

**City of Davis Public Works  
Department**

**Preventative Maintenance  
Report - Buildings**

*Prepared by Kitchell for*

**City of Davis – Davis, CA**



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**Job No. 5011A3**



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**Executive Summary**

Overview:

At the request of the City of Davis Public Works Department, the City of Davis, has contracted with Kitchell to develop a Facility Condition Assessment (FCA) for 56 of their buildings in Davis, California. This document evaluates the Facility Maintenance (FM) staffing needs based on the deferred maintenance and preventative maintenance of the assessed buildings.

Summary of Findings:

**Appendices A-1** through **A-6** combine data from the FCA and statistical data of buildings of a similar age, size, and function as the City of Davis facilities in order to analyze the cost to maintain all building systems within the entire building. Because the scope of the FCA was limited to visual inspection of major systems, all unassessed building systems are estimated using a combination of statistical *CBRE/Whitestone* and similar industry resources to serve as a benchmark for this study.

The City of Davis buildings have an estimated replacement value of \$219M dollars (**Appendix A-1**). To maintain these facilities, the City of Davis currently utilizes a staff of three (3) working trade technicians. Although most buildings have been consistently maintained with a ‘Good’ Facility Condition Index (FCI) rating, some buildings have accumulated deferred maintenance items as indicated by the FCA.

It is recommended at least three-four (3-4) additional trade technicians be added to the facilities staff to maintain the level of the existing facilities and address backlog deferred maintenance over the next 5-years. Although the City of Davis does not formalize their staff with these titles, our benchmark research (*Whitestone*) recommends the maintenance staff to have a background with specific trades to address the needs of the buildings (**Appendices 6A-6B**). **Table 1** summarizes our recommendations:

**Table 1 – Staff Recommendations by Trade Discipline**

Classification	Current Staff	Recommended Staff For M&R Only	Recommended Staff for M&R Plus Deferred
HVAC Technician	<b>3</b>	1	1
Electrician		1	1
Plumber		1	1
Carpenter		1	1
Painter		1	1
General Maintenance		1	2
<b>TOTAL</b>		<b>3</b>	<b>6</b>

Besides ongoing M&R labor costs, additional staff is recommended in order to complete the deferred maintenance work. In addition to labor costs associated with deferred maintenance, it is estimated that \$200k in materials will be required to complete deferred maintenance items. (**Table 5**)

Maintenance costs of facilities are typically 2.00-2.25% of the replacement cost and escalate with labor and materials. Using this industry accepted guideline along with a benchmark deterioration rate of 2.5% per annum, \$2.7M per year should be spent on replacing major building systems and \$1.4M per year should be spent on repair and maintenance. (**Appendix A-2**)

Currently there are nearly \$7.9M in replacement and deferred maintenance items required at the City of Davis according to the FCA.



**1. Introduction**

The purpose of this study is to assist in determining how to reduce the amount of deferred maintenance backlog over the next five (5) years and what the appropriate level of facilities staff would be required to keep the backlog to an acceptable level. In addition, there are management supervisors, custodial staffing, administration, and clerical support.

City of Davis maintains over 330,000 gross square feet (GSF) of city facilities as listed in the **Table 2** below. The total basic replacement value for the buildings are \$219,190,681 (estimated hard cost only).

**Table 2 – Facility List**

Facility Name	Address	Sq. Ft	Year Built
Administrative Building	1818 5th Street	8,000	1977
Arroyo Women's/Men's/Mech Pool Building	2000 Shasta Drive	4,492	2000
Bicycle Hall of Fame	303 3rd Street	8,000	1990
Boy Scout Cabin	616 1st Street	1,500	1927
Brady Bldg	23 Russell Boulevard	1,300	2006
Building A - Admin	1717 5th Street	6,400	1970
Building B South	1717 5th Street	4,800	1965
Building BB - Electrician Super	1717 5th Street	560	2005
Building C Water/Trans	1717 5th Street	2,160	1995
Building D - Engineering	1717 5th Street	1,440	1987
Building E - Engineering/Recycling	1717 5th Street	1,440	1994
Building F - Well Building	1717 5th Street	2,160	2009
Building H Water/Collections	1717 5th Street	3,552	1965
Building I & J Water file/storage	1717 5th Street	2,513	1965
Building K - Collections/Lockers/Meeting	1717 5th Street	2,880	1963
Building L - Collections Office	1717 5th Street	2,880	1990
Building M - Storage Services	1717 5th Street	8,480	1986
Building N - Water Meter Shop	1717 5th Street	2,400	1965
Building O Paint Booth	1717 5th Street	390	1990
Building Q	1717 5th Street	3,000	1960
Building S	1717 5th Street	3,000	1960
Building W	1717 5th Street	300	1990
Chestnut Park Roundhouse	1020 Chestnut Lane	1,712	1962
City Hall	23 Russell Boulevard	17,348	1927
Civic Center Gym	23 Russell Boulevard	16,400	1927
Community Chambers	23 Russell Boulevard	4,217	1981
Community Development Modular	23 Russell Boulevard	1,440	1990
Community Park Pool Building	23 Russell Boulevard	16,396	2003
Downtown Parking Structure	117 F Street	9,247	1990
Evidence Storage North	2600 5th Street	480	2006
Evidence Storage South	2600 5th Street	480	2006



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Explorit Science Center	3141 5th Street	10,614	1994
Facilities Building	1818 5th Street	8,193	1990
Fire Station #32	1350 Arlington Boulevard	4,223	1986
Fire Station #33	425 Mace Boulevard	8,548	1965
Fire Station HQ	530 5th Street	9,678	1964
Fleet Shop/Parks Shop	1818 5th Street	12,396	1983
Fuel Facility	1717 5th Street	1,296	1985
Hattie Weber Museum	445 C Street	1,270	1911
Historic City Hall	226 F Street	11,772	1938
Hunt Boyer Admin	604 2nd Street	3,374	1911
Manor Pool Guard Building	2850 Temple Drive	1,050	1999
Manor Pool Mech/Concession	2850 Temple Drive	2,300	2011
Manor Pool Restrooms/Shower	2850 Temple Drive	2,796	1999
Police Station	2600 5th Street	35,000	2001
Redwood Park Community Building	1001 Anderson Road	2,100	1989
Senior Citizen Center	646 A Street	17,195	1983
SP Substation	826 2nd Street	400	1985
SP Tower/Switch Building	826 2nd Street	800	1930
SP Train Station	826 2nd Street	4,550	1987
Storage Canopy	1818 5th Street	8,000	1990
Varsity Theatre	616 2nd Street	8,800	1950
Veterans' Annex	203 East 14th Street	880	1973
Veterans' Center	203 East 14th Street	25,929	1973
Veterans' Theatre	203 East 14th Street	11,016	1973
West Area Tank Building	3003 John Jones Road	1,750	2001

Using industry standards, this report provides guidelines for determining non-capital expenses including maintenance staffing and other expenses related to maintaining the City of Davis buildings. Although terminology varies, these are sometimes called building “maintenance and repair” (M&R) expenses. M&R is defined as “the collection of activities necessary for keeping a building in good working order.” There are three elements to M&R:

**Preventive maintenance (PM) and minor repair:** These are tasks that are regularly scheduled and occur relatively frequently. Examples include changing filters in HVAC equipment, smaller painting projects and similar tasks. This is typically done by in-house staff.

**Unscheduled maintenance:** These are emergency service calls that individually cannot be predicted. However, these tasks consume a steady level of effort throughout the year and can be planned for at the global level. These issues typically get top priority and may even include overtime as a facility will be at least partially not operational until the issue is addressed. This is also typically done by in-house staff.

**Renewal and replacement:** Replacement of major equipment is covered in this category. These tasks are typically expensive and can generally be predicted and scheduled. Replacement is planned when the equipment, as an example, reaches the end of its service or economic life. Typically most of this work is performed by outside contractors on a bid basis.

M&R costs for a specific building vary throughout the year with significant peaks when a planned renewal or replacement of a costly item such as reroofing occurs. Chart 1-A shows that for a typical building the annual M&R costs can vary greatly. However, the annual level of expenditure can be predicted and planned for.

**Chart 1-A**  
**Typical Office Building Yearly Maintenance Costs/Square Foot**

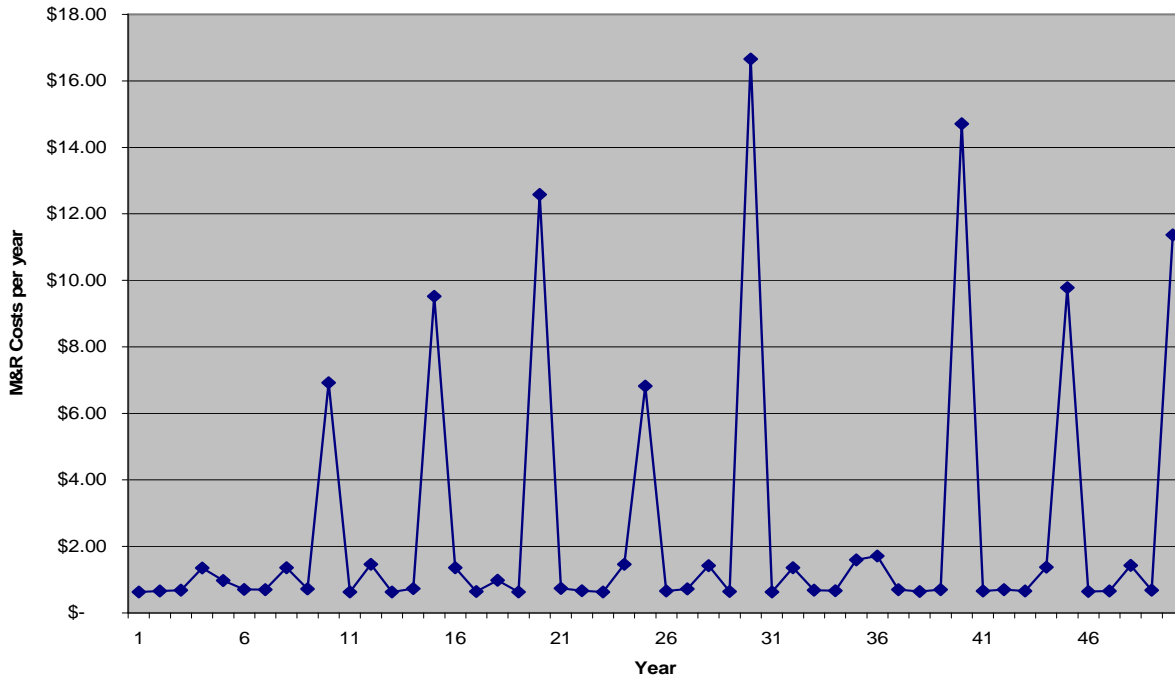


Chart 1-A depicts the typical \$/GSFT of expected annual maintenance & repair costs. The spiked line represents the same in total expected expenditure (\$/GSFT x GSFT of typical office space) that should be planned for expected maintenance & repairs. The costs in Chart 1-A do not model deferred maintenance. The Chart is meant to illustrate the expected repair and replacement projects for a typical building. Because there are deferred maintenance items related to the City of Davis facilities, a “catch-up” factor must be added to get the building up to a level that can be steadily maintained.

There are other costs related to maintaining facilities that are not addressed in M&R costs. These are in two major categories:

**Operations:** This includes the routine items that do not generally involve facilities maintenance staff. Costs for custodial, water/sewer, energy, grounds, refuse, security and similar items are in this category.

**Restoration and Modernization:** These are costs required to “restore or improve the productivity of an asset.” Examples include replacement due to obsolescence or change in occupancy, or policy mandated retrofits. Items in this category cannot be predicted. In California, one significant item is seismic upgrading. These costs are not examined in this study.

Utilizing industry indexes, the analysis also reviews past cost indexes to identify the probable future M&R costs.



**2. Maintenance and Repair (M&R) Costs and Staffing**

Maintenance and repair costs and staffing levels are based on the basic replacement costs of the facilities that are being maintained. Unless noted otherwise, the data utilized in this model is from CBRE|Whitestone, a leading industry resource for building maintenance and repair costs.

The methodology to determine the minimum number of trade technicians to perform the required M&R functions is outlined below:

**Step 1:** The first step in using this methodology is to determine the types of buildings involved and the costs per area based upon basic construction cost only. Maintenance effort varies with the activity that occurs in the building. **Appendix A-1** (Base Facility Replacement Cost by Type) lists the type of buildings and the basic construction costs. A factor for the nearest regional city, Sacramento, was added to develop a net basic replacement cost.

**Step 2:** The second step is to determine the overall replacement costs for the building structure. This is done by multiplying the replacement cost per gross square feet (GSF) times the GSF. By this methodology, the total replacement cost for basic construction for all buildings are about \$219,190,681.

As shown in **Appendix A-2** (% Annual Facility Maintenance Costs), there are various factors for M&R for each type of building construction. The factors are shown in the three M&R categories discussed above. The factors are then applied to the replacement costs. The percentage factors and resulting annual costs. Note that these are the average costs over a fifty year period in today’s dollars. Any one specific building may require considerably more or less costs in a specific year. In summary, the costs are shown in Table 3 below:

**Table 3 – Total Annual Maintenance and Replacement Costs**

Category	Costs
Preventive maintenance (PM) and minor repair	\$ 805,224
Unscheduled maintenance	\$ 595,350
Renewal and replacement	\$2,717,281
Total	\$4,117,856

The next steps involve converting the costs into in-house person-hours. The starting point is the predicted total annual cost in the three categories of M&R as indicated above.

The first factor applied is for the age of the buildings as shown in **Appendix A-3**. The average age of the buildings is 39 years old and the age weighted by area for the Davis buildings is 41 years old. As would be expected, more M&R costs are incurred as the building gets older. The factors range from 1.00 to 1.30 for a building that is 50 years old. Therefore a multiplier of 1.30 has been chosen and applied to the normal expected maintenance costs for the Davis buildings. As would be expected, more M&R costs are incurred as the building gets older as Chart 1-A depicts.

The next factor applied is the expected percentage to be performed by in-house staff as opposed to outside contractors. Typically, all preventive maintenance and minor repair, and unscheduled maintenance are performed in-house. Most of the renewal and replacement work is done by outside contractors. It has been assumed that only 10% of the work in this category will be completed by in-house staff. This includes the time trade technicians have to be present for required hands on coordination with contractors as well as the direct work they do.

Of the costs, a certain amount will be for material with the remainder for labor. It has been assumed that 85% of the costs for preventive maintenance and minor repair, unscheduled maintenance, and renewal/replacement are for labor costs leaving 15% for material costs.

Applying the factors provides the total in-house labor costs that are predicted. This is converted into man-hours by applying a labor rate. **Appendix A-4** shows the shop rate calculations for the burdened labor rates for typical trade technicians in California today.

Applying the labor rate converts it to the total number of hours recommended to address each level of M&R. **Appendix A-5** shows the weighted average shop rate calculations to develop the net number of hours that a technician is available to perform maintenance work.

**Appendix A-6A** indicates the typical average cost of an asset over the course of 50 years per gross square foot. Nationally accepted benchmarks and our practical industry experience inform us that for these buildings there is a specific percentage of work by specialty during typical maintenance and repair.

**Table 4** summarizes the steps described above. Note that these costs account for typical M&R conditions without deferred maintenance items. The deferred maintenance ‘catch-up’ will be discussed later in this study.

**Table 4 – Determination of Trade Technicians Based on Maintenance and Replacement Costs**

	<b>PM &amp; Minor Repair</b>	<b>Unscheduled Maintenance</b>	<b>Renewal &amp; Replacement</b>	<b>Total</b>
<b>Annual M&amp;R Costs</b> (Appendix A-2)	\$805,224	\$595,350	\$2,717,281	\$4,117,856
Factor for age of buildings (Appendix A-3)	1.30	1.30	1.30	
Annual Costs: Increase for Age factor	\$1,046,791	\$773,955	\$3,532,466	\$5,353,212
Assumed percentage In-house	100%	100%	10%	
<b>Total In-house Costs</b>	<b>\$1,046,791</b>	<b>\$773,955</b>	<b>\$353,247</b>	\$2,173,993
Assumed percentage Labor	85%	85%	85%	
<b>Total In-house Labor Costs</b>	<b>\$889,772</b>	<b>\$657,862</b>	<b>\$300,260</b>	\$1,847,894
Material costs for trade technicians	\$157,019	\$116,093	\$52,987	
Average trade tech. rate (Appendix A-4)	\$77.21	\$77.21	\$77.21	
Estimated trade hours per year	11,524	8,520	3,889	
Net trade hours per year (Appendix A-5)	1820	1820	1820	
<b>Recommended # of trade technicians</b>	<b>6</b>	<b>5</b>	<b>2</b>	

**Table 4** concludes that it is recommended to have at least six (6) total staff to take on PM & Minor Repair. Note that the table illustrates the recommended number of staff needed for each type of M&R category. Unscheduled Maintenance and Renewal & Replacement items are planned for, but these can be accounted for within the composition of the total in-house staff. Unscheduled Maintenance items typically require specific specialty trades background based on the building systems within the City of Davis’ assets; therefore, it is recommended that five (5) staff members hold at least one specific trade background as illustrated later in this report. Renewal & Replacement items are typically contracted out and require only 10% of in-house staff. This work is typically to oversee and manage the contracted workers these two (2) staff members are recommended to have a manager, lead, or senior role.



### 3. Deferred Maintenance Costs and Staffing

The Maintenance and Repair costs developed so far in this study do not include deferred maintenance that has accumulated and identified in the building assessment reports. Additional staff may be required to address this “catch-up”.

The City of Davis FCA shows the estimated costs summary for major deferred maintenance items, (listed as anticipated capital renewal) as \$7,835,838. Further detailed information on the deferred maintenance can be found within the FCA Report.

The first factor applied is the expected percentage to be performed by in-house staff as opposed to outside contractors. Most of the deferred capital renewal and replacement work is done by outside contractors. It has been assumed that only 15% of the work in this category will be completed by in-house staff. This includes the time trade technicians have to be present for required hands on coordination with contractors as well as the direct work they do.

Of the in-house costs, a certain amount will be for in-house materials with the remainder for labor. The in-house material costs account for additional resources in-house staff would need to provide to the capital renewal. It has been assumed that 85% of the costs for % In-House Anticipated Capital Renewal are for in-house labor leaving 15% for in-house material costs.

We convert the in-house labor costs into an average annual staffing cost and convert this value into man-hours by applying an average trade rate. Details of the trade rate can be found in **Appendix A-4**.

Applying the average trade rate converts the cost to the total number of hours required to complete deferred maintenance items. **Appendix A-5** shows the weighted average shop rate calculations to develop the net number of hours that a technician is available to perform maintenance work.

**Table 5** summarizes all the calculations above.

**Table 5 – Determination of Trade Technicians Based on Deferred Maintenance Items**

Category	Source	Results
A. Anticipated Capital Renewal (Years 1-5)	Facility Conditions Assessment	\$7,835,838
B. % In-House	15% of Line A	\$1,175,376
C. Labor cost	85% of Line B	\$999,069
D. Material cost	15% of Line B	\$176,306
E. Yearly staffing costs	Line B / 5	\$199,814
F. Average trade rate (Appendix A-4)	Appendix A-4	\$77.21
G. Trade hours per year (Appendix A-5)	Appendix A-5	1,820
H. Additional staff required for deferred maintenance	Line E / (Line F x Line G)	<b>1</b>

**Table 5** concludes that it is recommended to have at least one (1) additional staff to provide support on deferred maintenance items.

**4. Trade Tech Composition**

In summary, **Table 4** illustrates that baseline models recommend six (6) staff for M&R and **Table 5** recommends one (1) additional staff to aid in ‘catch-up’ deferred maintenance items with a total of seven (7) maintenance staff.

**Table 4** further illustrates that five (5) of the total staff cover have trades background to cover all building systems within the assessed assets.

**Appendix A-6A** takes the typical average cost of M&R per building system and weighs the model based on total square footage of the assessed sites. From the weighed-average costs, we obtain a % of work per building system.

Next we convert the % of work per building system to trade backgrounds. Based on Whitestone baseline, we have categorized the following trade titles to cover specific building systems;

**Table 6 – Trade Technician Background per Building System**

Trade	Building System
HVAC Technician	HVAC System
Electrician	Electrical
Plumber	Plumbing
Carpenter	Roofing / Interior Construction
Painter	Interior Finishes
General	Exterior Closure / Stairways / Conveying Systems / Fire Protection / Etc.

**Appendix A-6B** takes these titles and applies the recommended total staff for M&R and deferred maintenance in order to obtain the recommended number of trade technicians per trade disciplines.

The Appendices conclude that for M&R, there is a need for at least one trained staff per each trade background. The additional member for deferred maintenance ‘catch-up’ is recommended to have a diverse background to cover all deficiencies and has been classified as General.



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**Appendix A-1 – Facility Replacement Costs**

Facility Name	Address	Building Type	Sq. Ft	Renewal & Replacement Cost/ Sq Ft.	Renewal & Replacement Cost
Administrative Building	1818 5th Street	OFFICE	8,000	\$552	\$ 4,414,410
Arroyo Women's/Men's/Mech Pool Building	2000 Shasta Drive	OUTDOOR POOL	4,492	\$960	\$ 4,313,567
Bicycle Hall of Fame	303 3rd Street	VISITOR CENTER	8,000	\$781	\$ 6,248,970
Boy Scout Cabin	616 1st Street	OFFICE	1,500	\$473	\$ 709,459
Brady Bldg	23 Russell Boulevard	OFFICE	1,300	\$1,104	\$ 1,434,683
Building A - Admin	1717 5th Street	OFFICE	6,400	\$552	\$ 3,531,528
Building B South	1717 5th Street	OFFICE	4,800	\$552	\$ 2,648,646
Building BB - Electrician Super	1717 5th Street	WAREHOUSE, SELF STORAGE	560	\$201	\$ 112,367
Building C Water/Trans	1717 5th Street	OFFICE	2,160	\$509	\$ 1,099,016
Building D - Engineering	1717 5th Street	OFFICE	1,440	\$509	\$ 732,677
Building E - Engineering/Recycling	1717 5th Street	OFFICE	1,440	\$509	\$ 732,677
Building F - Well Building	1717 5th Street	OFFICE	2,160	\$509	\$ 1,099,016
Building H Water/Collections	1717 5th Street	OFFICE	3,552	\$645	\$ 2,290,907
Building I & J Water file/storage	1717 5th Street	WAREHOUSE, SELF STORAGE	2,513	\$330	\$ 828,404
Building K - Collections/Lockers/Meeting	1717 5th Street	WAREHOUSE, SELF STORAGE	2,880	\$380	\$ 1,093,856
Building L - Collections Office	1717 5th Street	OFFICE	2,880	\$537	\$ 1,547,910
Building M - Storage Services	1717 5th Street	WAREHOUSE, SELF STORAGE	8,480	\$365	\$ 3,099,260
Building N - Water Meter Shop	1717 5th Street	MAINTENANCE SHOP	2,400	\$380	\$ 911,547
Building O Paint Booth	1717 5th Street	WAREHOUSE, DRY	390	\$408	\$ 159,306
Building Q	1717 5th Street	MAINTENANCE SHOP	3,000	\$401	\$ 1,203,930
Building S	1717 5th Street	MAINTENANCE SHOP	3,000	\$380	\$ 1,139,434
Building W	1717 5th Street	MAINTENANCE SHOP	300	\$688	\$ 206,388
Chestnut Park Roundhouse	1020 Chestnut Lane	PUBLIC RESTROOM	1,712	\$709	\$ 1,214,593
City Hall	23 Russell Boulevard	OFFICE	17,348	\$817	\$ 14,172,492
Civic Center Gym	23 Russell Boulevard	COMMUNITY CENTER	16,400	\$695	\$ 11,400,071
Community Chambers	23 Russell Boulevard	COMMUNITY CENTER	4,217	\$745	\$ 3,142,888
Community Development Modular	23 Russell Boulevard	MODULAR CLASSROOM	1,440	\$580	\$ 835,871
Community Park Pool Building	23 Russell Boulevard	OUTDOOR POOL	16,396	\$781	\$ 12,807,264
Downtown Parking Structure	117 F Street	GARAGE PARKING	9,247	\$244	\$ 2,253,055



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Evidence Storage North	2600 5th Street	WAREHOUSE, DRY	480	\$279	\$	134,152
Evidence Storage South	2600 5th Street	WAREHOUSE, DRY	480	\$279	\$	134,152
Explorit Science Center	3141 5th Street	WAREHOUSE, SELF STORAGE	10,614	\$279	\$	2,966,400
Facilities Building	1818 5th Street	OFFICE	8,193	\$387	\$	3,170,507
Fire Station #32	1350 Arlington Boulevard	FIRE STATION	4,223	\$817	\$	3,449,990
Fire Station #33	425 Mace Boulevard	FIRE STATION	8,548	\$817	\$	6,983,310
Fire Station HQ	530 5th Street	FIRE STATION	9,678	\$817	\$	7,904,531
Fleet Shop/Parks Shop	1818 5th Street	GARAGE PARKING	12,396	\$502	\$	6,218,298
Fuel Facility	1717 5th Street	WAREHOUSE, SELF STORAGE	1,296	\$1,175	\$	1,523,143
Hattie Weber Museum	445 C Street	VISITOR CENTER	1,270	\$717	\$	910,114
Historic City Hall	226 F Street	COMMUNITY CENTER	11,772	\$889	\$	10,460,776
Hunt Boyer Admin	604 2nd Street	OFFICE	3,374	\$674	\$	2,272,819
Manor Pool Guard Building	2850 Temple Drive	OFFICE	1,050	\$717	\$	752,456
Manor Pool Mech/Concession	2850 Temple Drive	OUTDOOR POOL	2,300	\$1,003	\$	2,307,533
Manor Pool Restrooms/Shower	2850 Temple Drive	PUBLIC RESTROOM	2,796	\$860	\$	2,404,420
Police Station	2600 5th Street	OFFICE	35,000	\$889	\$	31,101,525
Redwood Park Community Building	1001 Anderson Road	COMMUNITY CENTER	2,100	\$573	\$	1,203,930
Senior Citizen Center	646 A Street	COMMUNITY CENTER	17,195	\$788	\$	13,554,604
SP Substation	826 2nd Street	OFFICE	400	\$788	\$	315,315
SP Tower/Switch Building	826 2nd Street	OFFICE	800	\$889	\$	710,892
SP Train Station	826 2nd Street	PASSENGER TERMINAL	4,550	\$688	\$	3,130,218
Storage Canopy	1818 5th Street	WAREHOUSE, DRY	8,000	\$165	\$	1,318,590
Varsity Theatre	616 2nd Street	MOVIE THEATER	8,800	\$717	\$	6,306,300
Veterans' Annex	203 East 14th Street	COMMUNITY CENTER	880	\$537	\$	472,973
Veterans' Center	203 East 14th Street	COMMUNITY CENTER	25,929	\$645	\$	16,723,233
Veterans' Theatre	203 East 14th Street	AUDITORIUM	11,016	\$588	\$	6,473,360
West Area Tank Building	3003 John Jones Road	WAREHOUSE, SELF STORAGE	1,750	\$516	\$	902,948
<b>Total Sq. Ft.</b>			<b>333,297</b>			
<b>Total Basic Replacement Cost</b>					<b>\$</b>	<b>219,190,681</b>



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**Appendix A-2 – % & Annual Facility Maintenance Costs**

Facility	Renewal & Replacement Cost	PM & Minor Repair		Unscheduled Maintenance		Renewal & Replacement		Total
		% of Renewal & Replacement	Annual Cost	% of Renewal & Replacement	Annual Cost	% of Renewal & Replacement	Average Annual Cost	
Administrative Building	\$ 4,414,410	0.27%	\$ 11,919	0.16%	\$ 7,063	1.05%	\$ 46,351	\$ 65,333
Arroyo Women's/Men's/Mech Pool Building	\$ 4,313,567	0.62%	\$ 26,744	0.55%	\$ 23,725	1.30%	\$ 56,076	\$ 106,545
Bicycle Hall of Fame	\$ 6,248,970	0.42%	\$ 26,246	0.23%	\$ 14,373	1.20%	\$ 74,988	\$ 115,606
Boy Scout Cabin	\$ 709,459	0.27%	\$ 1,916	0.16%	\$ 1,135	1.05%	\$ 7,449	\$ 10,500
Brady Bldg	\$ 1,434,683	0.27%	\$ 3,874	0.16%	\$ 2,295	1.05%	\$ 15,064	\$ 21,233
Building A - Admin	\$ 3,531,528	0.27%	\$ 9,535	0.16%	\$ 5,650	1.05%	\$ 37,081	\$ 52,267
Building B South	\$ 2,648,646	0.27%	\$ 7,151	0.16%	\$ 4,238	1.05%	\$ 27,811	\$ 39,200
Building BB - Electrician Super	\$ 112,367	0.29%	\$ 326	0.19%	\$ 213	1.84%	\$ 2,068	\$ 2,607
Building C Water/Trans	\$ 1,099,016	0.27%	\$ 2,967	0.16%	\$ 1,758	1.05%	\$ 11,540	\$ 16,265
Building D - Engineering	\$ 732,677	0.27%	\$ 1,978	0.16%	\$ 1,172	1.05%	\$ 7,693	\$ 10,844
Building E - Engineering/Recycling	\$ 732,677	0.27%	\$ 1,978	0.16%	\$ 1,172	1.05%	\$ 7,693	\$ 10,844
Building F - Well Building	\$ 1,099,016	0.27%	\$ 2,967	0.16%	\$ 1,758	1.05%	\$ 11,540	\$ 16,265
Building H Water/Collections	\$ 2,290,907	0.27%	\$ 6,185	0.16%	\$ 3,665	1.05%	\$ 24,055	\$ 33,905
Building I & J Water file/storage	\$ 828,404	0.29%	\$ 2,402	0.19%	\$ 1,574	1.84%	\$ 15,243	\$ 19,219
Building K - Collections/Lockers/Meeting	\$ 1,093,856	0.29%	\$ 3,172	0.19%	\$ 2,078	1.84%	\$ 20,127	\$ 25,377
Building L - Collections Office	\$ 1,547,910	0.27%	\$ 4,179	0.16%	\$ 2,477	1.05%	\$ 16,253	\$ 22,909
Building M - Storage Services	\$ 3,099,260	0.29%	\$ 8,988	0.19%	\$ 5,889	1.84%	\$ 57,026	\$ 71,903
Building N - Water Meter Shop	\$ 911,547	0.35%	\$ 3,190	0.25%	\$ 2,279	1.14%	\$ 10,392	\$ 15,861
Building O Paint Booth	\$ 159,306	0.24%	\$ 382	0.16%	\$ 255	1.08%	\$ 1,721	\$ 2,358
Building Q	\$ 1,203,930	0.35%	\$ 4,214	0.25%	\$ 3,010	1.14%	\$ 13,725	\$ 20,948
Building S	\$ 1,139,434	0.35%	\$ 3,988	0.25%	\$ 2,849	1.14%	\$ 12,990	\$ 19,826
Building W	\$ 206,388	0.35%	\$ 722	0.25%	\$ 516	1.14%	\$ 2,353	\$ 3,591
Chestnut Park Roundhouse	\$ 1,214,593	0.42%	\$ 5,101	0.48%	\$ 5,830	1.07%	\$ 12,996	\$ 23,927
City Hall	\$ 14,172,492	0.27%	\$ 38,266	0.16%	\$ 22,676	1.05%	\$ 148,811	\$ 209,753
Civic Center Gym	\$ 11,400,071	0.27%	\$ 30,780	0.23%	\$ 26,220	1.02%	\$ 116,281	\$ 173,281
Community Chambers	\$ 3,142,888	0.27%	\$ 8,486	0.23%	\$ 7,229	1.02%	\$ 32,057	\$ 47,772
Community Development Modular	\$ 835,871	1.50%	\$ 12,538	1.09%	\$ 9,111	2.88%	\$ 24,073	\$ 45,722
Community Park Pool Building	\$ 12,807,264	0.62%	\$ 79,405	0.55%	\$ 70,440	1.30%	\$ 166,494	\$ 316,339
Downtown Parking Structure	\$ 2,253,055	0.25%	\$ 5,633	0.09%	\$ 2,028	0.56%	\$ 12,617	\$ 20,277
Evidence Storage North	\$ 134,152	0.24%	\$ 322	0.16%	\$ 215	1.08%	\$ 1,449	\$ 1,985
Evidence Storage South	\$ 134,152	0.24%	\$ 322	0.16%	\$ 215	1.08%	\$ 1,449	\$ 1,985





**City of Davis Public Works Department**  
**Preventative Maintenance Report - Buildings**

Explorit Science Center	\$ 2,966,400	0.29%	\$ 8,603	0.19%	\$ 5,636	1.84%	\$ 54,582	\$ 68,820
Facilities Building	\$ 3,170,507	0.27%	\$ 8,560	0.16%	\$ 5,073	1.05%	\$ 33,290	\$ 46,924
Fire Station #32	\$ 3,449,990	0.84%	\$ 28,980	0.64%	\$ 22,080	2.39%	\$ 82,455	\$ 133,515
Fire Station #33	\$ 6,983,310	0.84%	\$ 58,660	0.64%	\$ 44,693	2.39%	\$ 166,901	\$ 270,254
Fire Station HQ	\$ 7,904,531	0.84%	\$ 66,398	0.64%	\$ 50,589	2.39%	\$ 188,918	\$ 305,905
Fleet Shop/Parks Shop	\$ 6,218,298	0.25%	\$ 15,546	0.09%	\$ 5,596	0.56%	\$ 34,822	\$ 55,965
Fuel Facility	\$ 1,523,143	0.29%	\$ 4,417	0.19%	\$ 2,894	1.84%	\$ 28,026	\$ 35,337
Hattie Weber Museum	\$ 910,114	0.42%	\$ 3,822	0.23%	\$ 2,093	1.20%	\$ 10,921	\$ 16,837
Historic City Hall	\$ 10,460,776	0.27%	\$ 28,244	0.23%	\$ 24,060	1.02%	\$ 106,700	\$ 159,004
Hunt Boyer Admin	\$ 2,272,819	0.27%	\$ 6,137	0.16%	\$ 3,637	1.05%	\$ 23,865	\$ 33,638
Manor Pool Guard Building	\$ 752,456	0.27%	\$ 2,032	0.16%	\$ 1,204	1.05%	\$ 7,901	\$ 11,136
Manor Pool Mech/Concession	\$ 2,307,533	0.62%	\$ 14,307	0.55%	\$ 12,691	1.30%	\$ 29,998	\$ 56,996
Manor Pool Restrooms/Shower	\$ 2,404,420	0.42%	\$ 10,099	0.48%	\$ 11,541	1.07%	\$ 25,727	\$ 47,367
Police Station	\$ 31,101,525	0.27%	\$ 83,974	0.16%	\$ 49,762	1.05%	\$ 326,566	\$ 460,303
Redwood Park Community Building	\$ 1,203,930	0.27%	\$ 3,251	0.23%	\$ 2,769	1.02%	\$ 12,280	\$ 18,300
Senior Citizen Center	\$ 13,554,604	0.27%	\$ 36,597	0.23%	\$ 31,176	1.02%	\$ 138,257	\$ 206,030
SP Substation	\$ 315,315	0.27%	\$ 851	0.16%	\$ 505	1.05%	\$ 3,311	\$ 4,667
SP Tower/Switch Building	\$ 710,892	0.27%	\$ 1,919	0.16%	\$ 1,137	1.05%	\$ 7,464	\$ 10,521
SP Train Station	\$ 3,130,218	0.36%	\$ 11,269	0.27%	\$ 8,452	1.19%	\$ 37,250	\$ 56,970
Storage Canopy	\$ 1,318,590	0.24%	\$ 3,165	0.16%	\$ 2,110	1.08%	\$ 14,241	\$ 19,515
Varsity Theatre	\$ 6,306,300	0.33%	\$ 20,811	0.23%	\$ 14,504	1.44%	\$ 90,811	\$ 126,126
Veterans' Annex	\$ 472,973	0.27%	\$ 1,277	0.23%	\$ 1,088	1.02%	\$ 4,824	\$ 7,189
Veterans' Center	\$ 16,723,233	0.27%	\$ 45,153	0.23%	\$ 38,463	1.02%	\$ 170,577	\$ 254,193
Veterans' Theatre	\$ 6,473,360	0.35%	\$ 22,657	0.29%	\$ 18,773	1.63%	\$ 105,516	\$ 146,945
West Area Tank Building	\$ 902,948	0.29%	\$ 2,619	0.19%	\$ 1,716	1.84%	\$ 16,614	\$ 20,948
<b>TOTAL</b>	<b>\$ 219,190,681</b>	<b>PM &amp; Minor Repair</b>	<b>\$ 805,224</b>	<b>Unscheduled Maintenance</b>	<b>\$ 595,350</b>	<b>Renewal &amp; Replacement</b>	<b>\$ 2,717,281</b>	<b>\$ 4,117,856</b>

Source: The Whitestone Building Maintenance and Repair Cost Reference 2014-2015.



**Appendix A-3 – Building Age Factor**

Facility	Year Built	Age Based on 2016	Building Area - SF	Age X Area
Administrative Building	1977	39	8,000	312,000
Arroyo Women's/Men's/Mech Pool Building	2000	16	4,492	71,872
Bicycle Hall of Fame	1990	26	8,000	208,000
Boy Scout Cabin	1927	89	1,500	133,500
Brady Bldg	2006	10	1,300	13,000
Building A - Admin	1970	46	6,400	294,400
Building B South	1965	51	4,800	244,800
Building BB - Electrician Super	2005	11	560	6,160
Building C Water/Trans	1995	21	2,160	45,360
Building D - Engineering	1987	29	1,440	41,760
Building E - Engineering/Recycling	1994	22	1,440	31,680
Building F - Well Building	2009	7	2,160	15,120
Building H Water/Collections	1965	51	3,552	181,152
Building I & J Water file/storage	1965	51	2,513	128,163
Building K - Collections/Lockers/Meeting	1963	53	2,880	152,640
Building L - Collections Office	1990	26	2,880	74,880
Building M - Storage Services	1986	30	8,480	254,400
Building N - Water Meter Shop	1965	51	2,400	122,400
Building O Paint Booth	1990	26	390	10,140
Building Q	1960	56	3,000	168,000
Building S	1960	56	3,000	168,000
Building W	1990	26	300	7,800
Chestnut Park Roundhouse	1962	54	1,712	92,448
City Hall	1927	89	17,348	1,543,972
Civic Center Gym	1927	89	16,400	1,459,600
Community Chambers	1981	35	4,217	147,595
Community Development Modular	1990	26	1,440	37,440
Community Park Pool Building	2003	13	16,396	213,148
Downtown Parking Structure	1990	26	9,247	240,422
Evidence Storage North	2006	10	480	4,800
Evidence Storage South	2006	10	480	4,800
Explorit Science Center	1994	22	10,614	233,508
Facilities Building	1990	26	8,193	213,018
Fire Station #32	1986	30	4,223	126,690
Fire Station #33	1965	51	8,548	435,948
Fire Station HQ	1964	52	9,678	503,256
Fleet Shop/Parks Shop	1983	33	12,396	409,068
Fuel Facility	1985	31	1,296	40,176



**City of Davis Public Works Department**  
**Preventative Maintenance Report - Buildings**

Hattie Weber Museum	1911	105	1,270	133,350
Historic City Hall	1938	78	11,772	918,216
Hunt Boyer Admin	1911	105	3,374	354,270
Manor Pool Guard Building	1999	17	1,050	17,850
Manor Pool Mech/Concession	2011	5	2,300	11,500
Manor Pool Restrooms/Shower	1999	17	2,796	47,532
Police Station	2001	15	35,000	525,000
Redwood Park Community Building	1989	27	2,100	56,700
Senior Citizen Center	1983	33	17,195	567,435
SP Substation	1985	31	400	12,400
SP Tower/Switch Building	1930	86	800	68,800
SP Train Station	1987	29	4,550	131,950
Storage Canopy	1990	26	8,000	208,000
Varsity Theatre	1950	66	8,800	580,800
Veterans' Annex	1973	43	880	37,840
Veterans' Center	1973	43	25,929	1,114,947
Veterans' Theatre	1973	43	11,016	473,688
West Area Tank Building	2001	15	1,750	26,250
<b>Total Sq. Ft.</b>			<b>333,297</b>	
<b>Average Age - Non-Weighted</b>		<b>39</b>		
<b>Average Age - Weighted by Area</b>				<b>41</b>

<b>Average Costs per 10-year Period &amp; Age Factor</b>				Age Factor
Cost yr. 1-10	17.60	avg. cost yr. 1-10	1.76	1.00
Cost yr. 11-20	31.84	avg. cost yr. 11-20	3.18	1.08
Cost yr. 21-30	34.70	avg. cost yr. 21-30	3.47	1.15
Cost yr. 31-40	23.86	avg. cost yr. 31-40	2.39	1.23
Cost yr. 41-50	32.64	avg. cost yr. 41-50	3.26	1.30
<b>Weighted Age by Area = 41</b>				<b>1.30</b>

Source: The Whitestone Building Maintenance and Repair Cost Reference 2014-2015.

**Appendix A-4 – Shop Rates**

<b>Classification</b>	<b>In-House Shop Rate \$</b>
HVAC Technician	83.35
Maintenance Electrician	73.90
Maintenance Plumber	78.80
Maintenance Carpenter	78.80
Maintenance Painter	71.20
<b>AVERAGE RATE</b>	<b>\$ 77.21</b>

Source: Similar Facility Management Division. It is unknown whether these shop rates include indirect compensation.

**Appendix A-5 – Trade Hours**

<b>Type</b>	<b>Hours</b>
Total hours per year (52 weeks x 40 hours)	2080
Vacation, holidays, and medical (20 days)	-160
Training, other overhead hours (100 hours)	-100
<b>Net Hours per year</b>	<b>1820</b>

Source: Similar Facility Management Division.



**Appendix A-6A - Typical Total Maintenance and Repair Cost of an Asset Over the Course of 50 years per GSQFT**

Asset Type	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Total SQFT
AUDITORIUM	10.90	26.93	6.88	0.00	33.96	0.00	25.12	45.31	9.28	59.57	11,016
COMMUNITY CENTER	22.35	26.93	20.45	0.47	23.53	0.00	32.43	43.75	19.34	23.46	78,493
FIRE STATION	71.23	42.31	9.95	0.00	65.27	23.95	52.92	102.20	39.60	106.70	22,449
GARAGE PARKING	9.64	0.21	0.00	2.10	11.54	13.44	0.76	0.00	3.89	9.16	21,643
MAINTENANCE SHOP	7.92	28.99	7.90	0.00	12.54	6.32	11.06	32.08	15.72	79.47	8,700
MODULAR CLASSROOM	24.30	27.92	0.00	0.00	26.49	0.00	0.00	103.80	4.76	75.58	1,440
MOVIE THEATER	16.90	26.93	14.93	0.44	24.54	0.00	18.72	95.61	18.46	16.94	8,800
OFFICE	5.33	13.46	9.11	0.02	23.70	17.94	8.66	36.26	4.88	39.31	101,797
OUTDOOR POOL	4.75	3.36	1.43	0.36	9.21	0.00	53.07	39.62	13.63	24.86	23,188
PASSENGER TERMINAL	19.74	26.93	19.15	0.00	10.70	0.00	19.11	65.94	16.92	36.99	4,550
PUBLIC RESTROOM	92.24	23.89	22.74	0.00	23.54	0.00	105.20	24.44	0.00	47.40	4,508
VISITOR CENTER	10.37	14.70	11.54	1.16	28.84	35.96	18.01	30.36	12.73	72.21	9,270
WAREHOUSE, DRY	4.06	26.93	0.36	0.00	8.58	9.83	1.96	2.05	4.41	26.90	9,350
WAREHOUSE, SELF STORAGE	41.27	26.93	0.00	0.00	35.76	0.00	5.41	1.16	9.45	30.31	28,093
<b>Total</b>	<b>\$ 341.00</b>	<b>\$ 316.42</b>	<b>\$ 124.44</b>	<b>\$ 4.55</b>	<b>\$ 338.20</b>	<b>\$ 107.44</b>	<b>\$ 352.43</b>	<b>\$ 622.58</b>	<b>\$ 173.07</b>	<b>\$ 648.86</b>	<b>\$ 333,297</b>
% of Total	11.3%	10.4%	4.1%	0.2%	11.2%	3.5%	11.6%	20.6%	5.7%	21.4%	
<b>Weighted % Based on SF</b>	<b>9.8%</b>	<b>10.3%</b>	<b>5.2%</b>	<b>0.2%</b>	<b>12.9%</b>	<b>4.8%</b>	<b>11.2%</b>	<b>19.7%</b>	<b>6.5%</b>	<b>19.6%</b>	

Source: The Whitestone Building Maintenance and Repair Cost Reference 2014-2015.

**Appendix A-6B – Staff Determination Based on Asset**

	HVAC Technician	Electrician	Plumber	Carpenter	Painter	General	TOTAL
Weighted % of Each Trade	19.7%	19.6%	11.2%	15.4%	12.9%	21.2%	100%
Staff for M&R	1.2	1.2	0.7	1.0	0.8	1.3	6
Deferred and M&R	1.4	1.4	0.8	1.1	0.9	1.5	7

Source: The Whitestone Building Maintenance and Repair Cost Reference 2014-2015.



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