Nova Scotia Utility Review Board Water Utility Accounting and Reporting Handbook

² Edward Cebon, Fire Service Impacts on Water Utilities

³ Maine Water Utilities Association Committee on Fire Protection Charges Report.

provided to 60 and 76 accounts in the Marina and Ord communities, respectively. Prior to the adjustment, the District charged a uniform rate of \$20 for commercial fire lines. The revised methodology was implemented to account for the relative demands of each service. As the size of the water system was upsized to handle fire flow, it is appropriate for the rates to be based on the size of the connection – rather than flat fee per account.

Each account’s service connection was multiplied by a demand factor. The demand factor is derived based on the nominal size of the cross-sectional area of the connection. The relative flow potential for various size pipes is dependent on the diameter raised to the 2.63 power.

Table 1 below details the number of accounts, the size of the connection, and the number of equivalent demand units.

| Table 1 Fire Service Units Marina Coast Water District Comprehensive Rate Study and Financial Plan | | | | | |
|---|--------------------|-----------------|-------------------------|--------------|----------------------|
| Service Size | AWWA Demand Factor | Marina Accounts | Marina Equivalent Units | Ord Accounts | Ord Equivalent Units |
| 1.0" | 1.00 | - | - | - | - |
| 1.5" | 2.90 | 1 | 3 | - | - |
| 2.0" | 6.19 | - | - | - | - |
| 2.5" | 11.13 | 10 | 111 | - | - |
| 3.0" | 17.98 | 1 | 18 | 1 | 18 |
| 4.0" | 38.32 | 15 | 575 | 35 | 1,341 |
| 6.0" | 111.31 | 30 | 3,339 | 29 | 3,228 |
| 8.0" | 237.21 | 3 | 712 | 7 | 1,661 |
| 10.0" | 426.58 | - | - | 4 | 1,706 |
| | | 60 | 4,758 | 76 | 7,954 |

This methodology is designed to reflect the design and operation of the water system that is specifically available for fire protection. Following the cost allocation and calculation of equivalent units, a unit cost is calculated by dividing the cost by the number of users.

Table 2 presents the calculation of the equivalent unit cost and the resulting rates.

| Table 2 Monthly Fire Service Rate Marina Coast Water District Comprehensive Rate Study and Financial Plan | | | | |
|--|-----------------|---------------------------------------|---------------------|------------------|
| | | Private Fire Service Allocation | \$85,286 | \$136,051 |
| | | Fire Service Equivalents ⁴ | 4,758 | 7,954 |
| | | Charge Per Unit | \$1.49 | \$1.43 |
| Meter Size | Existing | AWWA Demand Factor | Marina Water | Ord Water |
| 1" | \$20.00 | 1.00 | \$1.49 | \$1.43 |
| 1 1/2" | 20.00 | 2.90 | 4.33 | 4.13 |
| 2" | 20.00 | 6.19 | 9.25 | 8.82 |
| 2.5" | 20.00 | 11.13 | 16.63 | 15.86 |
| 3" | 20.00 | 17.98 | 26.86 | 25.63 |
| 4" | 20.00 | 38.32 | 57.24 | 54.62 |
| 6" | 20.00 | 111.31 | 166.27 | 158.66 |
| 8" | 20.00 | 237.21 | 354.33 | 338.12 |
| 10" | 20.00 | 426.58 | 637.21 | 608.05 |

The following two figures, on the next page, provide a rate comparison of agencies throughout western United States. Much like typical water or service rates, fire service charges vary greatly from agency to agency. Even more than potable rates, there are various different ways that utilities address the recovery of private fire protection. The Districts implemented fire protection rates were design to fully recover costs associated with the define levels of service. As such, the rates might appear higher relative to its peers.

⁴ Following the Cost of Service Analysis and development of rates and upon reviewing its billing database, the District discovered that some accounts that may have been previously unaccounted. This table reflects the updated number of account and equivalent units based on additional analysis by staff.

As shown, there are a wide variety of rates and price differentials between different service lines. Price differentials are typically derived from the demand factor. While it is unknown what factors other agency relied upon, the District's rates were based on those defined in the AWWA M1 Manual.

