



TOWN OF MIDDLEBURY

Public Works Commission

MINUTES Regular Meeting February 18, 2015

MEMBERS PRESENT

Terry Smith, Chairman
Mark A. Capodanno
Francis L. Barton
Mark Carroll

MEMBERS ABSENT

John DeRiu
Joseph DeSantis
Charles Rossi

ALSO PRESENT

Dan Norton, Public Works Director

1. CALL TO ORDER

The Regular Meeting was called to order at 7:08 P.M. by Chairman Terry Smith.

2. APPROVAL OF THE MINUTES OF THE JANUARY 21, 2015 REGULAR MEETING

Motion: to approve the Minutes of the January 21, 2015 Regular Meeting. Made by Mark Capodanno, seconded by Mark Carroll. Unanimous Approval

3. DIRECTOR'S REPORT

Dan Norton, Director of Public Works, reviewed his report with the Commission. Given the severity of this winter, he needed to order 300 tons of salt, 4,500 gallons of liquid, and a skid of sidewalk ice melt which were all over-budget. If the weather continues like it has been, he fears the he may be forced to order additional supplies to get through the remainder of the season. The mechanical repairs on the plows and spreaders have also exceeded the budget by approximately \$10,000.00.

4. NEW BUSINESS

a. Life Cycle Cost Analysis from Gale Associates

Chairman Smith confirmed that the members received a copy of the Life Cycle Cost Analysis from Gale Associates (see attached) regarding the proposed roof replacements at the Town Hall and Shepardson Community Center. He stated that the Board of Selectmen would like a recommendation from this Commission as to their opinion.

Dan Norton, Director of Public Works, stated that upon his review of the analysis he noticed that they offer a scrap value for the slate which he has never heard of before. He also wanted the Commission to know that snow guards, pointing and waterproofing the chimneys, and the issue with wood rot within the eaves are not included in said analysis. It strictly reflects the slate material. When considering all immediate and future costs involved, slate vs. asphalt shingles run fairly close in comparison.

Chairman Smith did confirm that the Commission has already put on the record that they recommend slate material be utilized.

Dan Norton, Director of Public Works, verified that the area is called out as a historic district but does not carry any stipulations. The roofs that currently exist are 80± years old.

Motion: to recommend to the Board of Selectmen that they go with Gale Associates recommendation for slate, acknowledging that it is not a construction estimate but just the estimate for the slate itself and not any insular work such as gutters, ice guards, flashing and unforeseen issues. Made by Mark Capodanno, seconded by Francis Barton.
Unanimous Approval.

b. Code of Ethics

Francis Barton, Mark Capodanno, & Mark Carroll provided Rachelle Behuniak, Recording Clerk with their signature page acknowledging receipt and agreement of the Middlebury Code of Ethics.

5. LIAISONS

- a. Personnel** – None
- b. Budget** – See Above
- c. Park & Recreation** – None
- d. Equipment** – See Above
- e. Waste Removal** – None

- f. Energy & Technology** – None
- g. Buildings** – See Above

6. ADJOURNMENT

Motion: to adjourn the meeting at 7:26 P.M. Made by Mark Capodanno, seconded by Francis Barton. Unanimous Approval

Filed Subject to Approval,

Respectfully Submitted,

Rachelle Behuniak, Clerk

Original to Town Clerk

cc: Public Works Commission
Daniel Norton, Director of Public Works



Middlebury Department of Public Works
Roof Design and Consulting Services
Town Hall and Shepardson Community Center
976190
Life Cycle Cost Analysis

Gale Associates, Inc. (Gale) performed a Life Cycle Cost (LCC) cost analysis for different roof systems at both the Middlebury Town Hall (1212 Whittemore Road) and the Shepardson Community Center (1172 Whittemore Road). The tables below indicates assumptions used in the economic calculations in order to determine present day costs for different types of roof systems, their annual maintenance and estimated service lives. Please note that the bold Present Value cost represents the most economical present day values of all expenditures including initial costs of roof replacement, future replacements and continued maintenance for the anticipated service life. Estimated service lives are predicated on a pro-active continuing maintenance program.

Middlebury Town Hall	Roof A Asphalt Shingle	Roof B Synthetic Slate	Roof C Natural Slate
First Cost	5,190 sf x \$20= \$103,800	5,190 sf x \$26= \$134,940	5,190 sf x \$32= \$166,080
Annual Maintenance	\$500	\$1000	\$1000
Salvage Value	0	0	5500
Service Life (Using LCM Method of 80 years)	40	40	80
Interest Rate (inflation)	3%	3%	3%
Present Value	\$222,700	\$300,081	\$195,764



Shepardson Community Center	Roof A Asphalt Shingle	Roof B Synthetic Slate	Roof C Natural Slate
First Cost	12,430 sf x \$20= \$248,600	12,430 sf x \$26= \$323,180	12,430 sf x \$32= \$397,760
Annual Maintenance	\$500	\$1000	\$1000
Salvage Value	0	0	\$5500
Service Life (Using LCM Method of 80 years)	40	40	80
Interest Rate (inflation)	3%	3%	3%
Present Value	\$512,300	\$676,561	\$427,444

At both the Town Hall and Shepardson Community Center, it appears that the natural slate roof replacement solution is the more economical choice with the service life of the natural slate system being the defining variable. In Gale's experience, natural slate roofing typically outlasts synthetic slate by approximately double and therefore would be the most economical choice using the least common multiple (LCM) method of 80 years. In a period of 80 years the asphalt shingle roof would need to be replaced two (2) times, the synthetic slate roof would need to be replaced two (2) times, while the natural slate system would be replaced one (1) time.

Please note that the variables used in the economic calculations will be estimates and will vary from the actual first costs, which will be based on competitive contractor bids, maintenance required and fluctuations in the estimated inflation rate. The estimated life cycles will be affected by quality of initial installation and amount and type of continued maintenance. Changes in weather exposure, lack of maintenance and/or lower initial installation quality will affect the service life of a roof system.

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**Life Cycle Cost Analysis
Middlebury Town Hall and Shepardson Community Center**

Middlebury Town Hall

5,190 sf

	Asphalt Shingle	Synthetic Slate	Natural Slate
First Cost	\$103,800	\$134,940	\$166,080
Annual Maintenance	\$500	\$1,000	\$1,000
Salvage Value	\$0	\$0	\$0
Service Life: (Using LCM Method of 100 years)	40	40	80
Interest Rate (inflation)	3%	3%	3%
Present Value	\$222,700	\$300,081	\$195,764

Shepardson Community Center

12,430 sf

	Asphalt Shingle	Synthetic Slate	Natural Slate
First Cost	\$248,600	\$323,180	\$397,760
Annual Maintenance	\$500	\$1,000	\$1,000
Salvage Value	\$0	\$0	\$0
Service Life: (Using LCM Method of 100 years)	40	40	80
Interest Rate (inflation)	3%	3%	3%
Present Value	\$512,300	\$676,561	\$427,444

Roof Type Estimated Cost Per Square Foot

Asphalt Shingle	\$20	per sf
Synthetic Slate	\$26	per sf
Natural Slate	\$32	per sf

Calculations
Life Cycle Cost Analysis
Middlebury Town Hall and Shepardson Community Center

Formulas

PW =	$C_i R + O(P/A) - S(P/F)$
P/A =	$((1+i)^n - 1) / (i(1+i)^n) \quad i \neq 0$
P/F =	$1 / (1+i)^n$
C_i =	AC_{sf}

Variables

Asphalt Shingle		Synthetic Slate		Natural Slate	
C_{sf}	\$20	C_{sf}	\$26	C_{sf}	\$32
R	2	R	2	R	1
O	\$500	O	\$1,000	O	\$1,000
S	\$0	S	\$0	S	\$5,500

i	3%	n	80
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Middlebury Town Hall	5,190 sf
Shepardson Community Center	12,430 sf

Calculations

P/A	30.20076345
P/F	0.09398

Middlebury Town Hall

Asphalt Shingle		Synthetic Slate		Natural Slate	
C_i	\$103,800	C_i	\$134,940	C_i	\$166,080
PW	\$222,700	PW	\$300,081	PW	\$195,764

Shepardson Community Center

Asphalt Shingle		Synthetic Slate		Natural Slate	
C_i	\$248,600	C_i	\$323,180	C_i	\$397,760
PW	\$512,300	PW	\$676,561	PW	\$427,444

Calculations
Life Cycle Cost Analysis
Middlebury Town Hall and Shepardson Community Center

<u>Key</u>			
PW	Present Worth, \$	*P/A	This equation allows the calculation of an equivalent uniform annual series which begins at the end of year 1 and extends for n years at an interest rate i.
C_i	Initial Cost, \$		
C_{sf}	Cost per square foot, \$		
O	Annual Operating Cost, \$		
P/A	Uniform-series Present-worth Factor*		
S	Salvage Value, \$		
P/F	Single-payment Present-worth Factor*	*P/F	This equation allows the calculation of a given future amount after n years at interest rate i
A	Area of roof, sf		
R	Replacement Rate- based on LCM of 100 years		
i	Interest Rate (Inflation), %		
n	Time, years		

References
 Life Cycle Cost Analysis
 Middlebury Town Hall and Shepardson Community Center

PAYMENTS

n	i = 3%		i = 4%	
	Single	Uniform-Series	Single	Uniform-Series
	Present Worth: P/F	Present Worth: P/A	Present Worth: P/F	Present Worth: P/A
1	0.9709	0.9709	0.9615	0.9615
2	0.9426	1.9135	0.9246	1.8861
3	0.9151	2.8286	0.8890	2.7751
4	0.8885	3.7171	0.8548	3.6299
5	0.8626	4.5797	0.8219	4.4518
6	0.8375	5.4172	0.7903	5.2421
7	0.8131	6.2303	0.7599	6.0021
8	0.7894	7.0197	0.7307	6.7327
9	0.7664	7.7861	0.7026	7.4353
10	0.7441	8.5302	0.6756	8.1109
11	0.7224	9.2526	0.6496	8.7605
12	0.7014	9.9540	0.6246	9.3851
13	0.6810	10.6350	0.6006	9.9856
14	0.6611	11.2961	0.5775	10.5631
15	0.6419	11.9379	0.5553	11.1184
16	0.6232	12.5611	0.5339	11.6523
17	0.6050	13.1661	0.5134	12.1657
18	0.5874	13.7535	0.4936	12.6593
19	0.5703	14.3238	0.4746	13.1339
20	0.5537	14.8775	0.4564	13.5903
21	0.5375	15.4150	0.4388	14.0292
22	0.5219	15.9369	0.4220	14.4511
23	0.5067	16.4436	0.4057	14.8568
24	0.4919	16.9355	0.3901	15.2470
25	0.4776	17.4131	0.3751	15.6221
26	0.4637	17.8768	0.3607	15.9828
27	0.4502	18.3270	0.3468	16.3296
28	0.4371	18.7641	0.3335	16.6631
29	0.4243	19.1885	0.3207	16.9837
30	0.4120	19.6004	0.3083	17.2920
31	0.4000	20.0004	0.2965	17.5885
32	0.3883	20.3888	0.2851	17.8736
33	0.3770	20.7658	0.2741	18.1476
34	0.3660	21.1318	0.2636	18.4112
35	0.3554	21.4872	0.2534	18.6646
36	0.3450	21.8323	0.2437	18.9083
37	0.3350	22.1672	0.2343	19.1426
38	0.3252	22.4925	0.2253	19.3679
39	0.3158	22.8082	0.2166	19.5845

References
Life Cycle Cost Analysis
Middlebury Town Hall and Shepardson Community Center

40	0.3066	23.1148	0.2083	19.7928
45	0.2644	24.5187	0.1712	20.7200
50	0.2281	25.7298	0.1407	21.4822
55	0.1968	26.7744	0.1157	22.1086
60	0.1697	27.6756	0.0951	22.6235
65	0.1464	28.4529	0.0781	23.0467
70	0.1263	29.1234	0.0642	23.3945
75	0.1089	29.7018	0.0528	23.6804
80	0.0940	30.2008	0.0434	23.9154
84	0.0835	30.5501	0.0371	24.0729
85	0.0811	30.6312	0.0357	24.1085
90	0.0699	31.0024	0.0293	24.2673
96	0.0586	31.3812	0.0232	24.4209
100	0.0520	31.5989	0.0198	24.5050
108	0.0411	31.9642	0.0145	24.6383
120	0.0288	32.3730	0.0090	24.7741
