Appendix A

Replacement Value, FCI, and RI

Replacement Value

What is Replacement Value?

The **Replacement Value** is the total amount of expenditure required to construct a replacement facility in like kind The RV for a single Asset can be based on the sum of the System replacement costs, or it can be a custom cost. The RV may include or exclude overhead costs. (Also known as Current Replacement Value (CRV).

How is Replacement Value calculated?

The Asset's **Current Replacement Value** (CRV) is the total amount of expenditure required to replace a facility to its optimal condition. CRV is a key figure in determining the condition of a portfolio; it is compared against the costs of deferred maintenance in order to derive the FCI.

FCI

What is FCI?

The **Facility Condition Index (FCI)** is an industry-standard index that measures the relative condition of a facility by considering the costs of deferred maintenance and repairs as well as the value of the facility. FCI allows condition benchmarking between facilities of unequal size and composition, both within and among institutions.

FCI, in conjunction with VFA.facility's Funding Analysis tools, allows decision makers to understand funding needs and comparisons, and provides a rule of thumb for the annual reinvestment rate to prevent further accumulation of deferred maintenance. Using FCI, an organization can set targets to achieve an overall acceptable condition for facilities.

How is FCI calculated?

FCI is a ratio of deferred maintenance costs and the Asset Replacement Value:

$$\frac{\text{Total \$ of \textbf{Subset} of Requirements}}{\text{Total Asset Replacement Value}}$$

For example:

- An Asset with a CRV of $500,000 and eligible Requirements of $100,000 has an FCI of **0.20** ($100,000/$500,000).

- An Asset with a CRV of $1,000,000 and eligible Requirements of $100,000 has an FCI of **0.10** ($100,000/$1,000,000).

- An Asset with a CRV of $2,000,000 and eligible Requirements of $100,000 has an FCI of **0.05** ($100,000/$2,000,000).

This principle applies to a group of Assets, and entire Campuses and Regions. For example, a portfolio of 10 Assets with total replacement costs of $10,000,000 and eligible Requirements of $1,000,000 has an FCI of 0.10 ($1,000,000/$10,000,000).

What does FCI signify?

FCI allows you to quickly compare the condition of Assets against industry-wide standards or across a portfolio.

Based on the default FCI settings (which include only the costs of deferred maintenance Requirements) an Asset in excellent condition has a 0.00 to 0.05 FCI, while an Asset in good condition has a 0.05 to 0.15 FCI. A high FCI (greater than .15) signals that the Asset is in poor condition; it indicates that the Asset has Requirements with costs that are a high percentage of the Asset's CRV.

If your organization has configured the FCI settings, then the costs included in FCI calculation may be more or less. Since FCI settings are applied evenly across a portfolio, the FCI is still an excellent tool to compare conditions within your institution.

What is a deferred maintenance cost?

Deferred maintenance costs are the costs of certain Requirements. Optionally, they can include the cost of System Renewals.

Which Requirement costs are used in FCI calculation?

By default, VFA.facility calculates FCI according to the industry-standard definition. It includes only the costs of deferred maintenance/backlog Requirements, and excludes the costs of non-condition based Requirements (for example, capital improvements and grandfathered code issues).

Administrators can customize what is considered a 'deferred maintenance cost' by modifying the FCI Settings to only include certain Requirements (based on the Requirement's Priority and Category). A Requirement is included if **both** of the following criteria are met:

- The Requirement's Category is an FCI category. For a list of the default FCI categories, see *Requirement Categories*. Your site's FCI Settings may include additional FCI categories or exclude default FCI categories.

- The Requirement's Recommended Action Date (or Override Action Date, if provided) occurs in the past, the current fiscal year, and one future fiscal year. Your site's FCI Settings may include more future years. For more information, see *Requirement Priorities*.

A Requirement's cost is equal to the cost of its Prime Action. Requirements with a **Closed** status are never used in FCI calculation.

Are Renewal Costs included in FCI?

Your site may include the costs of System Renewal as deferred maintenance in the FCI. This option is useful for organizations that do not create Requirements for System Renewal (SRM), and instead want to rely on the information provided on each System record to forecast System Lifecycle costs.

RI

What is RI?

The **Requirements Index (RI)** measures the total needs of a facility by using the costs from all Requirements, including the deferred maintenance issues included in FCI, as well as any short or long-term capital improvements and grandfathered code issues that are not included in FCI.

Note: RI may not display on your site if the RI setting is disabled by your Administrator.

How is RI calculated?

To determine RI for any given set of Assets, the total cost of addressing all Requirements is divided by Replacement Value (RV):

$$\frac{\text{Total \$ of \textbf{All} Requirements}}{\text{Total Asset Replacement Value}}$$

For example:

An Asset with a RV of $500,000 and total Requirements of $100,000 has an RI of **0.20** ($100,000/$500,000).

An Asset with a RV of $1,000,000 and total Requirements of $100,000 has an RI of **0.10** ($100,000/$1,000,000).

An Asset with a RV of $2,000,000 and total Requirements of $100,000 has an RI of **0.05** ($100,000/$2,000,000).

All Requirements are used to calculate RI, except if the Requirement has the status **Closed.**

What is the difference between RI and FCI?

RI measures the total needs of an Asset by using costs from **all** Requirements. FCI measures condition, and omits costs from non-condition based Requirements (although this can be configured by an Administrator). RI includes all Requirements regardless of Category or Recommended Action Date (based on Priority).

What does RI signify? / What is a "good" RI?

RI reflects an Asset's long-term management needs by including the costs of Requirements that are excluded from FCI. For example, RI may include Requirements that address recommended improvements and grandfathered code issues. Long-term Asset management typically includes extending the life of Assets through multiple renovations. Unlike FCI, which has an industry-standard scale that allows facilities to benchmark facility condition, a building's RI is more useful from an internal perspective.

The RI is directly impacted by the types of Requirements that a facility chooses to create. For example, one organization may create Requirements for capital improvements such as Space Remodeling that would drive up their portfolio's RI. If the Requirements are created consistently across all Assets, RI can be used to compare the Assets internally. After analyzing their portfolio's RI, organizations should be able to establish their own RI scale.

VFA

Appendix B

Requirement Categories

Requirement Category Overview

Each Requirement must be assigned a category that indicates the general issue or the reason for the deficiency. The standard Requirement Categories, listed below, include a broad range of topical causes for adding the Requirement to the Asset, but may be customized by the client if necessary.

While the software allows a user to assign a parent or child category to a Requirement, the VFA standard is to use the child categories only. All types of Requirements can be categorized within the child categories, and doing so allows for a more precise classification of the issue.

Requirement Category Descriptions (* signifies a default FCI Category)

*Integrity

*Lifecycle: Components or Systems that are approaching or have exceeded their useful life. (Examples: a 25 year old chiller that is approaching the end of its useful life and is recommended to be replaced within the next 5 years; a 15 year old membrane roof that is prematurely aged and showing signs of wear and leaking)

*Reliability: Components or Systems that are not working as designed and/or cannot be depended upon, but have not yet exceeded their useful life. (Examples: a recently installed mechanical control that is not operating properly or functioning in an unpredictable manner. breaches in the roof membrane or deteriorated window sealants).

*Regulatory

*Life Safety: Conditions that pose an immediate danger to human life or safety. (Examples: blocked emergency egress, dead-end corridors, damaged and/or non-functional fire protection or emergency Systems).

*Building Code: Conditions that violate the client specified local and/or national Building codes. (Examples: lack of backflow protection, insufficient ventilation, OSHA violations)

*HazMat: Regulatory issues associated with Asbestos, Lead, PCB, and other situations in which hazardous materials are known or suspected to be present in the Asset. (Examples: suspected asbestos pipe insulation or floor tiles)

*Accessibility: Conditions that violate accessibility guidelines, such as the Americans with Disabilities Act or Barrier-Free Design Standards. (Examples: non-accessible building entrances, plumbing fixtures, or door hardware)

Optimization [suggested/requested changes]

Technological Improvements: Conditions that need to be made modern to meet current tech standards. (Examples: pneumatic to DDC; non-energy based upgrades).

Capacity: Problems with a System's ability to meet current demand. (Examples: heating equipment that cannot adequately cover its intended area)

Mission: Components or Systems that do not meet the critical standards of the organization, per the guidelines provide by the client. (Examples: the facility needs to be operational on a 24/7 basis…therefore redundancy/backup components need to be added, e.g. dual-fuel boilers; plant adaptation, e.g. required additions/alterations associated with the conversion of a classroom facility into a dormitory; client driven security vulnerabilities)

Maintenance: Components or Systems that require routine maintenance (Examples: recalibration of thermostats, cleaning of ducts, cyclical painting, other aesthetic considerations)

Abandoned: Equipment or Facility Systems that have been abandoned in place. (Examples: old cooling tower abandoned on the roof; old oil storage tank abandoned in the basement)

Energy: Conditions that adversely affect energy use (Examples: single-pane windows, lack of pipe insulation).

Sustainability: Improvements where components and/or Systems potentially have a sustainable opportunity (other than Energy based). (Examples: water conservation measures, use of building materials and resources based on sustainable procurement and with recycled/bio-based content, improvement of indoor environmental quality and considerations that reduce the impact of the building and its operations on the surrounding site.)

The Requirement Category is an important indicator of the nature of the issues that affect a facility. Often, a single facility issue may affect multiple categories. For example, an antiquated electrical System is beyond its useful life, energy inefficient, and non-ADAAG compliant. Consider the following guidelines when assigning the Requirement's Category:

Child Categories: Although the software allows the assignment of either a parent or child category to a Requirement, it is VFA's standard to select the child category to allow for a more precise categorization.

Life Safety: Generally, any Requirement that poses a Life Safety hazard should be assigned the Life Safety category above all other options.

Reliability: Generally, any Requirement that involves a broken or malfunctioning piece of equipment should be assigned the Reliability category.

Regulatory: Generally, any Requirement that is caused by or is causing non-compliance with a building regulation or code should be assigned the most appropriate Regulatory category. The exception is if the issue affects a System that requires replacement or maintenance. In this case, the Requirement may have a more immediate effect on another category. For example, aged bathroom fixtures may be antiquated as well as non-ADAAG compliant. If the inspector recommends that the bathroom fixtures be replaced within 1 to 2 years, the Requirement may be assigned the category Lifecycle rather than Accessibility.

Priority. If the Requirement affects several issues, assign the category with the greatest urgency. For example, aged windows may affect Reliability and Energy. If the inspector determines that the windows should be replaced in the next year, then Reliability could be the most appropriate category.

Cost. When a Requirement encompasses multiple issues, the costliest issue should be considered. For example, a Requirement that recommends the repair and painting of an interior wall affects both Reliability and Maintenance. The cost of repairing the wall is higher than painting the wall, so the Requirement should be assigned Reliability.

System. If the Requirement affects multiple building Systems, the System that is the most heavily-impacted should be considered. For example, if a Requirement addresses a clogged storm drain that has stained nearby carpeting, the Inspector may decide that the storm drain is a bigger issue than the carpeting, and therefore assign Reliability rather than Maintenance.

Facility Mission. Your organization may have its own process for assigning Requirement categories. For example, lighting that is inefficient and nearing the end of its useful life affects both Energy and Lifecycle. An organization that aims to improve energy efficiency may make greater use of the Energy category in order to categorize these types of Requirements.