

# FULL RESERVE STUDY

## Cross Keys Condominium I



**Baltimore, Maryland**  
**September 29, 2020**



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Cross Keys Condominium I  
Baltimore, Maryland

Dear Board of Directors of Cross Keys Condominium I:

At the direction of the Board that recognizes the need for proper reserve planning, we have conducted a *Full Reserve Study* of Cross Keys Condominium I in Baltimore, Maryland and submit our findings in this report. The effective date of this study is the date of our visual, noninvasive inspection, September 29, 2020.

This *Full Reserve Study* exceeds the Association of Professional Reserve Analysts (APRA) standards fulfilling the requirements of a "Level I Full Reserve Study."

An ongoing review by the Board and an Update of this Reserve Study are necessary to ensure an equitable funding plan since a Reserve Study is a snapshot in time. We recommend the Board budget for an Update to this Reserve Study in two- to three-years. We look forward to continuing to help Cross Keys Condominium I plan for a successful future.

As part of our long-term thinking and everyday commitment to our clients, we are available to answer any questions you may have regarding this study.

Respectfully submitted on November 16, 2020 by

*Reserve Advisors, LLC*

Visual Inspection and Report by: Aime V. Mbakop, RS<sup>1</sup>  
Review by: Alan M. Ebert, RS, PRA<sup>2</sup>, Director of Quality Assurance



<sup>1</sup> RS (Reserve Specialist) is the reserve provider professional designation of the Community Associations Institute (CAI) representing America's more than 300,000 condominium, cooperative and homeowners associations.

<sup>2</sup> PRA (Professional Reserve Analyst) is the professional designation of the Association of Professional Reserve Analysts. Learn more about APRA at <http://www.apra-usa.com>.



Long-term thinking. Everyday commitment.



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## 1. RESERVE STUDY EXECUTIVE SUMMARY

**Client:** Cross Keys Condominium I (Cross Keys)

**Location:** Baltimore, Maryland

**Reference:** 081336

**Property Basics:** Cross Keys Condominium I is a condominium style development consisting of 98 units in 10 buildings. The buildings were built in 1970.

**Reserve Components Identified:** 27 Reserve Components.

**Inspection Date:** September 29, 2020.

**Funding Goal:** The Funding Goal of this Reserve Study is to maintain reserves above an adequate, not excessive threshold during one or more years of significant expenditures. Our recommended Funding Plan recognizes this threshold funding year in 2050 due to replacement of the asphalt pavement.

**Cash Flow Method:** We use the Cash Flow Method to compute the Reserve Funding Plan. This method offsets future variable Reserve Expenditures with existing and future stable levels of reserve funding. Our application of this method also considers:

- Current and future local costs of replacement
- 0.9% anticipated annual rate of return on invested reserves
- 2.0% future Inflation Rate for estimating Future Replacement Costs

**Sources for Local Costs of Replacement:** Our proprietary database, historical costs and published sources, i.e., R.S. Means, Incorporated.

**Unaudited Cash Status of Reserve Fund:**

- \$613,444 as of July 31, 2020
- 2020 budgeted Reserve Contributions of \$115,386

**Project Prioritization:** We note anticipated Reserve Expenditures for the next 30 years in the **Reserve Expenditures** tables and include a **Five-Year Outlook** table following the **Reserve Funding Plan** in Section 3. We recommend the Association prioritize the following projects in the next five years based on the conditions identified:

- Deck boards replacement and interim repairs at the wood decks
- Replacement of gutters and downspouts
- Replacement of the asphalt shingle roofs
- Replacement of the wood soffit
- Crack repair and patch at the asphalt pavement
- Repairs and partial replacements at the concrete patios and sidewalks
- Replacement of the metal railings
- Repairs and partial replacements at the masonry retaining walls

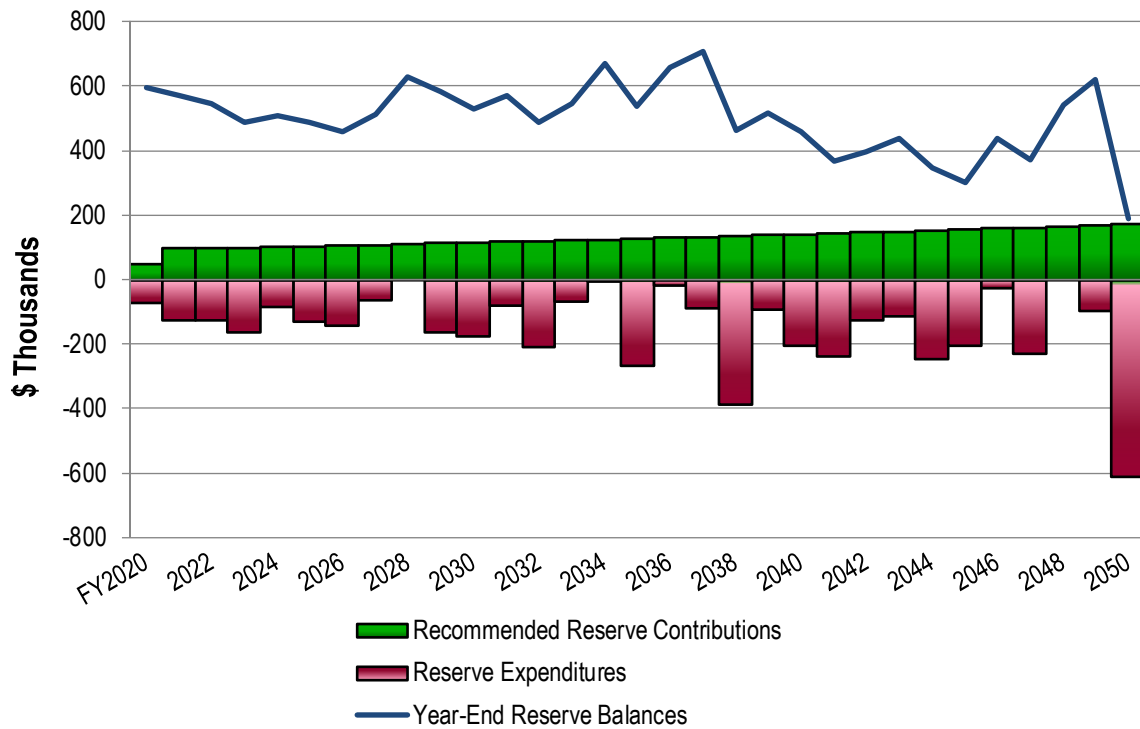
**Recommended Reserve Funding:** We recommend the following in order to achieve a stable and equitable Funding Plan:

- Reduced reserve budget of \$96,700 in 2021
- Inflationary increases through 2050, the limit of this study's Cash Flow Analysis
- 2021 Reserve Contribution of \$96,700 is equivalent to an average monthly contribution of \$82.23 per homeowner.



**Cross Keys**  
Recommended Reserve Funding Table and Graph

Year	Reserve Contributions (\$)	Reserve Balances (\$)	Year	Reserve Contributions (\$)	Reserve Balances (\$)	Year	Reserve Contributions (\$)	Reserve Balances (\$)
2021	96,700	568,542	2031	117,900	570,692	2041	143,900	368,444
2022	98,600	546,265	2032	120,300	486,870	2042	146,800	394,203
2023	100,600	488,466	2033	122,700	545,025	2043	149,700	435,938
2024	102,600	509,864	2034	125,200	669,895	2044	152,700	347,173
2025	104,700	489,366	2035	127,700	535,261	2045	155,800	301,707
2026	106,800	458,906	2036	130,300	655,521	2046	158,900	437,857
2027	108,900	510,731	2037	132,900	707,527	2047	162,100	373,249
2028	111,100	626,928	2038	135,600	463,837	2048	165,300	542,652
2029	113,300	584,378	2039	138,300	516,013	2049	168,600	621,515
2030	115,600	528,277	2040	141,100	458,050	2050	172,000	187,524





## 2. RESERVE STUDY REPORT

At the direction of the Board that recognizes the need for proper reserve planning, we have conducted a *Full Reserve Study* of

### **Cross Keys Condominium I**

### **Baltimore, Maryland**

and submit our findings in this report. The effective date of this study is the date of our visual, noninvasive inspection, September 29, 2020.

We present our findings and recommendations in the following report sections and spreadsheets:

- **Identification of Property** - Segregates all property into several areas of responsibility for repair or replacement
- **Reserve Expenditures** - Identifies reserve components and related quantities, useful lives, remaining useful lives and future reserve expenditures during the next 30 years
- **Reserve Funding Plan** - Presents the recommended Reserve Contributions and year-end Reserve Balances for the next 30 years
- **Five-Year Outlook** - Identifies reserve components and anticipated reserve expenditures during the first five years
- **Reserve Component Detail** - Describes the reserve components, includes photographic documentation of the condition of various property elements, describes our recommendations for repairs or replacement, and includes detailed solutions and procedures for replacements for the benefit of current and future board members
- **Methodology** - Lists the national standards, methods and procedures used to develop the Reserve Study
- **Definitions** - Contains definitions of terms used in the Reserve Study, consistent with national standards
- **Professional Service Conditions** - Describes Assumptions and Professional Service Conditions
- **Credentials and Resources**



## IDENTIFICATION OF PROPERTY



Our investigation includes Reserve Components or property elements as set forth in your Declaration. The Expenditure tables in Section 3 list the elements contained in this study. Our analysis begins by segregating the property elements into several areas of responsibility for repair and replacement.

Our process of identification helps assure that future boards and the management team understand whether reserves, the operating budget or Homeowners fund certain replacements and assists in preparation of the annual budget. We derive these segregated classes of property from our review of the information provided by the Association and through conversations with Management. These classes of property include:

- Reserve Components
- Long-Lived Property Elements
- Operating Budget Funded Repairs and Replacements
- Property Maintained by Homeowners
- Property Maintained by Others

We advise the Board conduct an annual review of these classes of property to confirm its policy concerning the manner of funding, i.e., from reserves or the operating budget. The Reserve Study identifies Reserve Components as set forth in your Declaration or which were identified as part of your request for proposed services. Reserve Components are defined by CAI as property elements with:

- Cross Keys responsibility
- Limited useful life expectancies
- Predictable remaining useful life expectancies
- Replacement cost above a minimum threshold



Long-Lived Property Elements may not have predictable Remaining Useful Lives or their replacement may occur beyond the 30-year scope of the study. The operating budget should fund infrequent repairs. Funding untimely or unexpected replacements from reserves will necessitate increases to Reserve Contributions. Periodic updates of this Reserve Study will help determine the merits of adjusting the Reserve Funding Plan. We identify the following Long-Lived Property Elements as excluded from the 30-year Reserve Expenditures at this time.

- Foundations
- Structural Frames

The operating budget provides money for the repair and replacement of certain Reserve Components. The Association may develop independent criteria for use of operating and reserve funds. For purposes of calculating appropriate Reserve Contributions, we identify the following list of Operating Budget Funded Repairs and Replacements:

- General Maintenance to the Common Elements
- Expenditures less than \$4,000 (Except Exterior Light Fixtures. These relatively minor expenditures have a limited effect on the recommended Reserve Contributions.)
- Catch Basins, Landscape
- Landscape
- Paint Finishes and Touch Up
- Other Repairs normally funded through the Operating Budget

Certain items have been designated as the responsibility of the homeowners to repair or replace at their cost. Property Maintained by Homeowners, including items billed back to Homeowners, relates to:

- Electrical Systems (Including Circuit Protection Panels)
- Entry Walks
- Heating, Ventilating and Air Conditioning (HVAC) Units
- Interiors
- Pipes (Within Units)
- Windows and Doors

Certain items have been designated as the responsibility of others to repair or replace. Property Maintained by Others relates to:

- Street Systems, Cross Keys and Hamlet Hill Roads (City of Baltimore)
- Retaining Wall, Timber, Rear of the Units Near Cross Keys Road (Neighboring Association)

### **3. RESERVE EXPENDITURES and FUNDING PLAN**

The tables following this introduction present:

#### **Reserve Expenditures**

- Line item numbers
- Total quantities
- Quantities replaced per phase (in a single year)
- Reserve component inventory
- Estimated first year of event (i.e., replacement, application, etc.)
- Life analysis showing
  - useful life
  - remaining useful life
- 2020 local cost of replacement
  - Per unit
  - Per phase
  - Replacement of total quantity
- Percentage of future expenditures anticipated during the next 30 years
- Schedule of estimated future costs for each reserve component including inflation

#### **Reserve Funding Plan**

- Reserves at the beginning of each year
- Total recommended reserve contributions
- Estimated interest earned from invested reserves
- Anticipated expenditures by year
- Anticipated reserves at year end

#### **Five-Year Outlook**

- Line item numbers
- Reserve component inventory of only the expenditures anticipated to occur within the first five years
- Schedule of estimated future costs for each reserve component anticipated to occur within the first five years

The purpose of a Reserve Study is to provide an opinion of reasonable annual Reserve Contributions. Prediction of exact timing and costs of minor Reserve Expenditures typically will not significantly affect the 30-year cash flow analysis. Adjustments to the times and/or costs of expenditures may not always result in an adjustment in the recommended Reserve Contributions.

Financial statements prepared by your association, by you or others might rely in part on information contained in this section. For your convenience, we have provided an electronic data file containing the tables of ***Reserve Expenditures*** and ***Reserve Funding Plan***.

## RESERVE EXPENDITURES

**Cross Keys  
Condominium I**  
Baltimore, Maryland

**Explanatory Notes:**

- 1) **2.0%** is the estimated Inflation Rate for estimating Future Replacement Costs.
- 2) FY2020 is Fiscal Year beginning January 1, 2020 and ending December 31, 2020.

Line Item	Total Quantity	Per Phase Quantity	Units	Reserve Component Inventory	Estimated 1st Year of Event	Life Analysis, Years		Costs, \$			Percentage of Future Expenditures	RUL = 0 FY2020	1 2021	2 2022	3 2023	4 2024	5 2025	6 2026	7 2027	8 2028	9 2029	10 2030	11 2031	12 2032	13 2033	14 2034	15 2035
						Useful	Remaining	Unit (2020)	Per Phase (2020)	Total (2020)																	
<b>Exterior Building Elements</b>																											
1.152	2,150	2,150	Square Feet	Decks, Wood, Deck Boards Replacement and Interim Repairs	2021	12 to 18	1	16.00	34,400	34,400	1.9%	35,088															
1.157	2,150	2,150	Square Feet	Decks, Wood, Replacement	2038	to 35	18	39.00	83,850	83,850	2.6%																
1.240	2,800	933	Linear Feet	Gutters and Downspouts, Aluminum, 2017 - 2019, Phased	2037	15 to 20	17 to 19	8.00	7,467	22,400	0.7%																
1.241	1,050	1,050	Linear Feet	Gutters and Downspouts, Aluminum (2020 is Planned)	2020	15 to 20	0	8.00	8,400	8,400	0.5%	8,400															
1.242	4,150	1,038	Linear Feet	Gutters and Downspouts, Aluminum, Remaining, Phased	2021	15 to 20	1 to 4	8.00	8,300	33,200	1.9%		8,466	8,635	8,808	8,984											
1.260	10	10	Each	Light Fixtures	2038	to 20	18	300.00	3,000	3,000	0.1%																
1.280	400	133	Squares	Roofs, Asphalt Shingles, 2017 - 2019, Phased	2037	15 to 20	17 to 19	410.00	54,665	164,000	5.2%																
1.281	150	150	Squares	Roofs, Asphalt Shingles (2020 is Planned)	2020	15 to 20	0	410.00	61,500	61,500	3.4%	61,500															
1.282	610	153	Squares	Roofs, Asphalt Shingles, Remaining, Phased	2021	15 to 20	1 to 4	410.00	62,525	250,100	14.4%		63,776	65,051	66,352	67,679											
1.590	7,400	1,850	Square Feet	Soffit and Fascia, Wood, Phased	2021	to 40	1 to 4	4.50	8,325	33,300	0.8%		8,492	8,661	8,835	9,011											
1.820	78,300	78,300	Square Feet	Walls, Masonry, Inspections and Repairs	2025	8 to 12	5	1.50	117,450	117,450	10.6%							129,674									158,072
<b>Building Services Elements</b>																											
3.300	10	10	Each	Electrical System, Main Panels	2040	to 70+	20	6,000.00	60,000	60,000	2.0%																
3.605	98	10	Units	Pipes, Domestic Water, Waste and Vent, Phased	2023	to 80+	3 to 30	7,600.00	74,480	744,800	23.1%				79,039			83,877			89,010			94,459			100,240
3.910	10	2	Each	Water Heaters, Phased	2026	15 to 20	6 to 18	3,500.00	7,000	35,000	1.8%							7,883			8,366			8,878			9,421
<b>Property Site Elements</b>																											
4.020	6,250	6,250	Square Yards	Asphalt Pavement, Crack Repair and Patch	2022	3 to 5	2	0.70	4,375	4,375	0.8%			4,552				4,927								5,773	
4.040	6,250	6,250	Square Yards	Asphalt Pavement, Mill and Overlay	2030	15 to 20	10	16.00	100,000	100,000	2.7%										121,899						
4.045	6,250	6,250	Square Yards	Asphalt Pavement, Total Replacement	2050	15 to 20	30	32.50	203,125	203,125	8.1%																
4.110	3,100	465	Linear Feet	Concrete Curbs, Partial	2022	to 65	2 to 30+	27.00	12,555	83,700	1.1%			13,062												15,304	
4.130	61	4	Each	Concrete Patios, Partial	2021	to 65	1 to 30+	1,500.00	6,000	91,500	1.1%		6,120					6,757							7,460		
4.140	7,800	520	Square Feet	Concrete Sidewalks, Partial	2021	to 65	1 to 30+	10.00	5,200	78,000	0.9%		5,304					5,856							6,466		
4.285	1,900	1,900	Linear Feet	Fences, Wood, Privacy	2032	15 to 20	12	41.00	77,900	77,900	2.2%														98,796		
4.560	13	13	Each	Light Poles and Fixtures	2026	to 25	6	2,200.00	28,600	28,600	0.7%							32,208									
4.620	14,750	3,688	Square Feet	Pavers, Masonry, Resetting and Partial Replacements, Phased	2027	15 to 20	7 to 13	14.50	53,469	213,875	9.9%								61,419		63,900			66,482		69,168	
4.650	1	1	Allowance	Pipes, Subsurface Utilities, Partial	2040	to 85+	20 to 30+	7,000.00	7,000	7,000	0.8%																
4.731	400	400	Linear Feet	Railings, Metal	2022	to 35	2	49.00	19,600	19,600	0.4%			20,392													
4.740	1,020	1,020	Square Feet	Retaining Walls, Masonry, Inspection and Capital Repairs	2022	10 to 15	2	5.20	5,304	5,304	0.5%			5,518											6,727		
4.760	790	790	Square Feet	Retaining Walls, Timber	2030	15 to 20	10	41.00	32,390	32,390	2.2%														39,483		
<b>Anticipated Expenditures, By Year (\$4,538,553 over 30 years)</b>												69,900	127,246	125,871	163,034	85,674	129,674	141,508	61,419	0	161,276	176,686	80,408	208,860	69,168	5,773	267,733

## RESERVE EXPENDITURES

### Cross Keys Condominium I Baltimore, Maryland

Line Item	Total Quantity	Per Phase Quantity	Units	Reserve Component Inventory	Estimated 1st Year of Event	Life Analysis, Years		Costs, \$			Percentage of Future Expenditures	16 2036	17 2037	18 2038	19 2039	20 2040	21 2041	22 2042	23 2043	24 2044	25 2045	26 2046	27 2047	28 2048	29 2049	30 2050	
						Useful	Remaining	Unit (2020)	Per Phase (2020)	Total (2020)																	
<b>Exterior Building Elements</b>																											
1.152	2,150	2,150	Square Feet	Decks, Wood, Deck Boards Replacement and Interim Repairs	2021	12 to 18	1	16.00	34,400	34,400	1.9%			49,132													
1.157	2,150	2,150	Square Feet	Decks, Wood, Replacement	2038	to 35	18	39.00	83,850	83,850	2.6%			119,758													
1.240	2,800	933	Linear Feet	Gutters and Downspouts, Aluminum, 2017 - 2019, Phased	2037	15 to 20	17 to 19	8.00	7,467	22,400	0.7%		10,455	10,664	10,877												
1.241	1,050	1,050	Linear Feet	Gutters and Downspouts, Aluminum (2020 is Planned)	2020	15 to 20	0	8.00	8,400	8,400	0.5%				12,482												
1.242	4,150	1,038	Linear Feet	Gutters and Downspouts, Aluminum, Remaining, Phased	2021	15 to 20	1 to 4	8.00	8,300	33,200	1.9%					12,580	12,832	13,088	13,350								
1.260	10	10	Each	Light Fixtures	2038	to 20	18	300.00	3,000	3,000	0.1%			4,285													
1.280	400	133	Squares	Roofs, Asphalt Shingles, 2017 - 2019, Phased	2037	15 to 20	17 to 19	410.00	54,665	164,000	5.2%		76,545	78,076	79,637												
1.281	150	150	Squares	Roofs, Asphalt Shingles (2020 is Planned)	2020	15 to 20	0	410.00	61,500	61,500	3.4%				91,386												
1.282	610	153	Squares	Roofs, Asphalt Shingles, Remaining, Phased	2021	15 to 20	1 to 4	410.00	62,525	250,100	14.4%				94,767	96,662	98,596	100,568									
1.590	7,400	1,850	Square Feet	Soffit and Fascia, Wood, Phased	2021	to 40	1 to 4	4.50	8,325	33,300	0.8%																
1.820	78,300	78,300	Square Feet	Walls, Masonry, Inspections and Repairs	2025	8 to 12	5	1.50	117,450	117,450	10.6%										192,689						
<b>Building Services Elements</b>																											
3.300	10	10	Each	Electrical System, Main Panels	2040	to 70+	20	6,000.00	60,000	60,000	2.0%				89,157												
3.605	98	10	Units	Pipes, Domestic Water, Waste and Vent, Phased	2023	to 80+	3 to 30	7,600.00	74,480	744,800	23.1%			106,376		112,887		119,796		127,129					134,910		
3.910	10	2	Each	Water Heaters, Phased	2026	15 to 20	6 to 18	3,500.00	7,000	35,000	1.8%			9,998				11,259		11,948					12,680		
<b>Property Site Elements</b>																											
4.020	6,250	6,250	Square Yards	Asphalt Pavement, Crack Repair and Patch	2022	3 to 5	2	0.70	4,375	4,375	0.8%			6,249			6,764				7,321						
4.040	6,250	6,250	Square Yards	Asphalt Pavement, Mill and Overlay	2030	15 to 20	10	16.00	100,000	100,000	2.7%																
4.045	6,250	6,250	Square Yards	Asphalt Pavement, Total Replacement	2050	15 to 20	30	32.50	203,125	203,125	8.1%														367,933		
4.110	3,100	465	Linear Feet	Concrete Curbs, Partial	2022	to 65	2 to 30+	27.00	12,555	83,700	1.1%														22,742		
4.130	61	4	Each	Concrete Patios, Partial	2021	to 65	1 to 30+	1,500.00	6,000	91,500	1.1%	8,237				9,094					10,041						
4.140	7,800	520	Square Feet	Concrete Sidewalks, Partial	2021	to 65	1 to 30+	10.00	5,200	78,000	0.9%	7,138				7,881					8,702						
4.285	1,900	1,900	Linear Feet	Fences, Wood, Privacy	2032	15 to 20	12	41.00	77,900	77,900	2.2%																
4.560	13	13	Each	Light Poles and Fixtures	2026	to 25	6	2,200.00	28,600	28,600	0.7%																
4.620	14,750	3,688	Square Feet	Pavers, Masonry, Resetting and Partial Replacements, Phased	2027	15 to 20	7 to 13	14.50	53,469	213,875	9.9%										91,265			94,952			
4.650	1	1	Allowance	Pipes, Subsurface Utilities, Partial	2040	to 85+	20 to 30+	7,000.00	7,000	7,000	0.8%				10,402			11,484							12,680		
4.731	400	400	Linear Feet	Railings, Metal	2022	to 35	2	49.00	19,600	19,600	0.4%																
4.740	1,020	1,020	Square Feet	Retaining Walls, Masonry, Inspection and Capital Repairs	2022	10 to 15	2	5.20	5,304	5,304	0.5%						8,200										
4.760	790	790	Square Feet	Retaining Walls, Timber	2030	15 to 20	10	41.00	32,390	32,390	2.2%														58,670		
<b>Anticipated Expenditures, By Year (\$4,538,553 over 30 years)</b>												15,375	87,000	384,538	90,514	203,427	237,209	124,458	111,684	244,973	204,173	26,064	230,342	0	94,952	609,615	

## RESERVE FUNDING PLAN

### CASH FLOW ANALYSIS

#### Cross Keys

#### Condominium I

#### Baltimore, Maryland

#### Individual Reserve Budgets & Cash Flows for the Next 30 Years

		FY2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Reserves at Beginning of Year	(Note 1)	613,444	593,881	568,542	546,265	488,466	509,864	489,366	458,906	510,731	626,928	584,378	528,277	570,692	486,870	545,025	669,895
Total Recommended Reserve Contributions	(Note 2)	48,078	96,700	98,600	100,600	102,600	104,700	106,800	108,900	111,100	113,300	115,600	117,900	120,300	122,700	125,200	127,700
Estimated Interest Earned, During Year	(Note 3)	2,259	5,207	4,994	4,635	4,472	4,476	4,248	4,344	5,097	5,426	4,985	4,923	4,738	4,623	5,443	5,399
Anticipated Expenditures, By Year		(69,900)	(127,246)	(125,871)	(163,034)	(85,674)	(129,674)	(141,508)	(61,419)	0	(161,276)	(176,686)	(80,408)	(208,860)	(69,168)	(5,773)	(267,733)
Anticipated Reserves at Year End		<u>\$593,881</u>	<u>\$568,542</u>	<u>\$546,265</u>	<u>\$488,466</u>	<u>\$509,864</u>	<u>\$489,366</u>	<u>\$458,906</u>	<u>\$510,731</u>	<u>\$626,928</u>	<u>\$584,378</u>	<u>\$528,277</u>	<u>\$570,692</u>	<u>\$486,870</u>	<u>\$545,025</u>	<u>\$669,895</u>	<u>\$535,261</u>

(continued)

#### Individual Reserve Budgets & Cash Flows for the Next 30 Years, Continued

		2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Reserves at Beginning of Year		535,261	655,521	707,527	463,837	516,013	458,050	368,444	394,203	435,938	347,173	301,707	437,857	373,249	542,652	621,515
Total Recommended Reserve Contributions		130,300	132,900	135,600	138,300	141,100	143,900	146,800	149,700	152,700	155,800	158,900	162,100	165,300	168,600	172,000
Estimated Interest Earned, During Year		5,335	6,106	5,248	4,390	4,364	3,703	3,417	3,719	3,508	2,907	3,313	3,634	4,103	5,215	3,624
Anticipated Expenditures, By Year		(15,375)	(87,000)	(384,538)	(90,514)	(203,427)	(237,209)	(124,458)	(111,684)	(244,973)	(204,173)	(26,064)	(230,342)	0	(94,952)	(609,615)
Anticipated Reserves at Year End		<u>\$655,521</u>	<u>\$707,527</u>	<u>\$463,837</u>	<u>\$516,013</u>	<u>\$458,050</u>	<u>\$368,444</u>	<u>\$394,203</u>	<u>\$435,938</u>	<u>\$347,173</u>	<u>\$301,707</u>	<u>\$437,857</u>	<u>\$373,249</u>	<u>\$542,652</u>	<u>\$621,515</u>	<u>\$187,524</u>

(NOTES 4&5)

#### Explanatory Notes:

- 1) Year 2020 starting reserves are as of July 31, 2020; FY2020 starts January 1, 2020 and ends December 31, 2020.
- 2) Reserve Contributions for 2020 are the remaining budgeted 5 months; 2021 is the first year of recommended contributions.
- 3) 0.9% is the estimated annual rate of return on invested reserves; 2020 is a partial year of interest earned.
- 4) Accumulated year 2050 ending reserves consider the need to fund for replacement of the wood fences shortly after 2050, and the age, size, overall condition and complexity of the property.
- 5) Threshold Funding Year (reserve balance at critical point).

**FIVE-YEAR OUTLOOK****Cross Keys  
Condominium I**  
Baltimore, Maryland

Line Item	Reserve Component Inventory	RUL = 0 FY2020	1 2021	2 2022	3 2023	4 2024	5 2025
<b><u>Exterior Building Elements</u></b>							
1.152	Decks, Wood, Deck Boards Replacement and Interim Repairs		35,088				
1.241	Gutters and Downspouts, Aluminum (2020 is Planned)	8,400					
1.242	Gutters and Downspouts, Aluminum, Remaining, Phased		8,466	8,635	8,808	8,984	
1.281	Roofs, Asphalt Shingles (2020 is Planned)	61,500					
1.282	Roofs, Asphalt Shingles, Remaining, Phased		63,776	65,051	66,352	67,679	
1.590	Soffit and Fascia, Wood, Phased		8,492	8,661	8,835	9,011	
1.820	Walls, Masonry, Inspections and Repairs						129,674
<b><u>Building Services Elements</u></b>							
3.605	Pipes, Domestic Water, Waste and Vent, Phased				79,039		
<b><u>Property Site Elements</u></b>							
4.020	Asphalt Pavement, Crack Repair and Patch			4,552			
4.110	Concrete Curbs, Partial			13,062			
4.130	Concrete Patios, Partial		6,120				
4.140	Concrete Sidewalks, Partial		5,304				
4.731	Railings, Metal			20,392			
4.740	Retaining Walls, Masonry, Inspection and Capital Repairs			5,518			
<b>Anticipated Expenditures, By Year (\$4,538,553 over 30 years)</b>		69,900	127,246	125,871	163,034	85,674	129,674

## 4. RESERVE COMPONENT DETAIL

The Reserve Component Detail of this *Full Reserve Study* includes enhanced solutions and procedures for select significant components. This section describes the Reserve Components, documents specific problems and condition assessments, and may include detailed solutions and procedures for necessary capital repairs and replacements for the benefit of current and future board members. We advise the Board use this information to help define the scope and procedures for repair or replacement when soliciting bids or proposals from contractors. *However, the Report in whole or part is not and should not be used as a design specification or design engineering service.*

### Exterior Building Elements



**Building front elevation**



**Building rear elevation**



**Building side elevation**



## Decks, Wood

---

**Line Items:** 1.152 and 1.157

**Quantity:** Nine wood Decks which comprise a total of approximately 2,150 square feet located at the rear of units 40 - 58 Bouton Green Court.

**History:** The decks are at an unknown age. Management informs us the Association plans to conduct repairs at the decks in the near term.

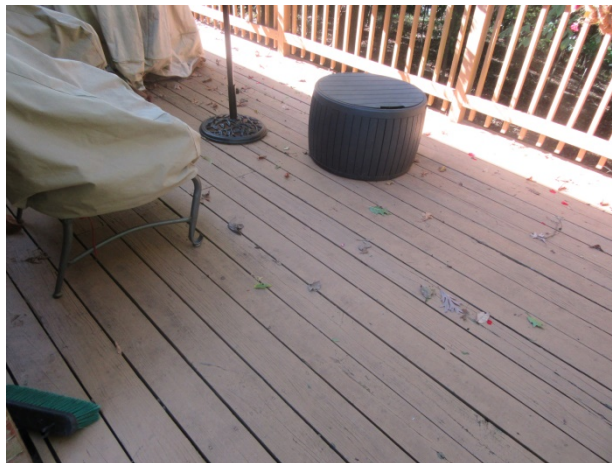
**Condition:** Reported in fair overall condition



Wood deck



Wood deck



Wood deck

**Useful Life:** Up to 35 years with proper maintenance and interim replacement of the deck boards every 12- to 18-years. **The rates and types of deterioration are not uniform due to the nature of wood. Replacement is normally an ongoing process which eventually leads to a complete replacement for economic or aesthetic reasons.**

**Component Detail Notes:** Deck construction includes the following:

- Wood decking
- Wood frames
- Wood Railings
- Frame supported by building structure
- Concrete footing

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect to identify and correct any unsafe conditions
  - Secure loose fasteners and replace deteriorated fasteners
  - Replace deteriorated wood components
  - Check railing stability and fasteners
- Every three years:
  - Power wash with algaecide and application of sealer/stain if applicable

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost for replacement includes replacement of the railings. Our cost for interim repairs includes replacement of the deck boards and partial replacement of deteriorated wood components.

## **Gutters and Downspouts, Aluminum**

---

**Line Items:** 1.240 and 1.242

**Quantity and History:** Approximately 8,000 linear feet of aluminum gutters and downspouts, of which approximately 2,800 linear feet were replaced from 2017 through 2019, approximately 1,050 linear feet are planned to be replaced in 2020, and approximately 4,150 linear feet are planned to be replaced from 2021 through 2024

**Condition:** Varying from good to fair; the gutters and downspouts replaced from 2017 through 2019 are in good overall condition with isolated fasteners rust. The remaining gutters and downspouts are in fair overall condition with weathered finish evident.



**Gutter and downspout assembly**



**Downspout fastener rust**



**Gutter weathered finish**

**Useful Life:** 15- to 20-years

**Component Detail Notes:** The size of the gutter is determined by the roof's watershed area, a roof pitch factor and the rainfall intensity number of the Association's region. We recommend sloping gutters 1/16 inch per linear foot and providing fasteners a maximum of every three feet.

Downspouts can drain 100 square feet of roof area per one square inch of downspout cross sectional area. We recommend the use of downspout extensions and splash blocks at the downspout discharge to direct storm water away from the foundations. Downspouts that discharge directly onto roofs cause premature deterioration of the roofs due to the high concentration of storm water. We recommend either routing these downspouts directly to the ground, connecting the downspouts to the gutters of the lower roof or distributing the storm water discharge over a large area.

The useful life of gutters and downspouts coincides with that of the asphalt shingle roofs. Coordinated replacement will result in the most economical unit price and

minimize the possibility of damage to other roof components as compared to separate replacements.

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Semi-annually:
  - Clean out debris and leaves that collect in the gutters
  - Repair and refasten any loose gutter fasteners
  - Repair and seal any leaking seams or end caps
  - Verify downspouts discharge away from foundations

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## Light Fixtures

---

**Line Item:** 1.260

**Quantity:** Approximately 10 exterior wall mounted Light Emitting Diode (LED) light fixtures accent the side elevations of the buildings

**History:** Installed in 2018

**Condition:** Good overall



**Light fixture**

**Useful Life:** Up to 20 years

**Priority/Criticality:** Per Board discretion

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- As-needed:
  - Inspect and repair broken or dislodged fixtures
  - Ensure a waterproof seal between the fixture and building exists

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## Roofs, Asphalt Shingles

---

**Line Items:** 1.280 – 1.282

**Quantity and History:** Approximately 1,160 *squares*<sup>1</sup> of asphalt shingles, of which approximately 400 squares were replaced from 2017 through 2019, approximately 150 squares will be replaced in 2020, and approximately 610 squares are planned to be replaced from 2021 through 2024.

**Condition:** Varying from good to fair. Roofs replaced from 2017 through 2019 are in good overall condition. The remaining roofs are in fair overall condition with stains, previous repairs, and shingle lift evident from our visual inspection from the ground.



**Asphalt shingle roofs**



**Asphalt shingle roof stains**

<sup>1</sup> We quantify the roof area in squares where one square is equal to 100 square feet of surface area.



**Asphalt shingle roofs stains**



**Asphalt shingle roof previous repairs**



**Asphalt shingle lift**

**Useful Life:** 15- to 20-years

**Component Detail Notes:** The existing roof assembly comprises the following:

- Laminate shingles
- Boston style ridge caps
- Rubber seal with metal base boot flashing at waste pipes
- Soffit and ridge vents
- Metal drip edge

Insulation and ventilation are two major components of a sloped roof system. Together, proper insulation and ventilation help to control attic moisture and maintain an energy efficient building. Both insulation and ventilation prevent moisture buildup which can cause wood rot, mold and mildew growth, warp sheathing, deteriorate shingles, and eventually damage building interiors. Sufficient insulation helps to minimize the quantity of moisture that enters the attic spaces and adequate ventilation helps to remove any moisture that enters the attic spaces. These two roof system components also help to reduce the amount of energy that is required to heat and cool a building. Proper attic insulation minimizes heat gain and heat loss between the residential living spaces and

attic spaces. This reduces energy consumption year-round. Proper attic ventilation removes excessive heat from attic spaces that can radiate into residential living spaces and cause air conditioners to work harder. Properly installed attic insulation and ventilation work together to maximize the useful life of sloped roof systems.

In addition to moisture control and energy conservation, proper attic insulation and ventilation are essential components to prevent the formation of ice dams. Ice dams occur when warm air accumulates at the peak of an attic while the roof eaves remain cold. Warm air from the attic melts the snow at the ridge of the roof and the water runs down the slope of the roof. At the cold roof eaves, the water refreezes and forms a buildup of snow and ice. This buildup often traps water that can prematurely deteriorate asphalt shingles and ultimately seep under the shingles and cause water damage to the roof deck and building interiors. Proper insulation minimizes the amount of heat that enters attic spaces in the winter and adequate ventilation helps to remove any heat that enters the attic spaces. Together, these components prevent ice dams with a cold roof deck that melts snow and ice evenly.

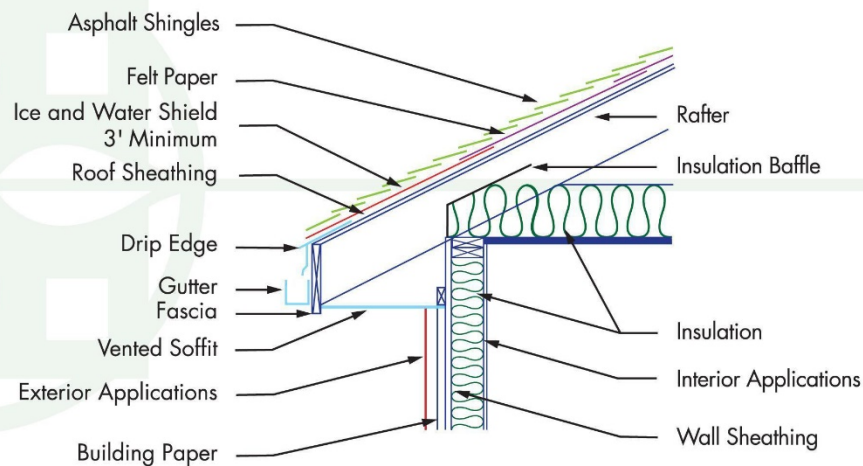
The vents should be clear of debris and not blocked from above by attic insulation. If the soffit vents are blocked from above, installation of polystyrene vent spaces or baffles between the roof joists at these locations can ensure proper ventilation.

Certain characteristics of condition govern the times of replacement. Replacement of an asphalt shingle roof becomes necessary when there are multiple or recurring leaks and when the shingles begin to cup, curl and lift. These conditions are indications that the asphalt shingle roof is near the end of its useful life. Even if the shingles are largely watertight, the infiltration of water in one area can lead to permanent damage to the underlying roof sheathing. This type of deterioration requires replacement of saturated sections of sheathing and greatly increases the cost of roof replacement. Roof leaks may occur from interrelated roof system components, i.e., flashings. Therefore, the warranty period, if any, on the asphalt shingles, may exceed the useful life of the roof system.

Warranties are an indication of product quality and are not a product guarantee. Asphalt shingle product warranties vary from 20- to 50-years and beyond. However, the scope is usually limited to only the material cost of the shingles as caused by manufacturing defects. Warranties may cover defects such as thermal splitting, granule loss, cupping, and curling. Labor cost is rarely included in the remedy so if roof materials fail, the labor to tear off and install new shingles is extra. Other limitations of warranties are exclusions for "incidental and consequential" damages resulting from age, hurricanes, hail storms, ice dams, severe winds, tornadoes, earthquakes, etc. There are some warranties which offer no dollar limit for replacement at an additional cost (effectively an insurance policy) but again these warranties also have limits and may not cover all damages other than a product defect. We recommend a review of the manufacturers' warranties as part of the evaluation of competing proposals to replace a roof system. This evaluation should identify the current costs of remedy if the roof were to fail in the near future. A comparison of the costs of remedy to the total replacement cost will assist in judging the merits of the warranties.

The following cross-sectional schematic illustrates a typical asphalt shingle roof system although it may not reflect the actual configuration at Cross Keys:

## ROOF SCHEMATIC



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Contractors use one of two methods for replacement of sloped roofs, either an overlayment or a tear-off. Overlayment is the application of new shingles over an existing roof. However, there are many disadvantages to overlayment including hidden defects of the underlying roof system, absorption of more heat resulting in accelerated deterioration of the new and old shingles, and an uneven visual appearance. Therefore, we recommend only the tear-off method of replacement. The tear-off method of replacement includes removal of the existing shingles, flashings if required and underlayments.

The Association should plan to coordinate the replacement of gutters and downspouts with the adjacent roofs. This will result in the most economical unit price and minimize the possibility of damage to other roof components as compared to separate replacements.

**Preventative Maintenance Notes:** We recommend the Association maintain a service and inspection contract with a qualified professional and record all documentation of repairs conducted. We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Record any areas of water infiltration, flashing deterioration, damage or loose shingles



- Inspect for ice dams and implement repairs as needed if issues are reoccurring
- Trim tree branches that are near or in contact with roof
- As-needed:
  - Ensure proper ventilation and verify vents are clear of debris and not blocked from attic insulation

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## **Soffit and Fascia, Wood**

---

**Line Item:** 1.590

**Quantity:** Approximately 7,400 square feet comprise the wood soffit

**History:** Likely original

**Condition:** Fair to poor overall with deterioration evident



**Soffit minor deterioration**



**Soffit deterioration**



**Soffit deterioration**



**Soffit deterioration**

**Useful Life:** Up to 40 years

**Component Detail Notes:** Maintenance and partial replacements of the soffits and fascia may extend the useful life. Normal deterioration mainly relates to fading of the exterior finish from exposure to sunlight, weathering and air pollutants. The lack of replacement pieces matching the color and profile of the existing soffits and fascia may result in the need for a premature replacement.

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## **Walls, Masonry**

---

**Line Item:** 1.820

**Quantity:** Approximately 78,300 square feet of the exterior walls; this quantity includes the masonry privacy walls.

**History:** Unknown year of last repairs

**Condition:** Fair overall with the following evident:

- Previous repairs
- Mortar cracks
- Mortar deterioration
- Masonry cracks
- Sealant cracks



**Mortar cracks and deterioration**



**Sealant cracks**



**Previous repairs and mortar deterioration**



**Previous repairs**

**Useful Life:** We advise a complete inspection of the masonry and related masonry repairs every 8- to 12-years to forestall deterioration.

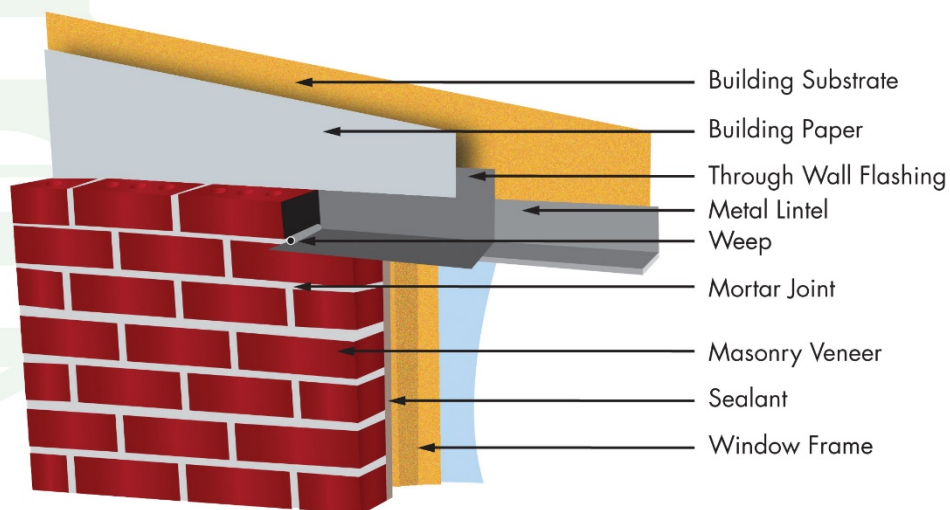
**Component Detail Notes:** Common types of masonry deterioration include efflorescence, spalling, joint deterioration and cracking. The primary cause of efflorescence, cracks and face spall is water infiltration, therefore prevention of water infiltration is the principal concern for the maintenance of masonry applications.

Repointing is a process of raking and cutting out defective mortar to a depth of not less than  $\frac{1}{2}$  inch nor more than  $\frac{3}{4}$  inch and replacing it with new mortar. Face grouting is the process of placing mortar over top of the existing mortar. We advise against face grouting because the existing, often deteriorated mortar does not provide a solid base for the new mortar. New mortar spalls at face grouted areas will likely occur. One purpose of a mortar joint is to protect the masonry by relieving stresses within the wall caused by expansion, contraction, moisture migration and settlement. Repointed mortar joints are more effective if the mortar is softer and more permeable than the masonry units, and no harder or less permeable than the existing mortar. The masonry contractor should address these issues within the proposed scope of work.

We recommend an inspection, repair and replacement of the steel lintels. Lintels are structural supports or beams above windows and doors. Fatigued lintels also allow the direct penetration of storm water into the wall assembly. These inspections should locate areas of rust on the lintels and cracks or other structural damage to the walls around lintels. The contractor should remove any areas of rust, prime and paint these lintels. Paint protects and maximizes the remaining useful life of the lintels and therefore the exterior wall systems. Structural damage can eventually lead to costly replacements of lintels and surrounding wall systems. The following diagram details a typical metal lintel and weep system and may not reflect the actual configuration at Cross Keys:

The following diagram details a typical metal lintel and weep system, however, this detail is similar to construction at shelf angles and may not reflect the actual configuration at Cross Keys:

### MASONRY WALL, METAL LINTEL AND WEEP SYSTEM DETAIL



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**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost includes the following activities:

- Complete inspection of the masonry
- Repointing of up to five percent (5%) of the masonry
- Replacement of a limited amount of the masonry (The exact amount of area in need of replacement will be discretionary based on the actual future conditions and the desired appearance.)

- Replacement/flushing installation at up to two percent (2%) of the metal lintels
- Paint applications to the metal lintels
- Replacement of up to fifty percent (50%) of the sealants at the window and door perimeters

## Building Services Elements

### Electrical System

---

**Line Item:** 3.300

**History:** Primarily original to construction.

**Condition:** Reported satisfactory

**Useful Life:** Up to and sometimes beyond 70 years

**Component Detail Notes:** We give a brief overview of electrical system components in the following sections of this narrative.

*Primary Switchgear* - The primary switchgear is located where the electric supply comes into the building. Switchgear can include associated controls, regulating, metering and protective devices, and is used for the transmission, distribution and conversion of electric power for use within the building. Switchgear components have a useful life of up to and sometimes beyond 70 years. Replacement is often determined by a desired upgrade of the entire electrical system.

*Transformer* - A transformer is an electric device with two or more coupled windings used to convert a power supply from one voltage to another voltage. Transformers within a building lower the supplied electrical voltage to a level that can be utilized by the building's equipment and unit owners. Transformers do not utilize mechanical components and therefore have a long useful life. However, the Association should anticipate periodic replacement of a limited quantity of transformers.

*Distribution Panel* - The distribution panel is an electric switchboard or panel used to control, energize or turn off electricity in total or for individual circuits. The panel also distributes electricity to individual and controllable circuits. One or more distribution panels may exist and further distribute electricity to individual panel boards for each unit. The distribution panel is enclosed in a box and contains circuit breakers, fuses and switches. Distribution panels have a useful life of up to and sometimes beyond 70 years.

*Circuit Protection* - Once electricity is distributed throughout the building and is at a usable voltage level, the electricity is divided into circuits. Each circuit requires

circuit protection. Circuit protection is necessary to prevent injury and fires, and minimize damage to electrical components and disturbances to the electrical system. Abnormalities in the circuit can include overloads, short circuits and surges. Circuit protection devices are commonly referred to as circuit breakers and fuses. For the protection of the circuits in the units and common areas, we recommend the use of only circuit breakers as they are safer than fuses. However, the use of fuses is common for equipment like emergency systems and individual items of equipment. Fuses with a low capacity rating can easily be replaced with fuses of a higher rating resulting in an unprotected, overloaded and unsafe circuit. The circuit protection panels have a useful life of up to and sometimes beyond 70 years.

*Conductor Insulation and Conduit* - Conductor insulation provides protection against the transfer of electricity. Conductor insulation can eventually become brittle and damaged from rodents or heat from many years of service. Conductor conduit is a pipe or tube used to enclose insulated electric wires to protect them from damage. Steel conductor conduit, although galvanized, will eventually rust if used in damp conditions. The useful life of conductor insulation and conduit is indeterminate.

***Preventative Maintenance Notes:*** We recommend the Association obtain and adhere to the manufacturer's recommended maintenance plan. We also recommend the Association maintain a maintenance contract with a qualified professional. The required preventative maintenance may vary in frequency and scope based on the unit's age, operational condition, or changes in technology. We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect system for signs of electrical overheating, deterioration, and/or panel corrosion
  - Clean and vacuum exterior and interior switchboards
- Five-Year Cycles:
  - Check power meters, lamps, indicators, and transformers for deficiencies
  - Inspect wiring, relays, power supply units, and timers
  - Verify surge protection is intact
- As-needed:
  - Test outlets and ground-fault circuit interrupters( GFCI's) for faulty components
  - Examine the insulation at switchgears for signs of deterioration or cracking
  - Ensure all conductors are clean and dry with no moisture build-up
  - Check and inspect for loose wire connections
  - Clean and clear dust and debris away from system components
  - Check for flickering or dimming light fixtures as these could indicate a short in the wiring, arcing, or an over-extension of the electrical system

- Conduct thermal image scanning if system experiences numerous or consistent outages
- Keep an accurate record of all repairs to the electrical system

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. We recommend the Association budget to replace the main switchgear, distribution and circuit protection panels. Updates of this Reserve Study will consider possible changes in the scope and times of component replacements based on the conditions, including the need for replacement of the wires.

We recommend the Association conduct thermoscans of the distribution panels and circuit protection panels, and inspections of the transformers for any indications of arcing, burning or overheating on a regular basis, funded through the operating budget. Verification of the integrity of all connection points minimizes the potential for arcing and fires.

## **Pipes, Domestic Water, Waste and Vent**

---

**Line Item:** 3.605

**Quantity:** We estimate that each unit shares domestic water plumbing pipes for both the kitchen and bathroom with the adjacent unit.

**History and Condition:**

- Domestic Water, Supply and Return – Original; Management reports a history of leaks at the return lines at multiple units. These leaks have been historically repaired as needed.
- Sanitary Waste Disposal and Vent – Original and reported in satisfactory condition

**Component Detail Notes:** The Association is responsible for maintenance and replacement of the piping systems arranged in vertical and horizontal segments. These pipes comprise the following:

- Domestic cold water
- Domestic hot water supply and return
- Vent plumbing fixtures
- Sanitary waste disposal

The exact locations and conditions of the pipes were not ascertained due to the nature of their location and the non-invasive nature of our inspection. We comment on the respective quantities and conditions of the piping systems in the following sections of this narrative.

**Domestic Water** - Copper piping is the predominant type of pipe used in new construction for domestic water piping. With low mineral content in the water, the

useful life of copper domestic water pipes is up to and sometimes beyond 80 years. However, there is recent evidence that copper piping prematurely develops pinhole leaks. Studies have shown that changes in water treatment practices, recently required in response to U.S. Environmental Protection Agency regulations, are dramatically increasing the risk of pitting corrosion in many geographic locations. Utility companies are implementing higher chloride levels to prevent outbreaks of waterborne disease. These higher chloride levels can accelerate corrosion of copper pipes and indeterminately reduce their useful life.

In the event that numerous pinhole leaks develop or occur throughout the system of pipes, Cross Keys should also consider “in-place” pipe restoration technology. This process includes drying, sandblasting away interior pipe occlusions and applying an epoxy lining to the interior surfaces of the pipes. Future updates of this study will consider the possibility of the pipe restoration process in lieu of pipe replacement at Cross Keys. Restoration technology can extend the useful life of a pipe system thus avoiding a system pipe replacement.

***Sanitary Waste Disposal and Vent*** - The material pipes typically deteriorate from the inside out as a result of sewer gases, condensation and rust.

***Valves*** - The piping systems include various valves. Identification of a typical useful life and remaining useful life for individual valves is difficult. Associations typically replace valves on an as needed basis in our experience.

***Pipes, Remaining*** – We anticipate a useful life of up to and sometimes beyond 100 years for the fire standpipes, gas supply lines and interior sprinkler pipes. Therefore, we do not foresee the need to budget for replacement of these pipes within the 30-year scope of this study. Future updates of this study will revisit the need to include partial replacement of these pipes.

***Preventative Maintenance Notes:*** The required preventative maintenance may vary in frequency and scope based on the building’s age and demands of the piping systems. We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Quarterly:
  - Inspect all visible piping for corrosion and leaks, including common areas or areas immediately surrounding pipes such as insulation, ceiling tiles or the floor for moisture, water accumulation, mold or mildew
- Annually:
  - Verify system pressure is sufficient
  - Check accessible valves for proper operation
  - Test backflow prevention devices
  - Inspect and obtain certification for pressure relief valves
  - Test drain line flow rates
  - Mechanically or chemically clean sewer lines as needed

***Priority/Criticality:*** Defer only upon opinion of independent professional or engineer



**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost assumes replacement of all pipes located within each wall opening, associated branch piping, fittings and minimal interior finishes. However, the cost does not include temporary housing for affected residents, pipes within the units or significant interior finishes.

The Association budgets an amount in the annual operating budget for minor pipe repairs and replacements. We recommend the Association continue to fund interim pipe replacements, prior to more aggregate replacements identified in the following paragraphs, from the operating budget. We also recommend the Association contract for an invasive investigation of the condition of the piping system prior to beginning more aggregate replacements, funded through the operating budget.

An invasive analysis of the piping systems will provide various replacement options. Replacement of the systems as an aggregate event will likely require the use of special assessments or loans to fund the replacements.

Although it is likely that the times of replacement and extent of repair costs may vary from the budgetary allowance, Cross Keys could budget sufficient reserves for the beginning of these pipe replacements and have the opportunity to adjust its future reserves up or down to meet any changes to these budgetary estimates. Updates of this Reserve Study would incorporate changes to budgetary costs through a continued historical analysis of the rate of deterioration and actual pipe replacements to budget sufficient reserves.

We recommend the Association budget for replacement of the following items through the operating budget:

- Replacement of valves on an as-needed basis
- Minor pipe repairs and replacements
- invasive investigation of the condition of the piping system prior to beginning more aggregate replacements
- Rodding of waste pipes

## **Water Heaters**

---

**Line Item:** 3.910

**Quantity:** 10 commercial grade 65-gallon gas-fired water heaters with an input capacity of 1,200 (thousand British Thermal Units per hour) to produce domestic hot water

**History:** Varying ages

**Condition:** Reported satisfactory without operational deficiencies



**Water heater**

**Useful Life:** 15-to 20-years

**Component Detail Notes:** The useful life is dependent on use, demand per unit and the quality of water.

**Preventative Maintenance Notes:** We recommend the Association obtain and adhere to the manufacturer's recommended maintenance plan. We also recommend the Association maintain a maintenance contract with a qualified professional. The required preventative maintenance may vary in frequency and scope based on the unit's age, operational condition, or changes in technology. We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Weekly:
  - Inspect for leaking water
  - Verify area around water heater is free from obstruction, including flammable liquids and combustible materials
  - Listen for any unusual vibrations or noises
- Monthly:
  - Verify relief valve is working properly and discharged water is directed to an open drain
  - Check controls and switches for proper operations
  - Conduct blowdown to minimize corrosion and remove suspended solids within the system

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Due to the low average MBH per unit, we anticipate a lower than expected useful life.



## Property Site Elements

### **Asphalt Pavement, Crack Repair and Patch**

---

**Line Item:** 4.020

**Quantity:** Approximately 6,250 square yards of asphalt pavement comprising access drives and parking areas throughout the community

**History:** Unknown year of last crack repairs and patching

**Condition:** Good to fair overall with previous repairs, cracks, and isolated minor deterioration evident

**Useful Life:** Three- to five-years

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost includes an allowance for crack repairs and patching of up to two percent (2%) of the pavement.

### **Asphalt Pavement, Repaving**

---

**Line Items:** 4.040 and 4.045

**Quantity:** Approximately 6,250 square yards of asphalt pavement comprising access drives and parking areas throughout the community

**History:** Unknown year of last repaving

**Condition:** Good to fair overall with previous repairs, cracks, and isolated minor deterioration evident



**Asphalt pavement; we note minor cracks and previous repairs**



**Asphalt pavement cracks**



**Asphalt pavement cracks, previous repairs, and minor deterioration**



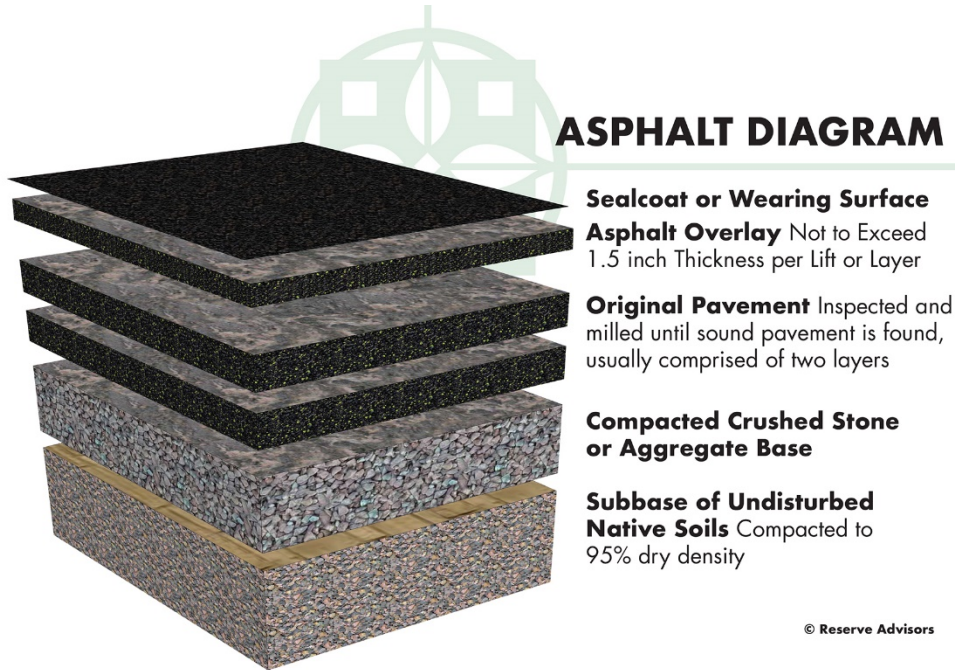
**Asphalt pavement cracks and minor deterioration**



**Asphalt pavement crack**

***Useful Life:*** 15- to 20-years with the benefit of timely crack repairs and patching

**Component Detail Notes:** The initial installation of asphalt uses at least two lifts, or two separate applications of asphalt, over the base course. The first lift is the binder course. The second lift is the wearing course. The wearing course comprises a finer aggregate for a smoother more watertight finish. The following diagram depicts the typical components although it may not reflect the actual configuration at Cross Keys:



The manner of repaving is either a mill and overlay or total replacement. A mill and overlay is a method of repaving where cracked, worn and failed pavement is mechanically removed or milled until sound pavement is found. A new layer of asphalt is overlaid atop the remaining base course of pavement. Total replacement includes the removal of all existing asphalt down to the base course of aggregate and native soil followed by the application of two or more new lifts of asphalt. We recommend mill and overlayment on asphalt pavement that exhibits normal deterioration and wear. We recommend total replacement of asphalt pavement that exhibits severe deterioration, inadequate drainage, pavement that has been overlaid multiple times in the past or where the configuration makes overlayment not possible. Based on the apparent visual condition and configuration of the asphalt pavement, we recommend the mill and overlay method for initial repaving followed by the total replacement method for subsequent repaving at Cross Keys.

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect for settlement, large cracks and trip hazards, and ensure proper drainage
  - Repair areas which could cause vehicular damage such as potholes

- As needed:
  - Perform crack repairs and patching as needed

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost for milling and overlayment includes area patching of up to ten percent (10%), and inspection and repairs at the catch basins.

## Concrete Curbs

---

**Line Item:** 4.110

**Quantity:** Approximately 3,100 linear feet throughout the community

**Condition:** Fair overall with cracks and deterioration evident



**Concrete curb cracks and deterioration**



**Concrete curb crack**



**Concrete curb deterioration**



**Concrete curb deterioration**

**Useful Life:** Up to 65 years although interim deterioration of areas is common

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair major cracks, spalls and trip hazards
  - Mark with orange safety paint prior to replacement or repair
  - Repair or perform concrete leveling in areas in immediate need of repair or possible safety hazard

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. We estimate that up to 1,395 linear feet of curbs, or forty-five percent (45%) of the total, will require replacement during the next 30 years. We include an allowance for repairs and partial replacements at the concrete curbs in 2022.

## Concrete Patios

---

**Line Item:** 4.130

**Quantity:** The Association is responsible 61 front and rear concrete patios, averaging approximately 120 square feet each.

**Condition:** We were unable to inspect all patios due to privacy fences. The patios we inspected are in fair overall condition with organic growth and deterioration evident



**Concrete patio; we note organic growth and deterioration**

**Useful Life:** Up to 65 years although interim deterioration of areas is common

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair major cracks, spalls and trip hazards
  - Mark with orange safety paint prior to replacement or repair
  - Repair or perform concrete leveling in areas in immediate need of repair or possible safety hazard

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. We recommend the Association plan for replacement of up to 25 patios, or approximately forty-one percent (41%) of the total, during the next 30 years.

## Concrete Sidewalks

---

**Line Item:** 4.140

**Quantity:** Approximately 7,800 square feet throughout the community

**Condition:** Fair overall with cracks, spalling, and deterioration evident



Concrete sidewalk



Concrete sidewalk crack





**Concrete sidewalk deterioration**



**Concrete sidewalk crack and spall**

**Useful Life:** Up to 65 years although interim deterioration of areas is common

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair major cracks, spalls and trip hazards
  - Mark with orange safety paint prior to replacement or repair
  - Repair or perform concrete leveling in areas in immediate need of repair or possible safety hazard

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. We estimate that up to 3,120 square feet of concrete sidewalks, or forty percent (40%) of the total, will require replacement during the next 30 years.

## **Fences, Wood, Privacy**

---

**Line Item:** 4.285

**Quantity:** Approximately 1,900 linear feet located at the front and rear elevations of the buildings

**History:** Unknown age

**Condition:** Good to fair overall with isolated deterioration evident



**Wood fence**



**Wood fence**



**Wood fence deterioration at unit 54**

**Useful Life:** 15- to 20-years

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair loose sections, finish deterioration and damage
  - Repair leaning sections and clear vegetation from fence areas which could cause damage

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. The Association should anticipate periodic partial replacements due to the non-uniform nature of wood deterioration. Along with these partial replacements, the Association should apply periodic paint applications as needed and fund these activities through the operating budget.

## Light Poles and Fixtures

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**Line Item:** 4.560

**Quantity:** 13 metal poles with light fixtures throughout the community

**History:** Unknown age; retrofitted to LED in 2018.

**Condition:** Fair overall with damage fixture evident



Light pole and fixture



Damaged light fixture at Bouton Court. We assume the Association will replace this light fixture in the near term and fund this activity through the operating budget

**Useful Life:** Up to 25 years

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- As-needed:
  - Inspect and repair broken or dislodged fixtures, and leaning or damaged poles
  - Replaced burned out bulbs as needed

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## Pavers, Masonry

---

**Line Item:** 4.620

**Quantity:** Approximately 14,750 square feet located at Bouton Green Court parking area, sidewalks, and front and rear patios.

**History:** Unknown age

**Condition:** Good to fair overall with displaced pavers, organic and vegetation growth evident



**Pavers**



**Pavers**



**Pavers displacement and vegetation growth**



**Pavers displacement and organic growth**

**Useful Life:** 15- to 20-years

**Component Detail Notes:** The following diagram depicts the typical components of a masonry paver system although it may not reflect the actual configuration at Cross Keys:

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair settlement, trip hazards and paver spalls at heavy traffic areas
  - Re-set and/or reseat damaged pavers as necessary
  - Periodically clean and remove overgrown vegetation as needed

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost includes complete resetting of the pavers with replacement of up to seventy percent (70%). We suggest the Association conduct interim resetting and replacement of minor areas of pavers as normal maintenance, funded from the operating budget.

## **Pipes, Subsurface Utilities**

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**Line Item:** 4.650

**Quantity:** The Association is responsible for subsurface utilities pipes

**Condition:** Reported satisfactory

**Useful Life:** Up to and likely beyond 85 years

**Component Detail Notes:** The Association maintains the subsurface utility pipes throughout the property. The exact amounts and locations of the subsurface utility pipes were not ascertained due to the nature of the underground construction and the non-invasive nature of the inspection.

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- As-needed:
  - Video inspect waste pipes for breaks and damaged piping
  - Monitor for water and gas leaks through pressure losses and present odors
  - Partially replace damaged section of pipes

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. At this time, we do not anticipate replacement of continuous lengths of subsurface utility pipes. Rather we recommend the Association budget for repairs to isolated occurrences of breached utilities. Although it is likely that the times of replacement and extent of repair costs may vary from the budgetary allowance, Cross Keys could budget sufficient reserves for these utility repairs and have the opportunity to adjust its future reserves up or down to meet any changes to these budgetary estimates. Updates of this Reserve Study would incorporate changes to budgetary costs through a continued historical analysis of the rate of deterioration and actual repairs to budget sufficient reserves.

## Railings, Metal

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**Line Item:** 4.731

**Quantity:** Approximately 400 linear feet located near the retaining walls at the side elevations of buildings

**History:** Likely original

**Condition:** Fair to poor overall with rust and deterioration evident.



**Metal railings; we note rust and finish deterioration**



**Metal railings rust and deterioration**



**Metal railings rust and finish deterioration**



**Metal railings rust and finish deterioration**

**Useful Life:** Up to 35 years

**Component Detail Notes:** Metal components at grade and key structural connections are especially prone to failure if not thoroughly maintained. Secure and rust free fasteners and connections will prevent premature deterioration. Preparation of the metal before application of the paint finish is critical to maximize the useful life of the finish.

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect for damage, and excessive finish deterioration or corrosion
  - Test security of railings and inspect connection fasteners

**Priority/Criticality:** Per Board discretion

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## Retaining Walls, Masonry

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**Line Item:** 4.740

**Quantity:** Approximately 1,020 square feet located near the side, rear, and front elevations of buildings

**History:** Likely original; unknown year of last repairs

**Condition:** Fair overall with previous repairs and masonry and mortar cracks evident



Retaining wall previous repairs



Retaining wall masonry crack



**Retaining wall mortar crack**



**Retaining wall masonry and mortar cracks**

**Useful Life:** Masonry retaining walls have indeterminate useful lives. However, we recommend the Association plan for inspections and capital repairs every 10- to 15- years to forestall deterioration.

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3. Our cost includes an allowance for an inspection, partial resetting and replacement of up to ten percent (10%).

## **Retaining Walls, Timber**

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**Line Item:** 4.760

**Quantity:** Approximately 790 square feet located at the side and rear elevations of buildings

**History:** Unknown age

**Condition:** Good to fair overall with organic growth evident





**Timber retaining wall**



**Timber retaining wall organic growth**

**Useful Life:** 15- to 20-years

**Preventative Maintenance Notes:** We note the following select recommended preventative maintenance activities to maximize the remaining useful life:

- Annually:
  - Inspect and repair leaning sections or damaged areas
  - Inspect and repair erosion at the wall base and backside

**Priority/Criticality:** Defer only upon opinion of independent professional or engineer

**Expenditure Detail Notes:** Expenditure timing and costs are depicted in the **Reserve Expenditures** table in Section 3.

## **Reserve Study Update**

An ongoing review by the Board and an Update of this Reserve Study are necessary to ensure an equitable funding plan since a Reserve Study is a snapshot in time. Many variables change after the study is conducted that may result in significant overfunding or underfunding the reserve account. Variables that may affect the Reserve Funding Plan include, but are not limited to:

- Deferred or accelerated capital projects based on Board discretion
- Changes in the interest rates on reserve investments
- Changes in the *local* construction inflation rate
- Additions and deletions to the Reserve Component Inventory
- The presence or absence of maintenance programs
- Unusually mild or extreme weather conditions
- Technological advancements

Periodic updates incorporate these variable changes since the last Reserve Study or Update. We recommend the Board budget for an Update to this Reserve Study in two- to three-years. Budgeting for an Update demonstrates the Board's



objective to continue fulfilling its fiduciary responsibility to maintain the commonly owned property and to fund reserves appropriately.

## 5.METHODOLOGY

Reserves for replacement are the amounts of money required for future expenditures to repair or replace Reserve Components that wear out before the entire facility or project wears out. Reserving funds for future repair or replacement of the Reserve Components is also one of the most reliable ways of protecting the value of the property's infrastructure and marketability.

Cross Keys can fund capital repairs and replacements in any combination of the following:

1. Increases in the operating budget during years when the shortages occur
2. Loans using borrowed capital for major replacement projects
3. Level monthly reserve assessments annually adjusted upward for inflation to increase reserves to fund the expected major future expenditures
4. Special assessments

We do not advocate special assessments or loans unless near term circumstances dictate otherwise. Although loans provide a gradual method of funding a replacement, the costs are higher than if the Association were to accumulate reserves ahead of the actual replacement. Interest earnings on reserves also accumulate in this process of saving or reserving for future replacements, thereby defraying the amount of gradual reserve collections. We advocate the third method of *Level Monthly Reserve Assessments* with relatively minor annual adjustments. The method ensures that Homeowners pay their "fair share" of the weathering and aging of the commonly owned property each year. Level reserve assessments preserve the property and enhance the resale value of the homes.

This Reserve Study is in compliance with and exceeds the National standards<sup>1</sup> set forth by the Association of Professional Reserve Analysts (APRA) fulfilling the requirements of a "Level I Full Reserve Study." These standards require a Reserve Component to have a "predictable remaining Useful Life." Estimating Remaining Useful Lives and Reserve Expenditures beyond 30 years is often indeterminate. Long-Lived Property Elements are necessarily excluded from this analysis. We considered the following factors in our analysis:

- The Cash Flow Method to compute, project and illustrate the 30-year Reserve Funding Plan
- Local<sup>2</sup> costs of material, equipment and labor
- Current and future costs of replacement for the Reserve Components
- Costs of demolition as part of the cost of replacement
- Local economic conditions and a historical perspective to arrive at our estimate of long-term future inflation for construction costs in Baltimore,

<sup>1</sup> Identified in the APRA "Standards - Terms and Definitions" and the CAI "Terms and Definitions".

<sup>2</sup> See Credentials for additional information on our use of published sources of cost data.

Maryland at an annual inflation rate<sup>3</sup>. Isolated or regional markets of greater construction (development) activity may experience slightly greater rates of inflation for both construction materials and labor.

- The past and current maintenance practices of Cross Keys and their effects on remaining useful lives
- Financial information provided by the Association pertaining to the cash status of the reserve fund and budgeted reserve contribution
- The anticipated effects of appreciation of the reserves over time in accord with a return or yield on investment of your cash equivalent assets. (We did not consider the costs, if any, of Federal and State Taxes on income derived from interest and/or dividend income).
- The Funding Plan excludes necessary operating budget expenditures. It is our understanding that future operating budgets will provide for the ongoing normal maintenance of Reserve Components.

Updates to this Reserve Study will continue to monitor historical facts and trends concerning the external market conditions.

<sup>3</sup> Derived from Marshall & Swift, historical costs and the Bureau of Labor Statistics.



## 6. CREDENTIALS

### HISTORY AND DEPTH OF SERVICE

**Founded in 1991**, Reserve Advisors is the leading provider of reserve studies, insurance appraisals, developer turnover transition studies, expert witness services, and other engineering consulting services. Clients include community associations, resort properties, hotels, clubs, non-profit organizations, apartment building owners, religious and educational institutions, and office/commercial building owners in 48 states, Canada and throughout the world.

The **architectural engineering consulting firm** was formed to take a leadership role in helping fiduciaries, boards, and property managers manage their property like a business with a long-range master plan known as a Reserve Study.

Reserve Advisors employs the **largest staff of Reserve Specialists** with bachelor's degrees in engineering dedicated to Reserve Study services. Our founders are also founders of Community Associations Institute's (CAI) Reserve Committee that developed national standards for reserve study providers. One of our founders is a Past President of the Association of Professional Reserve Analysts (APRA). Our vast experience with a variety of building types and ages, on-site examination and historical analyses are keys to determining accurate remaining useful life estimates of building components.

**No Conflict of Interest** - As consulting specialists, our **independent opinion** eliminates any real or perceived conflict of interest because we do not conduct or manage capital projects.

### TOTAL STAFF INVOLVEMENT

Several staff members participate in each assignment. The responsible advisor involves the staff through a Team Review, exclusive to Reserve Advisors, and by utilizing the experience of other staff members, each of whom has served hundreds of clients. We conduct Team Reviews, an internal quality assurance review of each assignment, including: the inspection; building component costing; lifing; and technical report phases of the assignment. Due to our extensive experience with building components, we do not have a need to utilize subcontractors.

### OUR GOAL

To help our clients fulfill their fiduciary responsibilities to maintain property in good condition.

### VAST EXPERIENCE WITH A VARIETY OF BUILDINGS

Reserve Advisors has conducted reserve studies for a multitude of different communities and building types. We've analyzed thousands of buildings, from as small as a 3,500-square foot day care center to the 2,600,000-square foot 98-story Trump International Hotel and Tower in Chicago. We also routinely inspect buildings with various types of mechanical systems such as simple electric heat, to complex systems with air handlers, chillers, boilers, elevators, and life safety and security systems.

We're familiar with all types of building exteriors as well. Our well-versed staff regularly identifies optimal repair and replacement solutions for such building exterior surfaces such as adobe, brick, stone, concrete, stucco, EIFS, wood products, stained glass and aluminum siding, and window wall systems.

### OLD TO NEW

Reserve Advisors' experience includes ornate and vintage buildings as well as modern structures. Our specialists are no strangers to older buildings. We're accustomed to addressing the unique challenges posed by buildings that date to the 1800's. We recognize and consider the methods of construction employed into our analysis. We recommend appropriate replacement programs that apply cost effective technologies while maintaining a building's character and appeal.

**AIME V. MBAKOP, RS**  
**Responsible Advisor**

**CURRENT CLIENT SERVICES**

Aime V. Mbakop, an Engineer, is an Advisor for Reserve Advisors. Mr. Mbakop is responsible for the inspection and analysis of the condition of clients' properties, and recommending engineering solutions to prolong the lives of the components. He also forecasts capital expenditures for the repair and/or replacement of the property components and prepares technical reports on assignments. He is responsible for conducting Life Cycle Cost Analyses and Capital Replacement Forecast services and the preparation of Reserve Study Reports for condominiums, townhomes, planned unit developments and homeowner associations.



The following is a partial list of clients served by Aime Mbakop demonstrating the breadth of experiential knowledge of community associations in construction and related buildings systems.

**Governor's Grove Condominium Association, Inc.** - An upscale residential property located in Williamsburg, Virginia, these three-story condominium buildings contain 100 units. The property includes multiple styles of exterior building elements, a clubhouse, a pool, and a retention pond.

**Charlestown Meadows Community Association** - Located in Malvern, Pennsylvania, this community comprises 191 townhomes in 50 buildings. The Association maintains various common elements including a tennis court, a controlled access clubhouse, a pool, and walking paths.

**Linton at Ballenger Community Association, Inc.** - This planned unit development consist of a combination of 180 single family homes and 249 townhomes. Residents enjoy common elements including a pedestrian bridge, ponds, multiple playground equipment, a controlled access clubhouse including a fitness center, and a pool comprising a picnic area.

**Batson Creek Estates Community Association, Inc.** - Located in Frankford, Delaware, this community features a clubhouse including a fitness center, a pool, and an outdoor fire pit area. The Community contains 110 single family homes. The Association maintains a number of common elements including storm water management systems, irrigation system, and a pool house.

**Brookfield Homeowners Association, Inc.** - This master planned community of 253 single family homes and 263 townhomes is located in Falling Waters, West Virginia. The community features an extensive boat ramp, multiple pavilions, and controlled access gates. The Association is responsible for a number of additional common elements including 17 miles of asphalt pavement.

**Lords Landing Village Condominium** - Located in Upper Marlboro, Maryland, these two and three-story condominiums were built from 1987 to 1992 and contain 200 units in 21 buildings. The Association is responsible for various common elements including multiple styles of exterior building elements and breezeways.

**PRIOR RELEVANT EXPERIENCE**

Before joining Reserve Advisors, Mr. Mbakop worked for the United States Patent and Trademark Office in Alexandria Virginia, where he was working as a patent examiner. Mr. Mbakop attended the School of Engineering and Applied Science at the University of the District of Columbia where he attained his Bachelor of Science degree in Electrical Engineering.

**EDUCATION**

University of the District of Columbia - B.S. Electrical Engineering

**PROFESSIONAL AFFILIATION**

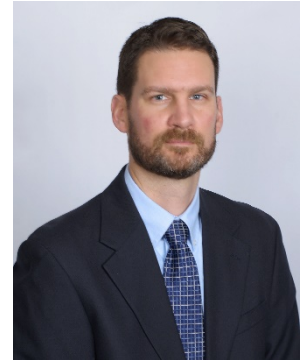
*Engineer in Training (E.I.T.) - District of Columbia*

**ALAN M. EBERT, P.E., PRA, RS**  
**Director of Quality Assurance**

**CURRENT CLIENT SERVICES**

Alan M. Ebert, a Professional Engineer, is the Director of Quality Assurance for Reserve Advisors. Mr. Ebert is responsible for the management, review and quality assurance of reserve studies. In this role, he assumes the responsibility of stringent report review analysis to assure report accuracy and the best solution for Reserve Advisors' clients.

Mr. Ebert has been involved with thousands of Reserve Study assignments. The following is a partial list of clients served by Alan Ebert demonstrating his breadth of experiential knowledge of community associations in construction and related buildings systems.



**Brownsville Winter Haven** Located in Brownsville, Texas, this unique homeowners association contains 525 units. The Association maintains three pools and pool houses, a community and management office, landscape and maintenance equipment, and nine irrigation canals with associated infrastructure.

**Rosemont Condominiums** This unique condominium is located in Alexandria, Virginia and dates to the 1940's. The two mid-rise buildings utilize decorative stone and brick masonry. The development features common interior spaces, multi-level wood balconies and common asphalt parking areas.

**Stillwater Homeowners Association** Located in Naperville, Illinois, Stillwater Homeowners Association maintains four tennis courts, an Olympic sized pool and an upscale ballroom with commercial-grade kitchen. The community also maintains three storm water retention ponds and a detention basin.

**Birchfield Community Services Association** This extensive Association comprises seven separate parcels which include 505 townhome and single family homes. This Community Services Association is located in Mt. Laurel, New Jersey. Three lakes, a pool, a clubhouse and management office, wood carports, aluminum siding, and asphalt shingle roofs are a few of the elements maintained by the Association.

**Oakridge Manor Condominium Association** Located in Londonderry, New Hampshire, this Association includes 104 units at 13 buildings. In addition to extensive roads and parking areas, the Association maintains a large septic system and significant concrete retaining walls.

**Memorial Lofts Homeowners Association** This upscale high rise is located in Houston, Texas. The 20 luxury units include large balconies and decorative interior hallways. The 10-story building utilizes a painted stucco facade and TPO roof, while an on-grade garage serves residents and guests.

**PRIOR RELEVANT EXPERIENCE**

Mr. Ebert earned his Bachelor of Science degree in Geological Engineering from the University of Wisconsin-Madison. His relevant course work includes foundations, retaining walls, and slope stability. Before joining Reserve Advisors, Mr. Ebert was an oilfield engineer and tested and evaluated hundreds of oil and gas wells throughout North America.

**EDUCATION**

University of Wisconsin-Madison - B.S. Geological Engineering

**PROFESSIONAL AFFILIATIONS/DESIGNATIONS**

*Professional Engineering License* – Wisconsin, North Carolina, Illinois, Colorado

*Reserve Specialist (RS)* - Community Associations Institute

*Professional Reserve Analyst (PRA)* - Association of Professional Reserve Analysts

## RESOURCES

Reserve Advisors utilizes numerous resources of national and local data to conduct its Professional Services. A concise list of several of these resources follows:

**Association of Construction Inspectors**, (ACI) the largest professional organization for those involved in construction inspection and construction project management. ACI is also the leading association providing standards, guidelines, regulations, education, training, and professional recognition in a field that has quickly become important procedure for both residential and commercial construction, found on the web at [www.iami.org](http://www.iami.org).

**American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.**, (ASHRAE) the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., devoted to the arts and sciences of heating, ventilation, air conditioning and refrigeration; recognized as the foremost, authoritative, timely and responsive source of technical and educational information, standards and guidelines, found on the web at [www.ashrae.org](http://www.ashrae.org). Reserve Advisors actively participates in its local chapter and holds individual memberships.

**Community Associations Institute**, (CAI) America's leading advocate for responsible communities noted as the only national organization dedicated to fostering vibrant, responsive, competent community associations. Their mission is to assist community associations in promoting harmony, community, and responsible leadership.

**Marshall & Swift / Boeckh**, (MS/B) the worldwide provider of building cost data, co-sourcing solutions, and estimating technology for the property and casualty insurance industry found on the web at [www.marshallswift.com](http://www.marshallswift.com).

**R.S. Means CostWorks**, North America's leading supplier of construction cost information. As a member of the Construction Market Data Group, Means provides accurate and up-to-date cost information that helps owners, developers, architects, engineers, contractors and others to carefully and precisely project and control the cost of both new building construction and renovation projects found on the web at [www.rsmeans.com](http://www.rsmeans.com).

Reserve Advisors' library of numerous periodicals relating to reserve studies, condition analyses, chapter community associations, and historical costs from thousands of capital repair and replacement projects, and product literature from manufacturers of building products and building systems.



## 7. DEFINITIONS

Definitions are derived from the standards set forth by the Community Associations Institute (CAI) representing America's 305,000 condominium and homeowners associations and cooperatives, and the Association of Professional Reserve Analysts, setting the standards of care for reserve study practitioners.

**Cash Flow Method** - A method of calculating Reserve Contributions where contributions to the reserve fund are designed to offset the variable annual expenditures from the reserve fund. Different Reserve Funding Plans are tested against the anticipated schedule of reserve expenses until the desired funding goal is achieved.

**Component Method** - A method of developing a Reserve Funding Plan with the total contribution is based on the sum of the contributions for individual components.

**Current Cost of Replacement** - That amount required today derived from the quantity of a *Reserve Component* and its unit cost to replace or repair a Reserve Component using the most current technology and construction materials, duplicating the productive utility of the existing property at current *local* market prices for *materials, labor* and manufactured equipment, contractors' overhead, profit and fees, but without provisions for building permits, overtime, bonuses for labor or premiums for material and equipment. We include removal and disposal costs where applicable.

**Fully Funded Balance** - The Reserve balance that is in direct proportion to the fraction of life "used up" of the current Repair or Replacement cost similar to Total Accrued Depreciation.

**Funding Goal (Threshold)** - The stated purpose of this Reserve Study is to determine the adequate, not excessive, minimal threshold reserve balances.

**Future Cost of Replacement** - *Reserve Expenditure* derived from the inflated current cost of replacement or current cost of replacement as defined above, with consideration given to the effects of inflation on local market rates for materials, labor and equipment.

**Long-Lived Property Component** - Property component of Cross Keys responsibility not likely to require capital repair or replacement during the next 30 years with an unpredictable remaining Useful Life beyond the next 30 years.

**Percent Funded** - The ratio, at a particular point of time (typically the beginning of the Fiscal Year), of the actual (or projected) Reserve Balance to the Fully Funded Balance, expressed as a percentage.

**Remaining Useful Life** - The estimated remaining functional or useful time in years of a *Reserve Component* based on its age, condition and maintenance.

**Reserve Component** - Property elements with: 1) Cross Keys responsibility; 2) limited Useful Life expectancies; 3) predictable Remaining Useful Life expectancies; and 4) a replacement cost above a minimum threshold.

**Reserve Component Inventory** - Line Items in *Reserve Expenditures* that identify a *Reserve Component*.

**Reserve Contribution** - An amount of money set aside or *Reserve Assessment* contributed to a *Reserve Fund* for future *Reserve Expenditures* to repair or replace *Reserve Components*.

**Reserve Expenditure** - Future Cost of Replacement of a Reserve Component.

**Reserve Fund Status** - The accumulated amount of reserves in dollars at a given point in time, i.e., at year end.

**Reserve Funding Plan** - The portion of the Reserve Study identifying the *Cash Flow Analysis* and containing the recommended Reserve Contributions and projected annual expenditures, interest earned and reserve balances.

**Reserve Study** - A budget planning tool that identifies the current status of the reserve fund and a stable and equitable Funding Plan to offset the anticipated future major common area expenditures.

**Useful Life** - The anticipated total time in years that a *Reserve Component* is expected to serve its intended function in its present application or installation.



## 8. PROFESSIONAL SERVICE CONDITIONS

**Our Services** - Reserve Advisors, LLC (RA) performs its services as an independent contractor in accordance with our professional practice standards and its compensation is not contingent upon our conclusions. The purpose of our reserve study is to provide a budget planning tool that identifies the current status of the reserve fund, and an opinion recommending an annual funding plan to create reserves for anticipated future replacement expenditures of the property.

Our inspection and analysis of the subject property is limited to visual observations, is noninvasive and is not meant to nor does it include investigation into statutory, regulatory or code compliance. RA inspects sloped roofs from the ground and inspects flat roofs where safe access (stairs or ladder permanently attached to the structure) is available. The report is based upon a "snapshot in time" at the moment of inspection. RA may note visible physical defects in our report. The inspection is made by employees generally familiar with real estate and building construction but in the absence of invasive testing RA cannot opine on, nor is RA responsible for, the structural integrity of the property including its conformity to specific governmental code requirements for fire, building, earthquake, and occupancy, or any physical defects that were not readily apparent during the inspection.

RA is not responsible for conditions that have changed between the time of inspection and the issuance of the report. RA does not investigate, nor assume any responsibility for any existence or impact of any hazardous materials, such as asbestos, urea-formaldehyde foam insulation, other chemicals, toxic wastes, environmental mold or other potentially hazardous materials or structural defects that are latent or hidden defects which may or may not be present on or within the property. RA does not make any soil analysis or geological study as part of its services; nor does RA investigate water, oil, gas, coal, or other subsurface mineral and use rights or such hidden conditions. RA assumes no responsibility for any such conditions. The Report contains opinions of estimated costs and remaining useful lives which are neither a guarantee of the actual costs of replacement nor a guarantee of remaining useful lives of any property element.

RA assumes, without independent verification, the accuracy of all data provided to it. You agree to indemnify and hold RA harmless against and from any and all losses, claims, actions, damages, expenses or liabilities, including reasonable attorneys' fees, to which we may become subject in connection with this engagement, because of any false, misleading or incomplete information which we have relied upon supplied by you or others under your direction, or which may result from any improper use or reliance on the Report by you or third parties under your control or direction. Your obligation for indemnification and reimbursement shall extend to any director, officer, employee, affiliate, or agent of RA. Liability of RA and its employees, affiliates, and agents for errors and omissions, if any, in this work is limited to the amount of its compensation for the work performed in this engagement.

**Report** - RA completes the services in accordance with the Proposal. The Report represents a valid opinion of RA's findings and recommendations and is deemed complete. RA, however, considers any additional information made available to us within 6 months of issuing the Report if a timely request for a revised Report is made. RA retains the right to withhold a revised Report if payment for services was not tendered in a timely manner. All information received by RA and all files, work papers or documents developed by RA during the course of the engagement shall remain the property of RA and may be used for whatever purpose it sees fit.

**Your Obligations** - You agree to provide us access to the subject property for an on-site visual inspection. You agree to provide RA all available, historical and budgetary information, the governing documents, and other information that we request and deem necessary to complete the Report. You agree to pay actual attorneys' fees and any other costs incurred to collect on any unpaid balance for RA's services.

**Use of Our Report and Your Name** - Use of this Report is limited to only the purpose stated herein. You hereby acknowledge that any use or reliance by you on the Report for any unauthorized purpose is at your own risk and you shall hold RA harmless from any consequences of such use. Use by any unauthorized third party is unlawful. The Report in whole or in part ***is not and cannot be used as a design specification for design engineering purposes or as an appraisal.*** You may show our Report in its entirety to the following third parties: members of your organization, your accountant, attorney, financial institution and property manager who need to review the information contained herein. Without the written consent of RA, you shall not disclose the Report to any other third party. The Report contains intellectual property developed by RA and ***shall not be reproduced or distributed to any party that conducts reserve studies without the written consent of RA.***

RA will include your name in our client lists. RA reserves the right to use property information to obtain estimates of replacement costs, useful life of property elements or otherwise as RA, in its sole discretion, deems appropriate.

**Payment Terms, Due Dates and Interest Charges** - Retainer payment is due upon authorization and prior to inspection. The balance is due net 30 days from the report shipment date. Any balance remaining 30 days after delivery of the Report shall accrue an interest charge of 1.5% per month. Any litigation necessary to collect an unpaid balance shall be venued in Milwaukee County Circuit Court for the State of Wisconsin.