

EAST CAROLINA UNIVERSITY

Utilities Infrastructure Condition Assessment

Main Campus Chilled Water Distribution
Asset MCHWD

Inspected April 7, 2022

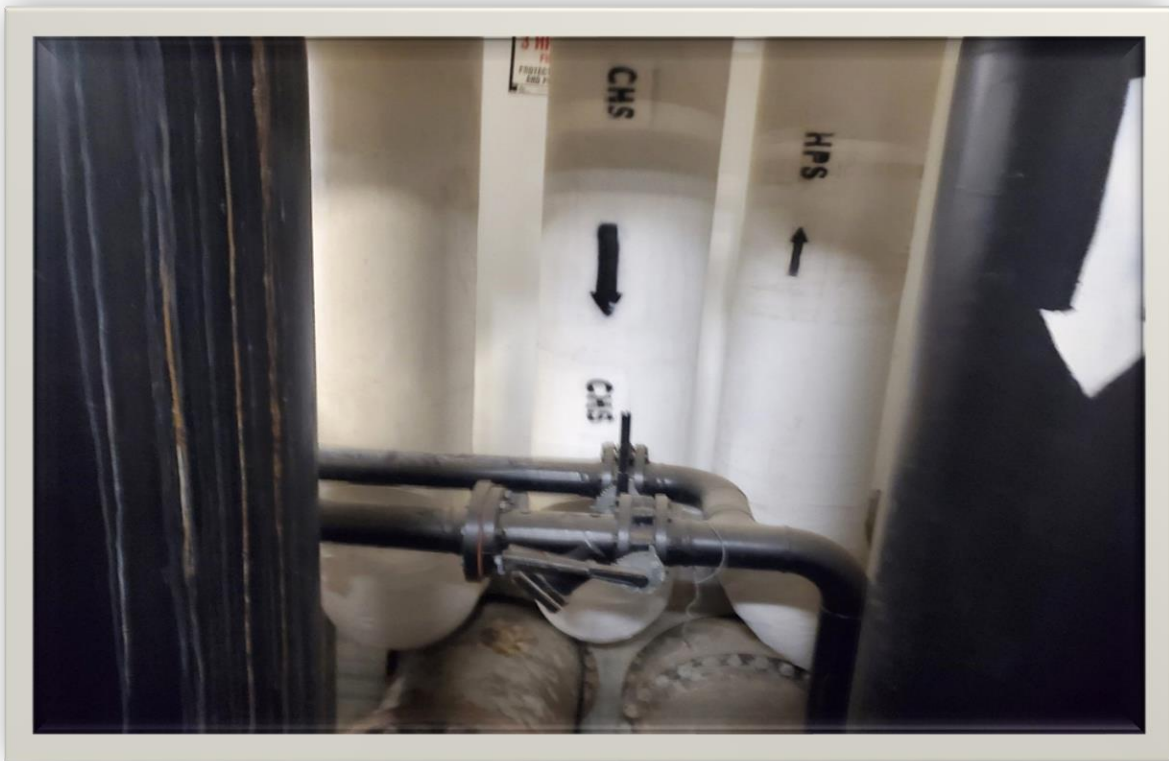


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Section 1

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

ASSET CODE	MCHWD	CURRENT REPLACEMENT VALUE	\$8,250,000
ASSET NAME	MAIN CAMPUS CHILLED WATER DISTRIBUTION	FACILITY CONDITION NEEDS INDEX	0.34
ASSET USE	Infrastructure	FACILITY CONDITION INDEX	0.00
YEAR BUILT	1968	10-YEAR \$/SF	NA
GSF	NA		
INSPECTION DATE	04/07/2022		

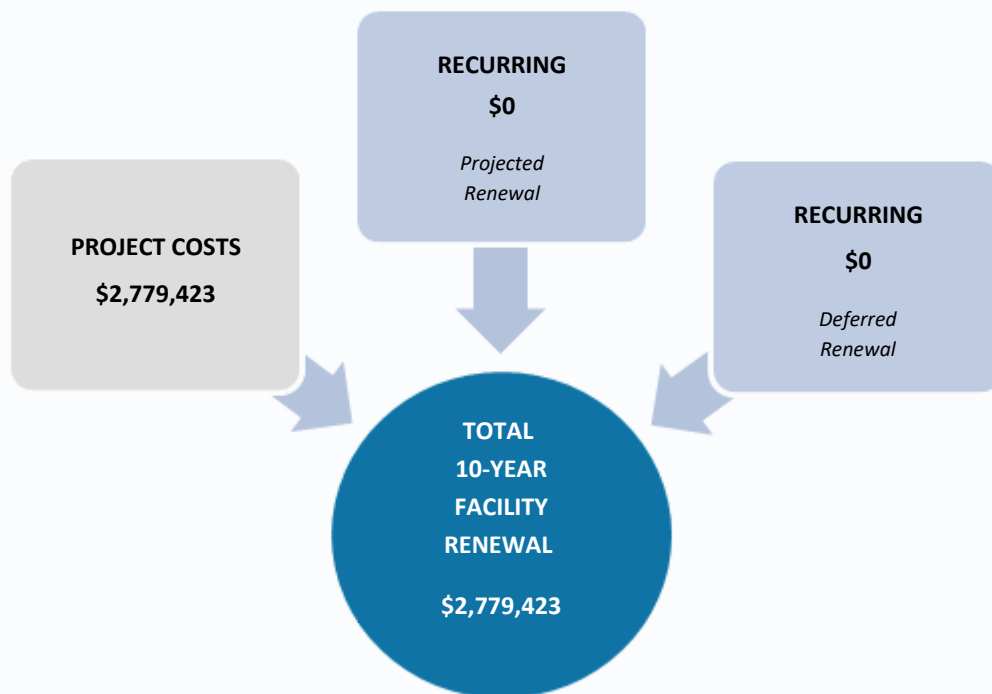
FCNI Scale

The FCNI for this asset is **0.34**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)



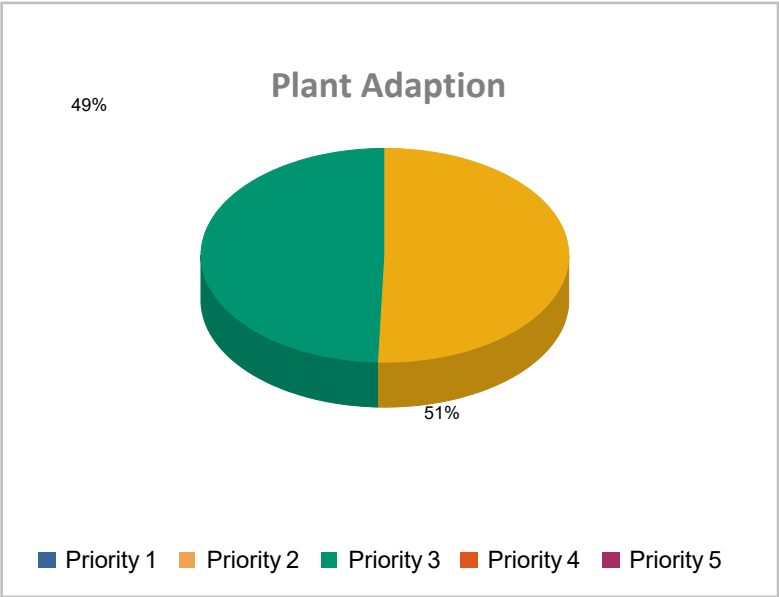
Total Facility Renewal Costs



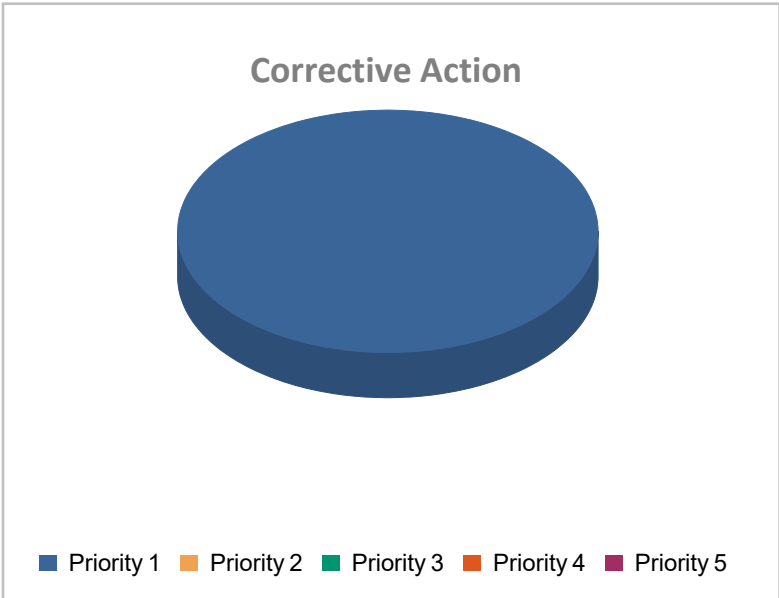
Project Costs

Project Cost by Priority

PLANT ADAPTION	
Priority 1	\$0
Priority 2	\$1,320,514
Priority 3	\$1,285,150
Priority 4	\$0
Priority 5	\$0

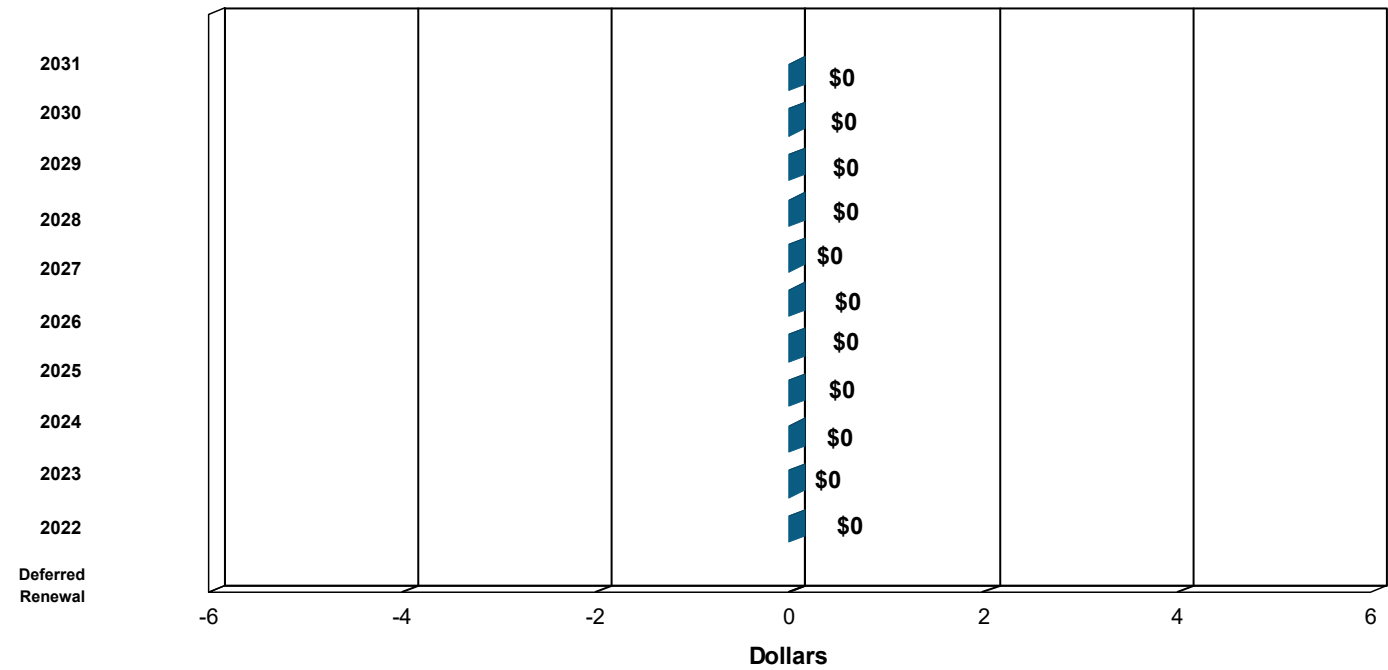


CORRECTIVE ACTION	
Priority 1	\$173,759
Priority 2	\$0
Priority 3	\$0
Priority 4	\$0
Priority 5	\$0

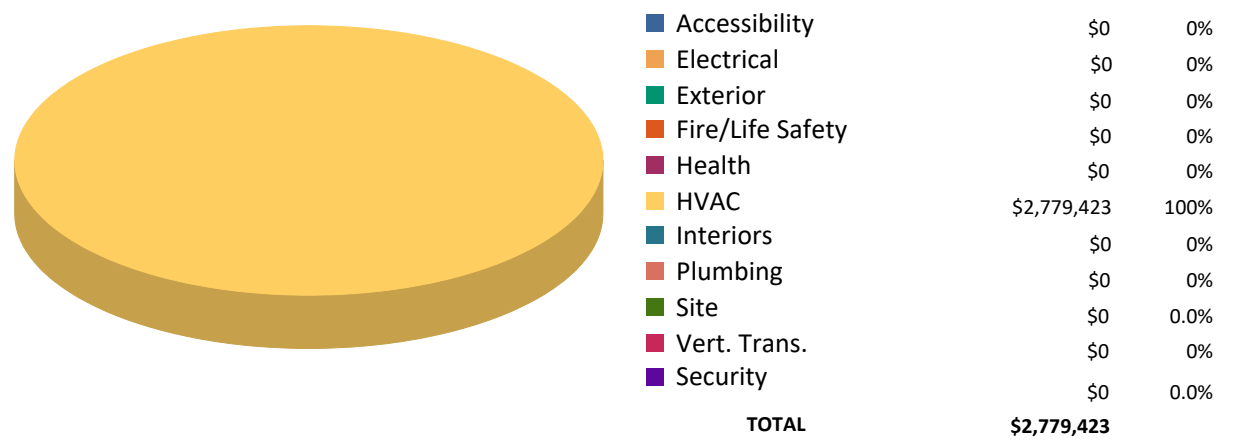


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



ASSET SUMMARY

Facilities on the main campus of East Carolina University are provided central chilled water for building comfort cooling and process systems. This distribution piping is in underground trench ducts interconnected with utility vaults containing isolation valves. There is approximately 10,000 linear feet of installed piping, but this number is only an estimate, as the provided utility drawings and GIS system are not complete or up to date.



Image 1: Chilled water pipe located in CCP#1

The chilled water supply and return pipe systems are relatively young and considered to be in good condition. A review of the system installation, maintenance, water treatment program, and operational history revealed no observable deficiencies. The valves, pipe, and utility vaults that support this system are all in proper working condition.

The chilled water piping is primarily high density polyethylene (HDPE) and wrapped in foam insulation with an HDPE covering. The system is served by some pre-insulated steel in the ground and tunnel network. The valves are a combination of ball, gate, and butterfly type and located in facility mechanical spaces and utility vaults. Thirteen utility vaults were identified for this report and are estimated to be 6'x6'x6' spaces of cast-in-place concrete.

While there are no recurring needs identified as lifecycle renewal opportunities, interviews with staff revealed a concern with corrosion on the underground and utility vault equipment. This corrosion has

made isolation of certain branches of the chilled water system difficult. It is recommended that the corroded valves, unions, strainers, or sleeve seals be replaced.

It is recommended that, over the next ten years, additional facilities be connected to the chilled water loop. These are:

- Joyner Library
- Student Recreation Center
- Wright Building
- Rawl Building

It is also recommended that an updated AutoCAD drawing of the underground chilled water distribution system be developed. This should include all pipe sections and sizes, utility vaults, valve locations and sizes, installation dates, distribution pressures, and distribution temperatures.

An additional recommendation is that a study be performed to determine whether the College Hill area of the main campus should be supported by a central chilled water system. Currently, the facilities (housing, dining, support, etc.) in this portion of campus are supported by incremental units that include up to 1,900 through-wall window air conditioning units and additional split systems. The study should determine if a minor central loop with generational capabilities should be installed.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the system to modern standards. The total costs include variable project delivery costs as determined by the Owner and do not represent the cost of a complete renovation. Soft costs are not represented in this report, nor are costs that could not be identified or determined from the visual inspection and available information.

INSPECTION TEAM DATA

Report Development

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Project Manager

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Date of Inspection

April 7, 2022

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Rob Camperlino	Facility Assessor	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health

Client Contact

NAME	POSITION
Griffin L. Avin, CEFP	Director of Facilities Services, Health Services Campus

DEFINITIONS

The following information is a clarification of the Utilities Infrastructure Condition Assessment report using example definitions.

Overview

Recurring and Nonrecurring Renewal Costs

Renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of systems and components. The tool for projecting the recurring renewal costs is the Renewable Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Greenville using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Also included in the renewal costs are the construction markup (general contractor profit and overhead, construction management, permitting, accounting, site security, insurance, bonds, sales tax, institutional fees, site utilities, refuse fees, and insurance) and professional fees (architect or engineer design fees and in-house design costs).

GLOBAL MARKUP	%
Local Labor Index	71.7
Local Materials Index	100.7
Construction Markup	20.0
Professional Fees	16.0

Recurring Costs

Renewable Component Inventory and Cost Projections

The Renewable Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major systems and components. Each indicated component has the following associated information:

CATEGORY	DESCRIPTION
Component Code	A four-digit code assigned by AMS to the component
Component Description	Description of the individual component
Identifier	Identifying information can be entered as necessary
Customer ID	Customer-provided equipment ID number
Location	The location of each component can be entered if applicable.
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Complexity Factor	Adjusts the component replacement costs when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	The unit cost multiplied by quantity, in today's dollars (note that this is a one-time renewal/replacement cost)
Install Date	This is the year that the component was or is estimated to have been installed. When this data is not available, the default is the year the asset was constructed.
Useful Life	Average life expectancy of the component
Useful Life Adjustment	An optional adjustment that lengthens or reduces the first lifecycle of the component
Replacement Year	Expresses when the next replacement should occur and is the sum of the install date, useful life, and any useful life adjustment

The component listing forms the basis of the Recurring Costs by Year report, which provides a year-by-year list of projected recurring renewal costs (in future year dollars) over the next ten years. Each individual component is assigned a replacement year based on lifecycles. For items already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot (\$/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- **Deferred Renewal**

Recurring repairs, generated by the Renewable Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the system. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- **Projected Renewal**

Recurring renewal efforts, generated by the Renewable Component Inventory, that will be due within the scope of the assessment. These are regular or normal maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the systems and components within are not included in the Renewable Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- **Plant Adaption**

Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing and improvements occasioned by the adoption of modern technology.

- **Corrective Action**

Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to

indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- **Priority 1 – High**

Items in this category include:

- a. correcting a cited safety hazard
- b. stopping accelerated deterioration
- c. returning a facility to normal operation

- **Priority 2 – Medium**

Items in this category include:

- a. repairs to prevent further deterioration
- b. improvements to facility approach/entry and access to goods and services (DOJ ADA title III, priorities 1 and 2)
- c. correction of potential safety hazards

- **Priority 3 – Low**

Items in this category include:

- a. improving access to restrooms and other amenities (DOJ ADA title III, priorities 3 and 4)
- b. bringing a facility into compliance with current building codes as grandfather clauses expire
- c. increasing usability following an occupancy or use change
- d. actions that are recommended but not required by code

Project Subclass

Subclass ratings are assigned to accessibility upgrade activities based on the four Department of Justice priority rankings recommended by the Title III regulations for planning readily achievable barrier removal projects. These ratings are:

- DOJ1 Accessible approach and entrance
- DOJ2 Access to goods and services
- DOJ3 Access to restrooms
- DOJ4 Any other necessary measures

Category Codes

CATEGORY CODE	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
VT1A – VT7A	VERTICAL TRANSPORTATION

Example: Category Code = EL5A	
EL	System Description
5	Component Description
A	Element Description

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example			
Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: Photo Number: 0001006e	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

Section 2

RENEWAL NEEDS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL
ACCESSIBILITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
EXTERIOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
INTERIOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
PLUMBING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
HVAC	173,759	1,320,514	1,285,150	0	0	0	0	0	0	0	0	0	0	0	\$2,779,423
FIRE/LIFE SAFETY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
ELECTRICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
SUBTOTAL	\$173,759	\$1,320,514	\$1,285,150	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,779,423
TOTAL NONRECURRING PROJECT NEEDS			\$2,779,423	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS											\$0

CURRENT REPLACEMENT VALUE	\$8,250,000
FACILITY CONDITION NEEDS INDEX	0.34
FACILITY CONDITION INDEX	0.00

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
NA	\$2,779,423	NA

RENEWAL NEEDS BY SYSTEM

All costs shown as Present Value

CATEGORY	NONRECURRING PROJECT COSTS	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	\$0	\$0	\$0
EXTERIOR	\$0	\$0	\$0
INTERIOR	\$0	\$0	\$0
PLUMBING	\$0	\$0	\$0
HVAC	\$2,779,423	\$0	\$2,779,423
FIRE/LIFE SAFETY	\$0	\$0	\$0
ELECTRICAL	\$0	\$0	\$0
SITE	\$0	\$0	\$0
VERT. TRANS	\$0	\$0	\$0
HEALTH	\$0	\$0	\$0
TOTALS	\$2,779,423	\$0	\$2,779,423

FACILITIES RENEWAL PLAN
RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
TOTAL							

There are no projected Recurring Needs for this facility within the next 10 Years.

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
MCHWDHV05	DEVELOP DISTRIBUTION SYSTEM AUTOCAD AND DRAWING	G3050	1	Corrective Action	36,000
MCHWDHV07	REPLACE CORRODED OR DAMAGED DISTRIBUTION EQUIPMENT	G3050	1	Corrective Action	137,759
MCHWDHV01	CONNECT JOYNER LIBRARY TO CHILLED WATER LOOP	G3050	2	Plant Adaption	831,435
MCHWDHV02	CONNECT STUDENT REC CENTER TO CHILLED WATER LOOP	G3050	2	Plant Adaption	489,079
MCHWDHV03	CONNECT WRIGHT BUILDING TO CHILLED WATER LOOP	G3050	3	Plant Adaption	586,895
MCHWDHV04	CONNECT RAWL BUILDING TO CHILLED WATER LOOP	G3050	3	Plant Adaption	586,895
MCHWDHV06	STUDY TO INSTALL CHILLED WATER SYSTEM AT COLLEGE HILL	G3050	3	Plant Adaption	111,360
TOTAL					\$2,779,423

Section 3

All costs shown as Present Value

DEVELOP DISTRIBUTION SYSTEM AUTOCAD AND DRAWING			
Project Number:	MCHWDHV05	Category Code:	
Priority Sequence:	1	HV7D	
Priority Class:	High	System:	HVAC
Project Class:	Corrective Action	Component:	INFRASTRUCTURE
Date Basis:	6/7/2022	Element:	CHILLED WATER DIST.

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Campus-wide: Floor(s) S

Description

It is recommended that an updated AutoCAD drawing of the underground chilled water distribution system be developed. This should include all pipe sections and sizes, utility vaults, valve locations and sizes, installation dates, distribution pressures, and distribution temperatures.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Generate chilled water system drawing	EA	1	\$5,000	\$5,000	\$25,000	\$25,000	\$30,000
Base Material/Labor Costs				\$5,000		\$25,000	
Indexed Material/Labor Costs				\$5,000		\$25,000	\$30,000
Construction Mark Up at 20.0%							\$6,000
Original Construction Cost							\$36,000
Date of Original Estimate:	6/7/2022					Inflation	\$0
Current Year Construction Cost							\$36,000
No Professional Fees Required							\$0
TOTAL PROJECT COST							\$36,000

All costs shown as Present Value

REPLACE CORRODED OR DAMAGED DISTRIBUTION EQUIPMENT			
Project Number: Priority Sequence: Priority Class: Project Class: Date Basis:	MCHWDHV07 2 High Corrective Action 8/2/2022	Category Code: HV7D	
		System:	HVAC
		Component:	INFRASTRUCTURE
		Element:	CHILLED WATER DIST.

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Undefined: Floor(s) S

Description

Interviews with staff revealed a concern with corrosion on the underground and utility vault equipment. This corrosion has made isolation of certain branches of the chilled water system difficult. It is recommended that the corroded valves, unions, strainers, or sleeve seals be replaced.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Replace corroded equipment	LOT	1	\$73,000	\$73,000	\$35,700	\$35,700	\$108,700
Base Material/Labor Costs				\$73,000		\$35,700	
Indexed Material/Labor Costs				\$73,511		\$25,454	\$98,965
Construction Mark Up at 20.0%							\$19,793
Original Construction Cost							\$118,758
Date of Original Estimate:	8/2/2022					Inflation	\$0
Current Year Construction Cost							\$118,758
Professional Fees at 16.0%							\$19,001
TOTAL PROJECT COST							\$137,759

All costs shown as Present Value

CONNECT STUDENT REC CENTER TO CHILLED WATER LOOP			
<div>Project Number:</div> <div>Priority Sequence:</div> <div>Priority Class:</div> <div>Project Class:</div> <div>Date Basis:</div>	<div>MCHWDHV02</div> <div>3</div> <div>Medium</div> <div>Plant Adaption</div> <div>8/2/2022</div>	<div>Category Code:</div> <div>HV7D</div>	
		<div>System:</div>	<div>HVAC</div>
		<div>Component:</div>	<div>INFRASTRUCTURE</div>
		<div>Element:</div>	<div>CHILLED WATER DIST.</div>

<div>Code Application:</div>	<div>Subclass/Savings:</div>	<div>Project Location:</div>
<div>Not Applicable</div>	<div>Not Applicable</div>	<div>Item Only: Floor(s) S</div>

Description

It is recommended that the Student Recreation Center be connected to the central chilled water system distributed from chilled water plant CCP#3.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Site demo, install chilled water pipe, insulation, manholes, valve, remediation	LF	500	\$450	\$225,000	\$350	\$175,000	\$400,000
Base Material/Labor Costs				\$225,000		\$175,000	
Indexed Material/Labor Costs				\$226,575		\$124,775	\$351,350
Construction Mark Up at 20.0%							\$70,270
Original Construction Cost							\$421,620
Date of Original Estimate:	8/2/2022					Inflation	\$0
Current Year Construction Cost							\$421,620
Professional Fees at 16.0%							\$67,459
TOTAL PROJECT COST							\$489,079

All costs shown as Present Value

CONNECT JOYNER LIBRARY TO CHILLED WATER LOOP			
Project Number:	MCHWDHV01	Category Code:	
Priority Sequence:	4	HV7D	
Priority Class:	Medium	System:	HVAC
Project Class:	Plant Adaption	Component:	INFRASTRUCTURE
Date Basis:	7/20/2022	Element:	CHILLED WATER DIST.

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Item Only: Floor(s) S

Description

It is recommended that the Joyner Library be connected to the central chilled water system distributed from chilled water plant CCP#3.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Site demo, install chilled water pipe, insulation, manholes, valve, remediation	LF	850	\$450	\$382,500	\$350	\$297,500	\$680,000
Base Material/Labor Costs				\$382,500		\$297,500	
Indexed Material/Labor Costs				\$385,178		\$212,118	\$597,295
Construction Mark Up at 20.0%							\$119,459
Original Construction Cost							\$716,754
Date of Original Estimate:	7/20/2022					Inflation	\$0
Current Year Construction Cost							\$716,754
Professional Fees at 16.0%							\$114,681
TOTAL PROJECT COST							\$831,435

All costs shown as Present Value

CONNECT WRIGHT BUILDING TO CHILLED WATER LOOP			
<div>Project Number:</div> <div>Priority Sequence:</div> <div>Priority Class:</div> <div>Project Class:</div> <div>Date Basis:</div>	<div>MCHWDHV03</div> <div>5</div> <div>Low</div> <div>Plant Adaption</div> <div>8/2/2022</div>	<div>Category Code:</div> <div>HV7D</div>	
		<div>System:</div>	<div>HVAC</div>
		<div>Component:</div>	<div>INFRASTRUCTURE</div>
		<div>Element:</div>	<div>CHILLED WATER DIST.</div>

<div>Code Application:</div>	<div>Subclass/Savings:</div>	<div>Project Location:</div>
<div>Not Applicable</div>	<div>Not Applicable</div>	<div>Item Only: Floor(s) 5</div>

Description

It is recommended that the Wright Building be connected to the central chilled water system.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Site demo, install chilled water pipe, insulation, manholes, valve, remediation	LF	600	\$450	\$270,000	\$350	\$210,000	\$480,000
Base Material/Labor Costs				\$270,000		\$210,000	
Indexed Material/Labor Costs				\$271,890		\$149,730	\$421,620
Construction Mark Up at 20.0%							\$84,324
Original Construction Cost							\$505,944
Date of Original Estimate:	8/2/2022					Inflation	\$0
Current Year Construction Cost							\$505,944
Professional Fees at 16.0%							\$80,951
TOTAL PROJECT COST							\$586,895

All costs shown as Present Value

CONNECT RAWL BUILDING TO CHILLED WATER LOOP			
<div>Project Number:</div> <div>Priority Sequence:</div> <div>Priority Class:</div> <div>Project Class:</div> <div>Date Basis:</div>	<div>MCHWDHV04</div> <div>6</div> <div>Low</div> <div>Plant Adaption</div> <div>8/2/2022</div>	<div>Category Code:</div> <div>HV7D</div>	
		<div>System:</div>	<div>HVAC</div>
		<div>Component:</div>	<div>INFRASTRUCTURE</div>
		<div>Element:</div>	<div>CHILLED WATER DIST.</div>

<div>Code Application:</div>	<div>Subclass/Savings:</div>	<div>Project Location:</div>
<div>Not Applicable</div>	<div>Not Applicable</div>	<div>Item Only: Floor(s) S</div>

Description

It is recommended that the Rawl Building be connected to the central chilled water system.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Site demo, install chilled water pipe, insulation, manholes, valve, remediation	LF	600	\$450	\$270,000	\$350	\$210,000	\$480,000
Base Material/Labor Costs				\$270,000		\$210,000	
Indexed Material/Labor Costs				\$271,890		\$149,730	\$421,620
Construction Mark Up at 20.0%							\$84,324
Original Construction Cost							\$505,944
Date of Original Estimate:	8/2/2022					Inflation	\$0
Current Year Construction Cost							\$505,944
Professional Fees at 16.0%							\$80,951
TOTAL PROJECT COST							\$586,895

All costs shown as Present Value

STUDY TO INSTALL CHILLED WATER SYSTEM AT COLLEGE HILL			
Project Number:	MCHWDHV06	Category Code:	
Priority Sequence:	7	HV7F	
Priority Class:	Low	System:	HVAC
Project Class:	Plant Adaption	Component:	INFRASTRUCTURE
Date Basis:	8/2/2022	Element:	OTHER

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Area Wide: Floor(s) S

Description

It is recommended that a study be performed to determine whether the College Hill area of the main campus should be supported by a central chilled water system. Currently, the facilities (housing, dining, support, etc.) in this portion of campus are supported by incremental units that include up to 1,900 through-wall window air conditioning units and additional split systems. The study should determine if a minor central loop with generational capabilities should be installed.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Perform chilled water study	LOT	1	\$5,000	\$5,000	\$75,000	\$75,000	\$80,000
Base Material/Labor Costs				\$5,000		\$75,000	
Indexed Material/Labor Costs				\$5,000		\$75,000	\$80,000
Construction Mark Up at 20.0%							\$16,000
Original Construction Cost							\$96,000
Date of Original Estimate:	8/2/2022					Inflation	\$0
Current Year Construction Cost							\$96,000
Professional Fees at 16.0%							\$15,360
TOTAL PROJECT COST							\$111,360

Section 4

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
CP43	PLASTIC HDPE - 4 INCH	CHW SUPPLY		CWM-0005 TO CROATAN	270	LF	1.35	\$63,514	2001	50		2051
CP43	PLASTIC HDPE - 4 INCH	CHW RETURN		CWM-0005 TO CROATAN	270	LF	1.35	\$63,514	2001	50		2051
CP44	PLASTIC HDPE - 6 INCH	CHW SUPPLY		CWM-00012 TO SPEIGHT	275	LF	1.35	\$70,701	2015	50		2065
CP44	PLASTIC HDPE - 6 INCH	CHW RETURN		CWM-00012 TO SPEIGHT	275	LF	1.35	\$70,701	2015	50		2065
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CCP#1 TO BATE	90	LF	1.35	\$26,621	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CCP#1 TO BATE	90	LF	1.35	\$26,621	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CCP#1 TO AUSTIN	500	LF	1.35	\$147,895	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CCP#1 TO AUSTIN	500	LF	1.35	\$147,895	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CHW VAULT E OF COOLING TWR TO FLANAGAN	126	LF	1.35	\$37,270	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CWM-0005 TO RIVERS	89	LF	1.35	\$26,325	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CWM-0010 TO CWM-0012	194	LF	1.35	\$57,383	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CWM-0008 TO CWM-0009	13	LF	1.35	\$3,845	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CWM-0009 TO FLETCHER MUSIC	490	LF	1.35	\$144,937	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW RETURN		CWM-0009 TO BREWSTER	310	LF	1.35	\$91,695	2001	50		2051

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CWM-0010 TO CWM-0012	194	LF	1.35	\$57,383	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CWM-0005 TO RIVERS	89	LF	1.35	\$26,325	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CHW VAULT E OF COOLING TWR TO FLANAGAN	126	LF	1.35	\$37,270	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CWM-0008 TO CWM-0009	13	LF	1.35	\$3,845	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CWM-0009 TO FLETCHER MUSIC	490	LF	1.35	\$144,937	2001	50		2051
CP45	PLASTIC HDPE - 8 INCH	CHW SUPPLY		CWM-0009 TO BREWSTER	310	LF	1.35	\$91,695	2001	50		2051
CP46	PLASTIC HDPE - 10 INCH	CHW SUPPLY		CCP#1 TO STUDENT HEALTH	450	LF	1.35	\$142,807	2001	50		2051
CP46	PLASTIC HDPE - 10 INCH	CHW RETURN		CCP#1 TO STUDENT HEALTH	450	LF	1.35	\$142,807	2001	50		2051
CP47	PLASTIC HDPE - 12 INCH	CHW SUPPLY		CCP#1 TO MCGINNIS	650	LF	1.35	\$221,986	2001	50		2051
CP47	PLASTIC HDPE - 12 INCH	CHW RETURN		CCP#1 TO MCGINNIS	600	LF	1.35	\$204,910	2001	50		2051
CP48	PLASTIC HDPE - 14 INCH	CHW SUPPLY		CWM-0008 TO CWM-0010	13	LF	1.35	\$4,730	2001	50		2051
CP48	PLASTIC HDPE - 14 INCH	CHW SUPPLY		CWM-0005 TO CWM-0012	65	LF	1.35	\$23,648	2001	50		2051
CP48	PLASTIC HDPE - 14 INCH	CHW RETURN		CWM-0008 TO CWM-0010	13	LF	1.35	\$4,730	2001	50		2051

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
CP48	PLASTIC HDPE - 14 INCH	CHW RETURN		CWM-0005 TO CWM-0012	65	LF	1.35	\$23,648	2001	50		2051
CP50	PLASTIC HDPE - 16 INCH	CHW SUPPLY		SERVICE TO STUDENT UNION	567	LF	1.35	\$500,174	2020	50		2070
CP50	PLASTIC HDPE - 16 INCH	CHW RETURN		CCP#1 TO CHW VAULT E. OF COOLING TOWER	140	LF	1.35	\$123,500	2001	50		2051
CP50	PLASTIC HDPE - 16 INCH	CHW SUPPLY		CCP#1 TO CHW VAULT E. OF COOLING TOWER	140	LF	1.35	\$123,500	2001	50		2051
CP50	PLASTIC HDPE - 16 INCH	CHW RETURN		SVC TO STUDENT UNION	567	LF	1.35	\$500,174	2020	50		2070
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CCP#1 TO COOLING TOWER	250	LF	1.35	\$315,456	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CCP#1 TO COOLING TOWER	250	LF	1.35	\$315,456	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0006 / 0007 TO CWM-0011	145	LF	1.35	\$182,965	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0004 TO CWM-0011	145	LF	1.35	\$182,965	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0003 TO CWM-0004	12	LF	1.35	\$15,142	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0002 TO CWM-0003	146	LF	1.35	\$184,227	2001	50		2051

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0001 TO CWM-0002	10	LF	1.35	\$12,618	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW SUPPLY		CWM-0001 TO SE OF HOWELL SCI	115	LF	1.35	\$145,110	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0006 / 0007 TO CWM-0011	145	LF	1.35	\$182,965	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0004 TO CWM-0011	145	LF	1.35	\$182,965	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0003 TO CWM-0004	12	LF	1.35	\$15,142	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0002 TO CWM-0003	146	LF	1.35	\$184,227	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0001 TO CWM-0002	10	LF	1.35	\$12,618	2001	50		2051
CP51	PLASTIC HDPE - 20 INCH	CHW RETURN		CWM-0001 TO SE OF HOWELL SCI	115	LF	1.35	\$145,110	2001	50		2051
UT02	UTILITY MANHOLE	CWM-0005		SW OF RIVERS	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0012		NE OF AUSTIN	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0010		N OF BREWSTER IN SIDEWALK	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0008		N OF BREWSTER IN SIDEWALK	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0009		N OF BREWSTER IN SIDEWALK	1	EA	1.35	\$16,720	2001	100		2101

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
UT02	UTILITY MANHOLE	CWM-0007		N OF BREWSTER IN STREET	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0006		N OF BREWSTER IN STREET	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0011		SE OF AUSTIN IN PARKING LOT	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0004		N OF CHRISTENBURY GYM	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0003		N OF CHRISTENBURY GYM	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0002		SE OF HOWELL SC	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CWM-0001		SE OF HOWELL SCI	1	EA	1.35	\$16,720	2001	100		2101
UT02	UTILITY MANHOLE	CHW VAULT (M305)		E OF CCP#1 COOLING TWR (STREET)	1	EA	1.35	\$16,720	2001	100		2101
Grand Total:								\$5,651,314				

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

No Projected Component Replacement Cost for Asset No. MCHWD for DR

No Projected Component Replacement Cost for Asset No. MCHWD for 2022

No Projected Component Replacement Cost for Asset No. MCHWD for 2023

No Projected Component Replacement Cost for Asset No. MCHWD for 2024

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

No Projected Component Replacement Cost for Asset No. MCHWD for 2025

No Projected Component Replacement Cost for Asset No. MCHWD for 2026

No Projected Component Replacement Cost for Asset No. MCHWD for 2027

No Projected Component Replacement Cost for Asset No. MCHWD for 2028

RECURRING NEEDS BY YEAR

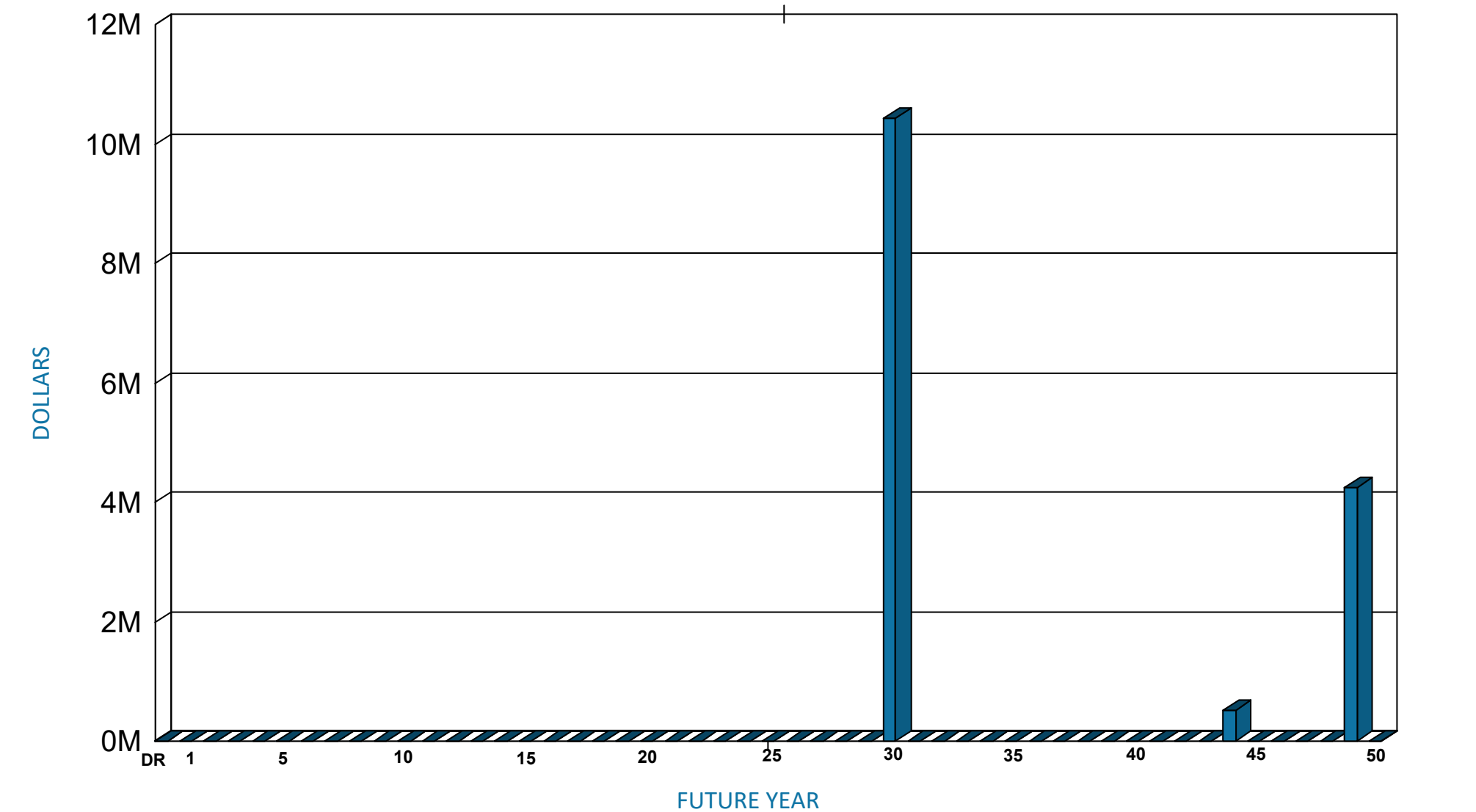
All costs shown as Future Value using a 3% average inflation rate

No Projected Component Replacement Cost for Asset No. MCHWD for 2029

No Projected Component Replacement Cost for Asset No. MCHWD for 2030

No Projected Component Replacement Cost for Asset No. MCHWD for 2031

RECURRING COMPONENT EXPENDITURE PROJECTIONS



Section 5

THERE ARE NO PHOTOS
FOR THIS ASSET

