

**TOWN OF CARLISLE
BOARD OF SELECTMEN**

AGENDA*

TIME	PURPOSE
7:00p.m.	Community Input
7:05p.m.	1. Interviews with Interested citizens re: Dog Committee
7:30p.m.	2. FY17 Tax Classification Hearing
7:45p.m.	3. FY16 Financial Statements/ Audit Committee <ul style="list-style-type: none">• Executive Session re: Ch.30A, s. 21 (4), Security Devices
8:15p.m.	4. Approval of Procedure for Delinquent Taxpayers
8:30p.m.	5. FY17 Board of Selectmen Goals Discussion
9:00p.m.	6. Action Items from previous meetings
9:15p.m.	7. Municipal Facilities/Town Building Committee charges
9:30p.m.	8. Town Administrator's Report
9:40p.m.	Appointments/Resignations Agricultural Commission - Olek Lorenc
9:45p.m.	Liaison Reports
9:55p.m.	Minutes
10:00p.m.	Adjournment

Place: Clark Room, Carlisle Town Hall

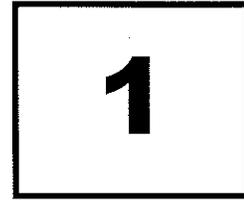
Date: Wednesday, November 9, 2016

Time: 7:00 p.m.

*The meeting agenda lists all topics reasonably anticipated by the Chairman at the time of posting. Agenda times are approximate and items may be taken up out of order to facilitate the use of time.



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016



Dog Control Subcommittee - Appointments

Requested by: Nathan Brown, chair

Action Sought: 11/9/16

Proposed Motion(s)

MOVE that the Board of Selectmen vote to appoint _____ to be the Citizen- a- large/ dog owner representative on the Dog Control Subcommittee for an indefinite term.

Additional Information

Attached is the Dog Control Subcommittee charge along with the updated town board control sheet.

To date, the board has received three (3) requests from the community to be appointed to this committee from David Ziehler (136 Acton St) , Susan Provenzano (80 Mill Pond Ln) and Naomi Oreskes (112 Johnson Rd) and no requests from non-dog owners.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>

Name: Dog Control Subcommittee

Appointing Authority: Board of Selectmen

Number of Members: 8

Purpose: To evaluate the need for action concerning dog related issues. The Subcommittee will evaluate whether the Town should amend its current bylaws, adopt new bylaws, or take no action. The main areas to be evaluated are

- 1) Public Safety – the Town of Carlisle does not currently have a leash law and this should be evaluated. Information on incidents should be collected through open meetings with the public as well as statistics collected from Carlisle Police Department, Board of Health, Conservation Commission and the Dog Officers. Thorough evaluation of leash laws in surrounding towns should be evaluated and their impacts should be determined.
- 2) Animal Waste – The Town of Carlisle currently has a bylaw pertaining to the non-removal of animal waste from private property, it does not necessarily pertain to Town owned land. The Committee should determine if this bylaw is adequate and if it is truly enforceable and the need for a bylaw on Town owned land as well.
- 3) Dog Licensing – Based on numbers from the Clerk’s Office there are a significant number of unregistered/unlicensed dogs in Carlisle. The committee should investigate registration requirements and determine possible enforcement actions for owners who do not register their animals.
- 4) Prolonged Barking - The Town of Carlisle currently has a bylaw pertaining to prolonged barking. Is the current bylaw adequate and enforceable? Review the number of registered complaints and consult with the Dog Officer regarding effectiveness.
- 5) Authority of Dog Officer – Evaluate the current authority the dog officer has and determine if it is adequate or should, and can be, expanded to include enforcement.

The subcommittee should include 2 members from the community, one dog owner and one non-dog owner. The subcommittee will also include one member designated to represent the Board of Selectmen, one member designated to represent the Board of Health, one member designated to represent the Recreation, one member designated to represent the Conservation Commission, one of the Town Dog Officers, and a member of the Carlisle Police Department (or significant input from CPD on enforcement potential)

If the Subcommittee determines that it would be in the best interests of the Town to adopt bylaw changes, the Subcommittee will be responsible for drafting a proposed bylaw or bylaw change to address the issue. The Subcommittee should also consider whether the bylaw changes should apply to all Town owned land or if certain Town parcels should be excluded. Town owned land includes public ways as well as parcels of land subject to the jurisdiction of the Board of Selectmen, Conservation Commission, School, Recreation, and land governed by other Town departments.

Dog Control Subcommittee

To evaluate the need for action concerning dog related issues. The Subcommittee will evaluate whether the Town should amend its current bylaws, adopt new bylaws, or take no action. The main areas to be evaluated are 1.) Public Safety – the Town of Carlisle does not currently have a leash law and this should be evaluated. Information on incidents should be collected through open meetings with the public as well as statistics collected from Carlisle Police Department, Board of Health, Conservation Commission and the Dog Officers. Thorough evaluation of leash laws in surrounding towns should be evaluated and their impacts should be determined. 2.) Animal Waste – The Town of Carlisle currently has a bylaw pertaining to the non-removal of animal waste from private property, it does not necessarily pertain to Town owned land. The Committee should determine if this bylaw is adequate and if it is truly enforceable and the need for a bylaw on Town owned land as well. 3.) Dog Licensing – Based on numbers from the Clerk's Office there are a significant number of unregistered/unlicensed dogs in Carlisle. The committee should investigate registration requirements and determine possible enforcement actions for owners who do not register their animals. 4.) Prolonged Barking - The Town of Carlisle currently has a bylaw pertaining to prolonged barking. Is the current bylaw adequate and enforceable? Review the number of registered complaints and consult with the Dog Officer regarding effectiveness. 5.) Authority of Dog Officer – Evaluate the current authority the dog officer has and determine if it is adequate or should, and can be, expanded to include enforcement.

The subcommittee should include 2 members from the community, one dog owner and one non-dog owner. The subcommittee will also include one member designated to represent the Board of Selectmen, one member designated to represent the Board of Health, one member designated to represent the Recreation, one member designated to represent the Conservation Commission, one of the Town Dog Officers, and a member of the Carlisle Police Department (or significant input from CPD on enforcement potential)

Members:

	<i>Name:</i>	<i>Address:</i>	<i>Representative</i>
1	Todd Brady	211 Cross Street	Board of Health
2	Dan Wells	172 Woodridge Rd	Conservation Commission
3	Drew McMorrow	301 Concord Street	Recreation Commission
4			Citizen at Large/ Dog Owner
5			Citizen at Large/Non-Dog Owner
6	Matt Svatek/Larry Sorli	N/A	Dog Officer
7	Lt. Leo Crowe	N/A	Police Department
8	Luke Ascolillo	86 Craigie Circle	Board of Selectmen

Positions to be filled:

Two Citizen-at-large positions, one dog owner and one non-dog owner.

Applicants:

	<i>Name:</i>	<i>Address:</i>	<i>Dog Owner/Non Dog Owner</i>
1	David Ziehler	136 Acton Street	Dog Owner
2	Susan Provenzano	80 Mill Road	Dog Owner
3	Naomi Oreskes	112 Johnson Road	Dog Owner

Jenn Gibbons

From: David <asfwt62@yahoo.com>
Sent: Monday, August 15, 2016 10:51 AM
To: tgoddard@carlisle.mec.edu
Subject: Dog issues working group

Mr Goddard,

My name is David Ziehler and I would like to be considered for the dog issues working group. I have lived in Carlisle for over 50 years and am also a life long dog owner. Recently dog issues have become a emotional issues to a lot of people who live in Carlisle on both sides of the issue.

By being part of the working group I hope to be part of a reasonable solution that befits all residents of Carlisle.

Respectfully submitted,

David Ziehler
136 Acton St
978-505-7334

Jenn Gibbons

From: Sukey Provenzano <slprovenzano@comcast.net>
Sent: Monday, August 15, 2016 9:51 PM
To: Tim Goddard
Subject: Dog Subcommittee

Hello Mr. Goddard,

Having just gotten caught up on my Mosquito reading after being on vacation I am wondering if there still is an opening on the dog issue subcommittee. If so I am interested in becoming a member of that subcommittee. I am the owner of three corgi dogs, but am also an avid horseback rider. While I feel a leash law is not necessary I do feel that steps need to be made to made owners more responsible of their dogs and I think there are numerous ways to achieve this. So if there still is a spot on the committee I would appreciate you considering me for that spot.

Thank you,

Susan Provenzano
80 Mill Pond Lane

Jenn Gibbons

From: Naomi Oresked <naoreskes@icloud.com>
Sent: Saturday, July 30, 2016 11:44 AM
To: tgoddard@carlisle.mec.edu
Cc: Suzan Baldoumas; Launa Zimmaro
Subject: dogs in Carlisle

Dear Mr. Goddard,

I would like to volunteer to participate in the discussion of dogs in Carlisle.

I own a 1-year old miniature Australian shepherd, rescued from a shelter. Taking walks with my dog, off leash, is a large and valued part of my life in Carlisle. In fact, when my husband, Ken Belitz, and I moved here from California three years ago, we chose Carlisle over neighboring towns explicitly because of the abundance of conservation land and trails, and the fact that dogs were allowed off leash under voice control, something I actively trained my dog to be before we ever moved here.

At the same time, I do appreciate that some people have legitimate concerns, in particular, that many owners are not cleaning up after their dogs at the Cranberry bogs. I met Judy Hodges there sometime ago, and we had a chat about this, and I agree that she is right to be concerned. I would be willing to help brainstorm solutions to this problem, such as, for example, helping to organize a yearly or seasonal volunteer clean up.

So, in short, I am on the "dog owner" side but I heartedly agree that dogs should be well behaved and their owners responsible.

Please let me know if I can be of assistance

Yours truly,

Naomi Oreskes
112 Johnson Road
Carlisle, MA 01741

PS I am copying two neighbors who are also dog owners in Carlisle, with whom I have discussed this issue.



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016

2

FY2017 Tax Classification Hearing

Requested by: Board of Assessors/ Assessor Melissa Stamp

Action Sought: 11/9/16

Proposed Motion(s)

I move that, for the purpose of setting the fiscal 2017 property tax rate, that the Board approve a residential factor of one, thereby establishing a uniform tax rate with no differences between commercial and residential property tax rates, and that the Board **not** grant an open space discount, **not** adopt a residential exemption, and **not** to adopt a small commercial exemption for fiscal year 2017. Further, we acknowledge that the Board of Assessors has informed the Board of Selectmen that the excess levy capacity for fiscal year 2017 is \$2,104,842.93

Additional Information

For your review please see attached shift tax rate percentage options prepared by Assessor Melissa Stamp along with a copy of the hearing notice published in the Mosquito on 10/29/2016.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>



**TOWN OF CARLISLE
BOARD OF SELECTMEN**

**LEGAL NOTICE
NOTICE OF A PUBLIC HEARING**

In accordance with the provisions of M.G.L. Ch. 40 Sec. 56, the Board of Selectmen will hold a public hearing on Wednesday, November 9, 2016 at 7:30 p.m. in the Town Hall Clark Room, 66 Westford Street, Carlisle, MA 01741. Said hearing will be held to determine the percentages of the local tax levy to be borne by each class of real and personal property for the fiscal year 2017. The Board of Assessors will be present at the hearing to provide all information and data relevant to making such determination and the fiscal effect of the available alternatives.

Nathan Brown, Chairman
Board of Selectmen

Publish in: Carlisle Mosquito:
Publish dates: October 28, 2016
Post: Carlisle Town Hall: October 17, 2016

**The Board of Assessors Recommendation to the Board of Selectmen
Tax Classification Hearing
November 9, 2016**

The Carlisle Board of Assessors recommends that the Selectmen vote for a residential factor of one for fiscal year 2017, meaning that there will be uniform tax rate with no differential between commercial, industrial, and residential property tax rates for fiscal year 2017.

The Board also recommends that the selectmen vote **not** to grant an open space discount, vote **not** to adopt a residential exemption and vote **not** to adopt a small commercial exemption.

As a result of the FY' 2017 rate setting process, the excess levy capacity has been calculated to be \$2,104,842.93

Proposed Motion by the Board of Selectmen

I move that, for the purpose of setting the fiscal 2017 property tax rate, that the Board approve a residential factor of one, thereby establishing a uniform tax rate with no differences between commercial and residential property tax rates, and that the Board **not** grant an open space discount, **not** adopt a residential exemption, and **not** to adopt a small commercial exemption for fiscal year 2017. Further, we acknowledge that the Board of Assessors has informed the Board of Selectmen that the excess levy capacity for fiscal year 2017 is \$2,104,842.93

WHAT IF.....SCENARIO WORKSHEET

Levy 25,666,466
 Single TaxRate 17.62

Shift Range 1 1.5
 Shift Increment % 10
 Max Shift Allowed 1.5

CIP Shift	Res Factor	Res SP	OS SP	Comm SP	Ind SP	PP SP	Total SP	Levy Amounts					Res ET	Comm ET	Ind ET	PP ET
								Res LA	Comm LA	Ind LA	PP LA	Total LA				
1.0000	100.0000	98.1982	0.0000	0.5305	0.0808	1.1905	100.0000	25,204,010	136,149	20,746	305,562	25,666,466	17.62	17.62	17.62	17.62
1.1000	99.8165	98.0180	0.0000	0.5835	0.0889	1.3096	100.0000	25,157,764	149,764	22,820	336,118	25,666,466	17.59	19.38	19.38	19.38
1.2000	99.6330	97.8378	0.0000	0.6365	0.0970	1.4286	100.0000	25,111,518	163,379	24,895	366,674	25,666,466	17.56	21.14	21.14	21.14
1.3000	99.4495	97.6577	0.0000	0.6896	0.1051	1.5477	100.0000	25,065,273	176,994	26,970	397,230	25,666,466	17.52	22.91	22.91	22.91
1.4000	99.2661	97.4775	0.0000	0.7426	0.1132	1.6667	100.0000	25,019,027	190,609	29,044	427,786	25,666,466	17.49	24.67	24.67	24.67
1.5000	99.0826	97.2973	0.0000	0.7957	0.1212	1.7858	100.0000	24,972,781	204,223	31,119	458,343	25,666,466	17.46	26.43	26.43	26.43



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016

3

FY2016 Financial Statement/ Audit Report

Requested by: Audit Committee & Finance Director

Action Sought: 11/9/16

Proposed Motion(s)

DISCUSSION

Executive Session Motion:

Motion: "I move that the Board enter into executive session pursuant to MGL Ch. 30A, §21(a) paragraph (4) to discuss strategy with respect to security devices as an open meeting may have a detrimental effect on the Town and that afterwards the Board will return to open session."

Additional Information

Attached are copies of the Town's audited financial statements and management letter for the fiscal year ending June 30, 2016. The Audit Committee, Town Accountant Priscilla Dumka and Finance Director Kerry Colburn-Dion will be present on Wednesday night to answer any questions.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>

TOWN OF CARLISLE
BASIC FINANCIAL STATEMENTS AND
REQUIRED SUPPLEMENTARY INFORMATION
YEAR ENDED JUNE 30, 2016

**TOWN OF CARLISLE, MASSACHUSETTS
TABLE OF CONTENTS
YEAR ENDED JUNE 30, 2016**

INDEPENDENT AUDITORS' REPORT	1
MANAGEMENT'S DISCUSSION AND ANALYSIS	3
BASIC FINANCIAL STATEMENTS	15
STATEMENT OF NET POSITION	15
STATEMENT OF ACTIVITIES	16
GOVERNMENTAL FUNDS – BALANCE SHEET	17
GOVERNMENTAL FUNDS – STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCES	19
RECONCILIATION OF THE GOVERNMENTAL FUNDS BALANCE SHEET TOTAL FUND BALANCES TO THE STATEMENT OF NET POSITION	21
RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES	22
FIDUCIARY FUNDS – STATEMENT OF FIDUCIARY NET POSITION	23
FIDUCIARY FUNDS – STATEMENT OF CHANGES IN FIDUCIARY NET POSITION	24
NOTES TO BASIC FINANCIAL STATEMENTS	25
REQUIRED SUPPLEMENTARY INFORMATION	57
GENERAL FUND – SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE – BUDGET AND ACTUAL	57
COMMUNITY PRESERVATION FUND – SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE – BUDGET AND ACTUAL	59
PENSION PLAN SCHEDULES	61
SCHEDULE OF THE TOWN'S PROPORTIONATE SHARE OF THE NET PENSION LIABILITY	61
SCHEDULE OF TOWN CONTRIBUTIONS	61
SCHEDULE OF THE TOWN'S PROPORTIONATE SHARE OF THE NET PENSION LIABILITY – MASSACHUSETTS TEACHERS' RETIREMENT SYSTEM	62
SCHEDULE OF THE TOWN'S CONTRIBUTIONS – MASSACHUSETTS TEACHERS' RETIREMENT SYSTEM	62
OTHER POSTEMPLOYMENT BENEFITS SCHEDULE	63
SCHEDULE OF FUNDING PROGRESS	63
NOTES TO REQUIRED SUPPLEMENTARY INFORMATION	64

PER FIRM POLICY, THE AUDITORS' OPINION HAS BEEN EXCLUDED FROM THIS DRAFT.

WE EXPECT THE OPINION TO BE CONSISTENT WITH THE PRIOR YEAR.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

As management of the Town of Carlisle, Massachusetts (Town), we offer readers of these financial statements this narrative overview and analysis of the Town's financial activities for the fiscal year ended June 30, 2016.

FINANCIAL HIGHLIGHTS

- The assets and deferred outflows of resources of the Town exceeded its liabilities and deferred inflows of resources at the close of the most recent fiscal year by \$21,701,369 (net position).
- The Town's total net position decreased by \$885,914, primarily due to the change in the net pension liability.
- At the end of the fiscal year, unassigned fund balance for the general fund totaled \$3,971,172, or 14.5%, of total general fund revenues and other financing sources of \$27,340,679.
- The Town's total bonded debt outstanding was \$14,570,191 at June 30, 2016, a decrease of \$1,034,848 during the fiscal year. No long-term debt was issued in fiscal year 2016.

OVERVIEW OF THE BASIC FINANCIAL STATEMENTS

This discussion and analysis is intended to serve as an introduction to the *basic financial statements*, which consists of the following three components:

1. Government-wide financial statements
2. Fund financial statements
3. Notes to the basic financial statements

This report also contains required supplementary information in addition to the basic financial statements.

Government-Wide Financial Statements

The government-wide financial statements are designed to provide readers with a broad overview of the Town's finances, in a manner similar to a private-sector business.

The **statement of net position** presents information on all of the Town's non-fiduciary assets, liabilities and deferred inflows/outflows of resources, with the difference reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Town is improving or deteriorating.

The **statement of activities** presents information showing how the government's net position changed during the most recent fiscal year. All changes in net position are reported as soon as the underlying event giving rise to the change occurs, regardless of the timing of related cash flows. Thus, revenues and expenses are reported in this statement for some items that will only result in cash flows in future fiscal periods (e.g., uncollected taxes, earned but unused vacation leave, etc.).

The government-wide financial statements present functions of the Town that are principally supported by taxes and intergovernmental revenues (governmental activities). Governmental activities include general government, public safety, education, public works, health and human services, culture and recreation, and debt service interest.

The government-wide financial statements can be found on pages 15-16 of this report.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

Fund Financial Statements

A fund is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. The Town, like other state and local governments, uses fund accounting to ensure and demonstrate compliance with finance-related legal requirements. All of the funds can be divided into the following categories and are described below:

1. Governmental funds
2. Fiduciary funds

Governmental Funds

Governmental funds are used to account for essentially the same functions reported as governmental activities in the government-wide financial statements. However, unlike the government-wide financial statements, governmental funds financial statements focus on near-term inflows and outflows of expendable resources, as well as on balances of expendable resources available at the end of the fiscal year. Such information may be useful in evaluating a government's near-term financing requirements.

Because the focus of governmental funds is narrower than that of the government-wide financial statements, it is useful to compare the information presented for governmental funds with similar information presented for governmental activities in the government-wide financial statements. By doing so, readers may better understand the long-term effect of the government's near-term financing decisions. Both the governmental funds balance sheet and the governmental funds statement of revenues, expenditures, and changes in fund balances provide a reconciliation to facilitate this comparison between governmental funds and governmental activities.

The Town maintains 17 individual governmental funds. Information is presented separately in the governmental funds balance sheet and in the governmental funds statement of revenues, expenditures, and changes in fund balances for the general, community preservation (special revenue), and land acquisition (capital projects) funds, each of which are considered to be major funds. Data from the other 14 governmental funds are combined into a single, aggregated presentation titled *nonmajor governmental funds*.

The basic governmental funds financial statements can be found on pages 17-22 of this report.

Fiduciary Funds

Fiduciary funds are used to account for resources held for the benefit of parties outside the government. Fiduciary funds are not reflected in the government-wide financial statements because the resources of those funds are not available to support the Town's programs. The accounting used for fiduciary funds is similar to that used for the government-wide financial statements.

The fiduciary funds provide separate information for private-purpose trust funds and agency funds, and are combined into a single, aggregate presentation in the fiduciary fund financial statements under the captions "private purpose trust funds" and "agency funds", respectively.

The basic fiduciary fund financial statements can be found on pages 23-24 of this report.

Notes to the Basic Financial Statements

The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. The notes to the financial statements are on pages 25-55.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

Required Supplementary Information

In addition to the basic financial statements and accompanying notes, this report also presents certain required supplementary information. Presented in this information is the budget comparison for the general fund and community preservation fund and certain pension and other post-employment benefits information, which can be found on pages 57-64 of this report.

GOVERNMENT-WIDE FINANCIAL ANALYSIS

The following tables present current and prior year data on the government-wide financial statements.

Net Position

As noted earlier, net position may serve over time as a useful indicator of a government's financial position. The Town's assets and deferred outflows of resources exceeded liabilities and deferred inflows of resources by \$21,701,369 at the close of the fiscal year and are summarized as follows:

	<i>Governmental Activities</i>	
	<u>2016</u>	<u>2015</u>
Assets		
Current assets.....	\$ 12,016,168	\$ 12,730,398
Noncurrent assets (excluding capital assets).....	200,404	102,976
Capital assets (net).....	<u>41,450,307</u>	<u>42,193,222</u>
Total assets.....	<u>53,666,879</u>	<u>55,026,596</u>
Deferred Outflows of Resources.....	<u>772,828</u>	<u>26,964</u>
Liabilities		
Current liabilities (excluding debt).....	1,812,150	2,419,074
Noncurrent liabilities (excluding debt).....	15,970,997	14,002,164
Current debt - short-term notes payable.....	385,000	440,000
Current debt - long-term bonds payable.....	1,063,102	1,480,039
Noncurrent debt.....	<u>13,507,089</u>	<u>14,125,000</u>
Total liabilities.....	<u>32,738,338</u>	<u>32,466,277</u>
Net Position		
Net investment in capital assets.....	26,726,328	26,379,640
Restricted.....	5,156,602	4,831,212
Unrestricted.....	<u>(10,181,561)</u>	<u>(8,623,569)</u>
Total net position.....	<u>\$ 21,701,369</u>	<u>\$ 22,587,283</u>

The largest portion of the Town's net position (\$26,726,328) reflects its investment in capital assets (e.g., land, land improvements, buildings, machinery and equipment and infrastructure), less any related outstanding debt used to acquire those assets. These capital assets are used to provide services to citizens; consequently, these assets are not available for future spending. Although the investment in its capital assets is reported net of related debt, it should be noted that the resources needed to repay this debt must be provided from other sources, since the capital assets themselves cannot be used to liquidate these liabilities.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

An additional portion of the Town's net position (23.8% or \$5,156,602) represents resources that are subject to external restrictions on how they may be used.

The Town has no unrestricted net position available for the support of governmental activities. Such resources have been consumed with the recognition of the net pension and other postemployment benefit liabilities.

Changes in Net Position

The Town's total net position decreased by \$885,914, compared to an increase of \$492,092 in the prior fiscal year. These amounts are summarized as follows:

	<i>Governmental Activities</i>	
Revenues	<u>2016</u>	<u>2015</u>
<i>Program Revenues:</i>		
Charges for services.....	\$ 1,176,371	\$ 1,160,612
Operating grants and contributions.....	3,549,152	3,024,940
Capital grants and contributions.....	512,132	350,997
<i>General Revenues:</i>		
Real estate and personal property taxes.....	24,697,956	24,143,511
Motor vehicle excise taxes.....	957,482	900,749
Penalties and interest on taxes.....	57,329	41,793
Payments in lieu of taxes.....	7,303	14,367
Community preservation surcharges.....	420,033	399,148
Grants and contributions not restricted to specific programs.....	488,355	481,582
Unrestricted investment income.....	5,492	18,767
Total revenues.....	<u>31,871,605</u>	<u>30,536,466</u>
Expenses		
General government.....	2,516,754	2,107,384
Public safety.....	3,368,393	3,111,413
Education.....	22,940,405	21,131,867
Public works.....	1,701,816	1,796,604
Health and human services.....	679,701	534,367
Culture and recreation.....	1,110,432	894,083
Debt service - interest.....	440,018	468,656
Total expenses.....	<u>32,757,519</u>	<u>30,044,374</u>
Change in net position.....	(885,914)	492,092
Net position - beginning of year	<u>22,587,283</u>	<u>22,095,191</u>
Net position - end of year.....	<u>\$ 21,701,369</u>	<u>\$ 22,587,283</u>

Governmental activities decreased the Town's net position by \$885,914. The key element of this change is an increase in the net pension liability of approximately \$928,000.

Fund Financial Statement Analysis

As noted earlier, the Town uses fund accounting to ensure and demonstrate compliance with finance-related legal requirements.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

Governmental funds

The focus of the governmental funds is to provide information on near-term inflows, outflows, and balances of expendable resources. Such information is useful in assessing the Town's financing requirements.

At the end of the current fiscal year, the governmental funds reported combined ending fund balances totaling \$9,914,331, an increase of \$91,785 in comparison with the prior year. Unassigned fund balance totaled \$3,586,172. The remainder of governmental fund balance includes the following constraints (as detailed in footnote 12 on page 47) for:

- Nonspendable \$234,346
- Restricted \$5,110,552
- Committed \$938,038
- Assigned \$45,223

The general fund is the chief operating fund of the Town. At the end of the current fiscal year, unassigned fund balance of the general fund totaled \$3,971,172, while total fund balance was \$5,826,159. As a measure of the general fund's liquidity, it may be useful to compare both unassigned fund balance and total fund balance to total general fund revenues and other financing sources. Unassigned fund balance represents 14.5% of total general fund revenues and other financing sources, while total fund balance represents 21.3% of that total.

The fund balance of the Town's general fund decreased by \$117,154 during the current fiscal year on a GAAP-basis of accounting. On a budgetary basis of accounting, the Town recognized a positive budget to actual variance of approximately \$600,000.

Financial highlights of the Town's other major governmental funds are as follows:

The fund balance of the community preservation fund (special revenue) increased by \$151,422 during the current fiscal year. The fund recognized \$422,755 in surcharges, liens and penalties and interest, \$118,424 in intergovernmental revenues and \$1,653 of investment income. Expenditures of \$391,410 were incurred during the fiscal year.

The land acquisition fund (capital project) increased by \$15,000 from the prior year. This fund has a negative unassigned fund balance of \$385,000 as of June 30, 2016 due to an outstanding BAN.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

General Fund Budgetary Highlights

The original general fund budgeted expenditures and transfers out totaled \$28,019,115. During the year, supplemental appropriations totaling \$63,663 were authorized. The following table summarizes the increase:

Purpose of Increase	Amount	Funding Source
General government.....	\$ 72,753	Unassigned fund balance
Transfers out to other funds.....	55,000	Unassigned fund balance
State and county charges.....	48,662	Unassigned fund balance
Public safety.....	10,000	Unassigned fund balance
Property and liability insurance.....	10,000	Unassigned fund balance
Public works.....	8,248	Unassigned fund balance
Education.....	(10,000)	Unassigned fund balance
Debt principal.....	(55,000)	Unassigned fund balance
Employee benefits.....	(76,000)	Unassigned fund balance
Total net increase.....	<u>\$ 63,663</u>	

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

General Fund Trends

	2016	2015	2014	2013	2012
General Fund - Operating Component:					
Total fund balance.....	\$ 4,663,109	\$ 4,770,219	\$ 4,296,869	\$ 3,871,764	\$ 2,770,959
Less restrictions for:					
Debt service (a).....	405,191	445,040	486,632	551,514	-
OPEB (b).....	466,535	253,638	-	-	-
Less commitments for:					
Subsequent year's expenditures (c).....	520,000	890,000	352,355	390,000	141,000
Continuing appropriations.....	418,038	436,491	378,291	319,019	421,196
Less assignments for:					
Encumbrances.....	45,223	39,809	63,504	55,095	51,796
Unassigned fund balance.....	2,808,122	2,705,241	3,016,087	2,556,136	2,156,967
General Fund - Stabilization Component:					
Total fund balance (unassigned).....	1,163,050	1,173,094	1,185,675	1,123,409	1,061,051
Total general fund balance.....	\$ 5,826,159	\$ 5,943,313	\$ 5,482,544	\$ 4,995,173	\$ 3,832,010
Total general fund revenue & other financing sources (ofs).....	\$ 27,340,679	\$ 26,641,445	\$ 27,395,298	\$ 26,319,270	\$ 25,041,207
Total general fund (operating) unassigned fund balance as % of total general fund revenues and ofs.....	10.2%	10.2%	11.0%	9.7%	8.6%
Total general fund (stabilization) unassigned fund balance as % of total general fund revenues and ofs.....	4.3%	4.4%	4.3%	4.4%	4.2%
Total general fund unassigned fund balance as % of total general fund revenues and ofs.....	14.5%	14.6%	15.3%	14.0%	12.9%

- (a) The fund balance restriction for debt service represents amounts accumulated for the future annual repayments of debt.
- (b) The fund balance restriction for OPEB represents amounts accumulated for other postemployment benefits.
- (c) Net changes in the commitment for subsequent year's expenditures are attributable to net changes in the amount of fund balance that the Town votes to fund a portion of the subsequent fiscal year's operating budget.

CAPITAL ASSET AND DEBT ADMINISTRATION

Capital Assets

The Town's investment in capital assets for its governmental activities at the end of the fiscal year totaled \$41,450,307 (net of accumulated depreciation). This investment in capital assets includes land, land improvements, buildings, machinery and equipment, and infrastructure. The total decrease in the investment in capital assets for the current fiscal year totaled \$742,915, resulting from depreciation expense in excess of capital asset additions.

Major capital asset events that occurred during the current fiscal year include the following:

- Chapter 90 roadway construction (\$382,653)
- Dump truck – department of public works (\$133,504)
- Vehicles – public safety (\$107,889)

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

The following table summarizes the Town's capital assets (net of accumulated depreciation):

	<u>2016</u>	<u>2015</u>
Land.....	\$ 9,718,798	\$ 9,718,798
Intangible assets.....	560,150	560,150
Construction in progress.....	-	13,168
Land improvements.....	152,543	155,259
Buildings.....	24,883,903	25,708,307
Machinery and equipment.....	1,296,143	1,342,593
Infrastructure.....	<u>4,838,770</u>	<u>4,694,947</u>
Total capital assets.....	<u>\$ 41,450,307</u>	<u>\$ 42,193,222</u>

Additional information on the Town's capital assets can be found in Note 6 of this report.

Long-Term Debt

At the end of the current fiscal year, total bonded debt outstanding was \$14,570,191, which is backed by the full faith and credit of the Town, and is summarized as follows:

	<u>2016</u>	<u>2015</u>
General obligation bonds.....	\$ 14,125,000	\$ 15,120,000
Massachusetts Water Pollution Abatement Trust (MWPAT) notes.....	<u>40,000</u>	<u>40,000</u>
Sub-total.....	14,165,000	15,160,000
Add: unamortized premium.....	<u>405,191</u>	<u>445,039</u>
Total bonds and notes and unamortized premiums.....	<u>\$ 14,570,191</u>	<u>\$ 15,605,039</u>

The Town's total bonded debt decreased \$1,034,848 during the current fiscal year. The Town received an Aa1 rating from Moody's Investor Service for its most recent issuance of long-term debt on November 15, 2012. This bond rating was an increase from the Town's previous issuance of long-term debt on March 15, 2010, which received an Aa2 rating from Moody's.

State statutes limit the amount of general obligation debt the Town may issue to 5% of its total assessed valuation. Based upon the equalized valuation dated July 20, 2016 by the Commissioner of Revenue, the current debt limit is \$75,859,280, which is significantly in excess of the Town's outstanding debt.

Additional information on the Town's long-term debt can be found in Note 10 of this report.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

ECONOMIC FACTORS AND NEXT YEAR'S BUDGETS AND RATES

The following factors were considered in preparing the Town's fiscal year 2017 budget:

- Anticipated fiscal year 2017 revenues and fund transfers (\$28,826,987) are expected to show an increase of 2.27% over fiscal year 2016 (\$28,188,524). Revenues from property taxes are expected to increase by 4.09%, which includes an increase in the excluded debt levy of \$58,644. For fiscal year 2017, State aid to cities and towns, local schools and regional school districts is expected to increase slightly as compared to the prior fiscal year. The Massachusetts Department of Revenue has published the fiscal year 2017 Cherry Sheet, showing that Carlisle should expect to receive a net of \$1,230,225 in state aid. This compares to \$1,194,975 estimated on the Cherry Sheet for fiscal 2016, an increase of \$35,250 (2.95%). Local receipts are expected to remain constant. To supplement the fiscal year 2017 budget items, the Town voted to use \$500,000 of Free Cash (\$100,000 contribution to the Town's OPEB trust, \$100,000 to offset the cost of capital appropriations, and \$300,000 to meet the appropriation for debt service).
- Free Cash represents amounts which are available for appropriation by Town Meeting each year. These amounts are certified annually in accordance with the provisions of G.L. Chapter 59, sec. 23 by the Massachusetts Department of Revenue. The calculation, and therefore the balance, differs materially from the fund balances set forth in these financial statements. The certified Free Cash balance as of July 1, 2016 was \$2,432,546 (\$2,389,686 at July 1, 2015).
- Fiscal year 2017 department appropriations provide for an increase of 2.88% as compared to fiscal year 2016. The budgets included cost-of-living increases and scheduled wage adjustments for non-contractual employees. All contractual obligations are funded for employees under contract. Increased costs for benefits, health insurance and retirement obligations for current and former employees are also provided. There are three collective bargaining units in Carlisle; the Carlisle Public School teachers are represented the Carlisle Teachers' Association, police officers are represented by the Massachusetts Coalition of Police Officers, Local 201, and communications (dispatchers) personnel are represented by the Massachusetts Coalition of Police Officers, Local 201A.
- The fiscal year 2017 budget provides for \$377,295 of continuing investment in the Town's assets, infrastructure, and on-going appropriations. These include a range of items for the local schools, police and fire departments, DPW and other bodies. The Town voted to fund these assets with \$277,295 from within the base property tax levy, and \$100,000 from free cash.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

- The fiscal year 2017 budget provides for payment of the budgetary assessment required by both the Concord-Carlisle Regional School District (CCRSD) and the Minuteman Regional School District (MMRSD) for operating expenses and debt service. In each case, the assessment is calculated based upon the percentage of Carlisle students to the total enrollment of the member communities. The assessment ratio in fiscal year 2016 for CCRSD was 26.29%, requiring an appropriation for operations and debt service of \$7,158,559 (\$5,905,074 for operations and \$1,253,485 for debt service). The assessment ratio for the fiscal year 2017 at CCRSD increased to 26.39%, resulting in an assessment for operations and debt service of \$7,451,285 (\$6,107,238 for operations and \$1,344,047 for debt service), approved by town meeting. The total appropriation has therefore increased 4.09% from fiscal 2016 to fiscal 2017 (3.42% for operations and 7.22% for debt service). The assessment ratio at CCRSD in the next few years is expected to decrease gradually, which will result in the Town bearing a smaller portion of the overall CCRSD budget for operations and debt service. Despite this, future assessments will require higher annual debt service costs, as the Region continues meet its debt obligations arising primarily from the building of the new high school.
- The MMRSD assessment for fiscal year 2017 decreased by \$52,726 (20.3%) as compared to fiscal 2016, to an assessment of \$173,559. The number of students attending MMRSD decreased from 7 attending in fiscal 2016 to 5 attending in fiscal 2017. Due to the provisions of the revised Minuteman Regional School District Agreement (see discussion below), the town's assessment will be based upon a four-year rolling average of student enrolled. As a result, for FY'17, the assessment for the year has been calculated based upon 8.5 students.
- To meet the total appropriations for the fiscal year 2017, no Proposition 2 ½ override was necessary. The total fiscal year 2017 budget, that is to be raised from taxes or provided through State aid, local receipts, etc., is expected to be \$28,826,987, an increase of 2.27% over fiscal year 2016.
- New growth, or the additional value of new construction or subdivisions, which is used to project new tax revenue, has remained relatively flat during the past two years. New growth for the twelve months ended June 30, 2015 amounted to \$17,470,909. The current estimate of new growth for the twelve months ended June 30, 2016 is estimated to be approximately \$15,000,000, and the current projection for new growth for the twelve months ending June 30, 2017 is \$15,000,000. New growth is derived from newly created building lots, from the construction of new homes, and renovations to existing properties.
- The Minuteman Regional School District (MMRSD), of which the Town has been a member, has been planning for a major renovation project of the campus located in Lexington. In order to more equitably allocate operating and debt service assessments among the members, revisions to the Minuteman Regional School District Agreement were proposed. Included in the revised agreement was a provision permitting any member community to withdraw from the district. At the February 9, 2016 Special Town Meeting, the Town of Carlisle voted to withdraw from the district, effective July 1, 2017. Should Carlisle students be enrolled at the regional school, as out-of-district pupils, the town would be required to pay a per pupil assessment determined by the Massachusetts Department of Secondary Education (DESE), as well as a possible facility fee. It is expected that future annual per pupil assessments will be lower as a non-member community.

**TOWN OF CARLISLE, MASSACHUSETTS
MANAGEMENT'S DISCUSSION AND ANALYSIS
JUNE 30, 2016**

- The Town reports the actuarial value of the Town's unfunded Other Post Retirement Benefits (OPEB) liability, principally health and life insurance coverage for the Town's retirees and their spouses. The actuarial analysis is required to be performed every two years. The most recent actuarial report, for the years ending June 30, 2016 and 2017, calculated the unfunded actuarial accrued liability at \$10,843,307 and \$11,764,202 respectively. Were the Town to begin funding this liability over the next thirty (30) years, the required contribution for fiscal years 2016 and 2017 would be \$1,216,371 and \$1,286,326, respectively. The Town reauthorized the establishment of an OPEB Trust fund at the April 2014 Annual Town Meeting, the purpose of which is to hold funds, if any, that are appropriated to meet the Town's unfunded OPEB liability. The OPEB Trust was established as of July 1, 2014. At the April 2014 Annual Town Meeting, the Town voted to begin partially funding these obligations by appropriating \$250,000 to the OPEB Trust for fiscal 2015 (\$100,000 from the tax levy and \$150,000 from Free Cash). At the April 2015 Annual Town Meeting, the Town voted to contribute an additional \$225,000 to the OPEB Trust for fiscal 2016 (\$125,000 from the tax levy and \$100,000 from Free Cash). At the April 2016 Annual Town Meeting, the Town voted to contribute an additional \$225,000 to the OPEB Trust for fiscal 2017. For fiscal 2018 and beyond, consideration will be given to how to continue to address the unfunded liability, and what, if any, level of future funding should be provided.

REQUESTS FOR INFORMATION

This financial report is designed to provide a general overview of the Town's finances for all those with an interest in its finances. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to the Finance Director, 66 Westford Street, Carlisle, Massachusetts 01741.

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**TOWN OF CARLISLE, MASSACHUSETTS
STATEMENT OF NET POSITION
JUNE 30, 2016**

	Primary Government
	Governmental Activities
ASSETS	
Current Assets:	
Cash and Cash Equivalents	\$ 6,917,593
Restricted Cash and Cash Equivalents	4,820,150
Receivables, Net of Allowance for Uncollectible Amounts:	
Real Estate and Personal Property Taxes	120,197
Tax Liens	23,865
Motor Vehicle Excise Taxes	19,701
Community Preservation Surcharges	2,916
Intergovernmental	107,549
Loans	4,197
Total Current Assets	12,016,168
Noncurrent Assets:	
Receivables, Net of Allowance for Uncollectible Amounts:	
Real Estate Tax Deferrals	69,653
Loans	43,329
Tax Foreclosures	87,422
Capital Assets not being Depreciated	10,278,948
Capital Assets, Net of Accumulated Depreciation	31,171,359
Total Noncurrent Assets	41,650,711
Total Assets	53,666,879
DEFERRED OUTFLOWS OF RESOURCES	
Deferred Outflows of Resources Related to Pension	772,828
LIABILITIES	
Current Liabilities:	
Warrants Payable	683,102
Accrued Payroll	748,733
Other Liabilities	211,371
Accrued Interest	67,843
Compensated Absences	101,101
Short-Term Notes Payable	385,000
Long-Term Bonds and Notes Payable	1,063,102
Total Current Liabilities	3,260,252
Noncurrent Liabilities:	
Net OPEB Obligation	6,829,892
Compensated Absences	228,350
Net Pension Liability	8,912,755
Long-Term Bonds and Notes Payable	13,507,089
Total Noncurrent Liabilities	29,478,086
Total Liabilities	32,738,338
NET POSITION	
Net Investment in Capital Assets	26,726,328
Restricted for:	
Community Preservation	1,736,321
Affordable Housing	204,304
Loans	47,526
Debt Service	405,191
OPEB	466,535
Permanent Funds:	
Expendable	479,765
Nonexpendable	186,820
Other Specific Purposes	1,635,140
Unrestricted	(10,181,561)
Total Net Position	\$ 21,701,369

See accompanying Notes to Basic Financial Statements.

**TOWN OF CARLISLE, MASSACHUSETTS
STATEMENT OF ACTIVITIES
FOR THE FISCAL YEAR ENDED JUNE 30, 2016**

Functions/Programs	Expenses	Program Revenues			Net (Expense)/ Revenue
		Charges for Services	Operating Grants and Contributions	Capital Grants and Contributions	
Primary Government:					
Governmental Activities:					
General Government	\$ 2,516,754	\$ 251,758	\$ 152,119	\$ 1,905	\$ (2,110,972)
Public Safety	3,368,393	295,372	26,627	-	(3,046,394)
Education	22,940,405	238,279	3,274,739	-	(19,427,387)
Public Works	1,701,816	63,199	1,900	495,957	(1,140,760)
Health and Human Services	679,701	134,655	78,308	14,270	(452,468)
Culture and Recreation	1,110,432	193,108	15,459	-	(901,865)
Debt Service-Interest	440,018	-	-	-	(440,018)
Total Governmental Activities	\$ 32,757,519	\$ 1,176,371	\$ 3,549,152	\$ 512,132	(27,519,864)
<i>General revenues:</i>					
					24,697,956
					957,482
					57,329
					7,303
					420,033
					488,355
					5,492
					<u>26,633,950</u>
					(885,914)
					<u>22,587,283</u>
					<u>\$ 21,701,369</u>

See accompanying Notes to Basic Financial Statements.

**TOWN OF CARLISLE, MASSACHUSETTS
GOVERNMENTAL FUNDS - BALANCE SHEET
JUNE 30, 2016**

ASSETS	<u>General</u>	<u>Community Preservation</u>
Cash and Cash Equivalents	\$ 6,917,593	\$ -
Receivables, Net of Allowance for Uncollectible Amounts:		
Real Estate and Personal Property Taxes	120,197	-
Real Estate Tax Deferrals	69,653	-
Tax Liens	23,865	-
Motor Vehicle Excise Taxes	19,701	-
Community Preservation Surcharges	-	2,916
Intergovernmental	-	-
Loans	-	-
Tax Foreclosures	87,422	-
Restricted Assets:		
Cash and Cash Equivalents	<u>466,535</u>	<u>1,735,751</u>
Total Assets	<u>\$ 7,704,966</u>	<u>\$ 1,738,667</u>
 LIABILITIES, DEFERRED INFLOWS OF RESOURCES AND FUND BALANCES		
LIABILITIES		
Warrants Payable	\$ 652,434	\$ 2,346
Accrued Payroll	743,883	-
Other Liabilities	211,371	-
Short-Term Notes Payable	-	-
Total Liabilities	<u>1,607,688</u>	<u>2,346</u>
 DEFERRED INFLOWS OF RESOURCES		
Unavailable Revenue	<u>271,119</u>	<u>2,916</u>
 FUND BALANCES		
Nonspendable	-	-
Restricted	871,726	1,733,405
Committed	938,038	-
Assigned	45,223	-
Unassigned	<u>3,971,172</u>	<u>-</u>
Total Fund Balances	<u>5,826,159</u>	<u>1,733,405</u>
Total Liabilities, Deferred Inflows of Resources and Fund Balances	<u>\$ 7,704,966</u>	<u>\$ 1,738,667</u>

See accompanying Notes to Basic Financial Statements.

	Land Acquisition	Nonmajor Governmental Funds	Total Governmental Funds
\$	-	-	\$ 6,917,593
	-	-	120,197
	-	-	69,653
	-	-	23,865
	-	-	19,701
	-	-	2,916
	-	107,549	107,549
	-	47,526	47,526
	-	-	87,422
	-	<u>2,617,864</u>	<u>4,820,150</u>
\$	<u>-</u>	<u>\$ 2,772,939</u>	<u>\$ 12,216,572</u>
\$	-	\$ 28,322	\$ 683,102
	-	4,850	748,733
	-	-	211,371
	<u>385,000</u>	-	<u>385,000</u>
	<u>385,000</u>	<u>33,172</u>	<u>2,028,206</u>
	-	-	<u>274,035</u>
	-	234,346	234,346
	-	2,505,421	5,110,552
	-	-	938,038
	-	-	45,223
	<u>(385,000)</u>	-	<u>3,586,172</u>
	<u>(385,000)</u>	<u>2,739,767</u>	<u>9,914,331</u>
\$	<u>-</u>	<u>\$ 2,772,939</u>	<u>\$ 12,216,572</u>

**TOWN OF CARLISLE, MASSACHUSETTS
GOVERNMENTAL FUNDS
STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCES
YEAR ENDED JUNE 30, 2016**

	<u>General</u>	<u>Community Preservation</u>	<u>Land Acquisition</u>
REVENUES			
Real Estate and Personal Property Taxes	\$ 24,751,092	\$ -	\$ -
Motor Vehicle Excise Taxes	943,401	-	-
Tax Liens	4,206	57	-
Payments in Lieu of Taxes	7,303	-	-
Community Preservation Surcharges	-	421,875	-
Charges for Services	-	-	-
Intergovernmental	1,243,393	118,424	-
Special Assessments	-	-	-
Penalties and Interest on Taxes	55,968	823	-
Licenses and Permits	99,774	-	-
Fines and Forfeitures	6,303	-	-
Departmental and Other	170,501	-	-
Contributions	-	-	-
Investment Income (Loss)	5,492	1,653	-
Total Revenues	<u>27,287,433</u>	<u>542,832</u>	<u>-</u>
EXPENDITURES			
Current:			
General Government	1,383,424	391,410	-
Public Safety	2,440,002	-	-
Education	17,984,819	-	-
Public Works	1,078,544	-	-
Health and Human Services	290,333	-	-
Culture and Recreation	795,176	-	-
Pension Benefits	771,117	-	-
Employee Benefits	920,423	-	-
Property and Liability Insurance	209,476	-	-
State and County Charges	48,662	-	-
Debt Service:			
Principal	995,000	-	-
Interest	485,857	-	-
Total Expenditures	<u>27,402,833</u>	<u>391,410</u>	<u>-</u>
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	<u>(115,400)</u>	<u>151,422</u>	<u>-</u>
OTHER FINANCING SOURCES (USES)			
Transfers In	53,246	-	15,000
Transfer Out	(55,000)	-	-
Total Other Financing Sources (Uses)	<u>(1,754)</u>	<u>-</u>	<u>15,000</u>
NET CHANGE IN FUND BALANCES	(117,154)	151,422	15,000
Fund Balances - Beginning of Year	<u>5,943,313</u>	<u>1,581,983</u>	<u>(400,000)</u>
FUND BALANCES - END OF YEAR	<u>\$ 5,826,159</u>	<u>\$ 1,733,405</u>	<u>\$ (385,000)</u>

See accompanying Notes to Basic Financial Statements.

Nonmajor Governmental Funds	Total Governmental Funds
\$ -	\$ 24,751,092
-	943,401
-	4,263
-	7,303
-	421,875
215,321	215,321
1,010,873	2,372,690
44,450	44,450
537	57,328
-	99,774
-	6,303
692,099	862,600
386,804	386,804
<u>(23,470)</u>	<u>(16,325)</u>
<u>2,326,614</u>	<u>30,156,879</u>
280,645	2,055,479
128,603	2,568,605
853,963	18,838,782
552,512	1,631,056
268,307	558,640
186,821	981,997
-	771,117
-	920,423
-	209,476
-	48,662
-	995,000
-	485,857
<u>2,270,851</u>	<u>30,065,094</u>
<u>55,763</u>	<u>91,785</u>
40,000	108,246
<u>(53,246)</u>	<u>(108,246)</u>
<u>(13,246)</u>	<u>-</u>
42,517	91,785
<u>2,697,250</u>	<u>9,822,546</u>
<u>\$ 2,739,767</u>	<u>\$ 9,914,331</u>

**TOWN OF CARLISLE, MASSACHUSETTS
RECONCILIATION OF THE GOVERNMENTAL FUNDS BALANCE SHEET
TOTAL FUND BALANCES TO THE STATEMENT OF NET POSITION
JUNE 30, 2016**

Total Governmental Fund Balances	\$ 9,914,331
Capital assets (net of accumulated depreciation) used in governmental activities are not financial resources and, therefore, are not reported in the governmental funds.	41,450,307
Certain liabilities do not require current financial resources and, therefore are reported as deferred outflows of resources in the statement of net position.	772,828
Other assets are not available to pay for current period expenditures and, therefore, are reported as deferred inflows of resources in the governmental funds.	274,035
In the statement of net position, interest is accrued on outstanding long-term debt, whereas in the governmental funds interest is not reported until due.	(67,843)
Long-term liabilities are not due and payable in the current period and, therefore, are not reported in the governmental funds.	
Bonds and Notes Payable, Net of Unamortized Premiums	(14,570,191)
Compensated Absences	(329,451)
Net OPEB Obligation	(6,829,892)
Net Pension Liability	<u>(8,912,755)</u>
Net Position of Governmental Activities	<u>\$ 21,701,369</u>

**TOWN OF CARLISLE, MASSACHUSETTS
RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES AND
CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS
TO THE STATEMENT OF ACTIVITIES
YEAR ENDED JUNE 30, 2016**

Net Change in Fund Balances - Total Governmental Funds	\$	91,785
<p>Governmental funds report capital outlays as expenditures. However, in the statement of activities the cost of those assets is allocated over their estimated useful lives and reported as depreciation expense. These amounts represent the related activity of the current period.</p>		
Capital Outlays		668,486
Depreciation		(1,411,399)
<p>Revenues in the statement of activities that do not provide current financial resources are fully deferred in the statement of revenues, expenditures and changes in fund balances. Therefore, the recognition of revenue for various types of accounts receivable (i.e., real estate and personal property, motor vehicle excise, etc.) and the recognition of expenses/ expenditures for various types of accounts receivable (i.e., notes) differ between the two statements. This amount represents the net change in deferred inflows of resources.</p>		
		(45,161)
<p>The issuance of long-term debt (e.g., bonds and leases) provides current financial resources to governmental funds, while the repayment of the principal of long-term debt consumes the financial resources of governmental funds. Neither transaction, however, has any impact on net position. Also, governmental funds report the effect of premiums, discounts and similar items when debt is first issued, whereas these amounts are deferred and amortized in the statement of activities. This amount represents the related activity of the current period.</p>		
Bond Maturities		995,000
Net Amortization of Bond Premiums		39,848
<p>In the statement of activities, interest is accrued on outstanding long-term debt, whereas in the governmental funds interest is not reported until due. This amount represents the net change in accrued interest payable</p>		
		5,991
<p>Some expenses reported in the statement of activities do not require the use of current financial resources and, therefore, are not reported in the governmental funds. These amounts represent the net changes in:</p>		
Compensated Absences		(51,584)
Net OPEB Obligation		(996,504)
Net Pension Liability		(928,240)
<p>In the statement of activities, deferred outflows related to pensions are amortized and recognized as pension expense. This amount represents the net change in deferred outflows related to pensions.</p>		
		745,864
Changes in Net Position of Governmental Activities	\$	(885,914)

The accompanying notes are an integral part of the financial statements.

**TOWN OF CARLISLE, MASSACHUSETTS
STATEMENT OF FIDUCIARY NET POSITION
JUNE 30, 2016**

ASSETS	<u>Private Purpose Trust Funds</u>	<u>Agency Funds</u>
Cash and Cash Equivalents	\$ 298,382	\$ 45,727
Receivables, Net of Allowance for Uncollectible Amounts: Departmental and Other	<u>-</u>	<u>18,111</u>
Total Assets	<u>298,382</u>	<u>63,838</u>
LIABILITIES		
Warrants Payable	-	26
Accrued Payroll	-	1,904
Liabilities Due Depositors	<u>-</u>	<u>61,908</u>
Total Liabilities	<u>-</u>	<u>63,838</u>
NET POSITION		
Held in Trust for Other Purposes	<u>\$ 298,382</u>	<u>\$ -</u>

See accompanying Notes to Basic Financial Statements.

**TOWN OF CARLISLE, MASSACHUSETTS
FIDUCIARY FUNDS
STATEMENT OF CHANGES IN FIDUCIARY NET POSITION
YEAR ENDED JUNE 30, 2016**

	<u>Private Purpose Trust Funds</u>
ADDITIONS	
Net Investment Income (Loss):	
Net Realized and Unrealized Gains	\$ <u>(12,690)</u>
DEDUCTIONS	
Scholarships Awarded	<u>8,000</u>
 CHANGE IN NET POSITION	 (20,690)
 NET POSITION AT BEGINNING OF YEAR	 <u>319,072</u>
 NET POSITION AT END OF YEAR	 \$ <u><u>298,382</u></u>

See accompanying Notes to Basic Financial Statements.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

A. General

The basic financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The Governmental Accounting Standards Board (GASB) is the standard-setting body for establishing governmental accounting and financial reporting principles. The significant accounting policies are described herein.

B. Reporting Entity

The Town of Carlisle, Massachusetts (Town) is a municipal corporation that is governed by an elected Board of Selectmen (the Board).

For financial reporting purposes, the basic financial statements include all funds, organizations, account groups, agencies, boards, commissions and institutions that are not legally separate from the Town.

The Town has also considered all potential component units for which it is financially accountable as well as other organizations for which the nature and/or significance of their relationship with the Town are such that exclusion would cause the Town's basic financial statements to be misleading or incomplete. It has been determined that there are no component units that require inclusion in the basic financial statements.

Joint Ventures

A joint venture is an organization (resulting from a contractual agreement) that is owned, operated or governed by two or more participants as a separate and specific activity subject to joint control in which the participants retain an ongoing financial interest or ongoing financial responsibility. Joint control means that no single participant has the ability to unilaterally control the financial or operating policies of the joint venture.

The Town participates in the following joint ventures with other municipalities to pool resources and share the costs, risks and rewards of providing goods and services to venture participants directly, or for the benefit of the general public or specified participants.

Concord-Carlisle Regional School District (CCRSD)

The CCRSD is governed by a seven member school committee including two elected representatives from the Town. The Town is indirectly liable for the CCRSD's debt and other expenditures and is assessed annually for its share of operating and capital costs. For the fiscal year ended June 30, 2016, the Town's assessment was \$7,158,559. Separate financial statements may be obtained by writing to the CCRSD at 120 Meriam Road, Concord, MA 01742. See Note 10 for the Town's overlapping debt associated with the CCRSD.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

B. Reporting Entity (Continued)

Joint Ventures (Continued)

Minuteman Regional High School District (MMRHSD)

The MMRHSD is governed by a seventeen member school committee which includes one elected representative from the Town. The Town is indirectly liable for the MMRHSD's debt and other expenditures and is assessed annually for its share of operating and capital costs. For the fiscal year ended June 30, 2016, the Town's assessment was \$226,285. Separate financial statements may be obtained by writing to the MMRHSD at 758 Marrett Road, Lexington, MA 02421.

Government-Wide and Fund Financial Statements

Government-Wide Financial Statements

The government-wide financial statements (statement of net position and the statement of activities) report information on all non-fiduciary activities of the primary government.

Fund Financial Statements

Separate financial statements are provided for governmental funds and fiduciary funds, even though fiduciary funds are excluded from the government-wide financial statements. Major individual governmental funds are reported as separate columns in the fund financial statements. Nonmajor governmental funds are aggregated and displayed in a single column. Fiduciary funds are reported by fund type.

C. Implementation of New Accounting Principles

For the year ended June 30, 2016, the Town implemented the following pronouncements issued by the GASB:

- GASB Statement No. 72, *Fair Value Measurement and Application*
- GASB Statement No. 73, *Accounting and Financial Reporting Pensions and Related Assets That Are Not within the scope of GASB 68, and Amendments to Certain Provisions of GASB Statements 67 and 68*
- GASB Statement No. 76, *The Hierarchy of Generally Accepted Accounting Principles for State and Local Governments*

The implementation of these GASB Statements had no reporting impact for the Town.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

D. Measurement Focus, Basis of Accounting and Basis of Presentation

Government-Wide Financial Statements

The government-wide financial statements are reported using the economic resources measurement focus and the accrual basis of accounting. Under this method, revenues are recorded when earned and expenses are recorded when the liabilities are incurred. Real estate and personal property taxes are recognized as revenues in the fiscal year for which they are levied. Grants and similar items are recognized as revenue as soon as all eligibility requirements imposed by the provider have been met.

The statement of activities demonstrates the degree to which the direct expenses of a function or segment are offset by program revenues. Direct expenses are those that are clearly identifiable with a specific function or segment. Program revenues include the following:

- Charges to customers or applicants who purchase, use, or directly benefit from goods, services, or privileges provided by a given function or segment.
- Grants and contributions that are restricted to meeting the operational requirements of a specific function or segment.
- Grants and contributions that are restricted to meeting the capital requirements of a specific function or segment.

Taxes and other items not identifiable as program revenues are reported as general revenues.

The effect of interfund activity has been eliminated from the government-wide financial statements.

Fund Financial Statements

Governmental funds financial statements are reported using the flow of current financial resources measurement focus and the modified accrual basis of accounting. Under the modified accrual basis of accounting, revenues are recognized when susceptible to accrual (i.e., measurable and available). Measurable means the amount of the transaction can be determined and available means collectible within the current period or soon enough thereafter to pay liabilities of the current period. Expenditures are recorded when the related fund liability is incurred, except for unmatured interest on general long-term debt which is recognized when due.

Real estate and personal property tax revenues are considered available if they are collected within 60 days after the end of the fiscal year. Investment income is susceptible to accrual. Other receipts and tax revenues become measurable and available when the cash is received and are recognized as revenue at that time.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

D. Measurement Focus, Basis of Accounting and Basis of Presentation (Continued)

Fund Financial Statements (Continued)

Entitlements and shared revenues are recorded at the time of receipt or earlier if the susceptible to accrual criteria is met. Expenditure driven grants recognize revenue when the qualifying expenditures are incurred and all other grant requirements are met.

The following major governmental funds are reported:

The *general fund* is used to account for and report all financial resources not accounted for and reported in another fund.

The *community preservation fund* is a special revenue fund (defined below) used to account for the 2% local real estate tax surcharge on nonexempt property (and matching state trust fund distribution) that can be used for open space, historic resource and affordable housing purposes. Property exempt from the surcharge consists of the first \$100,000 of all residential property and also property owned by low income residents or seniors with a low or moderate income as defined by Massachusetts Department of Revenue (DOR) guidelines. Disbursements from this fund must originate from the Community Preservation Committee and be approved by Town Meeting.

The *land acquisition fund* is a capital projects fund (defined below) used to account for the accumulation of resources for the Goff-Moseley land purchase.

The nonmajor governmental funds consist of other special revenue, capital projects and permanent funds that are aggregated and presented in the *nonmajor governmental funds* column on the governmental funds financial statements. The following describes the general use of these fund types:

Special revenue funds are used to account for and report the proceeds of specific revenue sources that are restricted or committed to expenditure for specified purposes other than debt service or capital projects.

Capital projects funds are used to account for and report financial resources that are restricted, committed, or assigned to expenditure for capital outlays, including the acquisition or construction of capital facilities and other capital assets. Capital projects funds exclude those types of capital-related outflows financed by proprietary funds or for assets that will be held in trust for individuals, private organizations, or other governments.

Permanent funds are used to account for and report resources that are restricted to the extent that only earnings, and not principal, may be used for purposes that support the government's programs and benefit the government or its citizenry.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

D. Measurement Focus, Basis of Accounting and Basis of Presentation (Continued)

Fund Financial Statements (Continued)

Fiduciary funds financial statements are reported using the flow of economic resources measurement focus and use the accrual basis of accounting. Fiduciary funds are used to account for assets held in a trustee capacity for others that cannot be used to support the government's programs.

The following fiduciary fund types are reported:

The *private-purpose trust fund* is used to account for trust arrangements, other than those properly reported in the permanent fund, under which principal and investment income exclusively benefits individuals, private organizations, or other governments.

The *agency fund* is used to account for assets held in a custodial capacity. Such assets consist of police detail and student activity funds. Agency funds do not present the results of operations or have a measurement focus.

E. Cash and Cash Equivalents and Investments

Government-Wide and Fund Financial Statements

Cash and cash equivalents are considered to be cash on hand, demand deposits and short-term investments with an original maturity of three months or less from the date of acquisition.

Investments are carried at fair value.

F. Accounts Receivable

Government-Wide and Fund Financial Statements

The recognition of revenue related to accounts receivable reported in the government-wide financial statements and fund financial statements are reported under the accrual basis of accounting and the modified accrual basis of accounting, respectively.

Real Estate Taxes, Personal Property Taxes and Tax Liens

Real estate and personal property taxes are levied and based on values assessed on January 1st of every year. Assessed values are established by the Board of Assessors for 100% of the estimated fair market value. Taxes are due on August 1st, November 1st, February 1st and May 1st and are subject to penalties and interest if they are not paid by the respective due date. Tax liens are processed approximately six months after the close of the valuation year on delinquent properties. Real estate and personal property taxes levied are recorded as receivables in the fiscal year of the levy.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

F. Accounts Receivable (Continued)

Motor Vehicle Excise Taxes

Motor vehicle excise taxes are assessed annually for each vehicle registered in the Town and are recorded as receivables in the fiscal year of the levy. The Commonwealth of Massachusetts is responsible for reporting the number of vehicles registered and the fair values of those vehicles to the Town. The tax calculation is the fair value of the vehicle multiplied by \$25 per \$1,000 of value.

Community Preservation Surcharges

Community preservation surcharges are levied annually and at a rate of 2% of residents' real estate tax bills with exemptions for the first \$100,000 of residential property and property owned by qualified persons with low income and seniors (60+) with low or moderate income as defined by DOR guidelines. The surcharge is due with the real estate tax on August 1st, November 1st, February 1st and May 1st and are subject to penalties and interest if they are not paid by the respective due date. Overdue surcharges are included on the tax liens processed on delinquent real estate taxes. Surcharges are recorded as receivables in the fiscal year of the levy.

Intergovernmental

Various state and federal operating and capital grants are applied for and received annually. For non-expenditure driven grants, revenue is recognized as soon as all eligibility requirements imposed by the provider have been met. For expenditure driven grants, revenue is recognized when the qualifying expenditures are incurred and all other grant requirements are met.

Loans

The Town administers various loan programs to residents that provide assistance to comply with Title V (related to septic systems) requirements. Loans are recorded as receivables upon issuance.

G. Allowance for Uncollectible Accounts

The allowance for uncollectible accounts is estimated based on historical trends and specific account analysis for the following accounts receivable:

- Personal property taxes
- Motor vehicle excise taxes
- Departmental and other
- Loans

TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

G. Allowance for Uncollectible Accounts (Continued)

The following types of accounts receivable are secured via the lien process (or other means) and are considered 100% collectible. Accordingly, an allowance for uncollectible accounts is not recorded.

- Real estate taxes and deferrals
- Community preservation surcharges
- Loans

Intergovernmental receivables are considered 100% collectible.

H. Inventories

Government-Wide and Fund Financial Statements

Inventories are recorded as expenditures at the time of purchase. Such inventories are not material in total to the government-wide and fund financial statements and therefore are not reported.

I. Restricted Assets

Government-Wide and Fund Financial Statements

Assets are reported as restricted when limitations on their use change the nature of the availability of the asset. Such constraints are either externally imposed by creditors, contributors, grantors, or laws of other governments, or are imposed by law through constitutional provisions or enabling legislation.

J. Capital Assets

Government-Wide Financial Statements

Capital assets, which consist of land, land improvements, buildings, machinery and equipment, and infrastructure, are reported in the government-wide financial statements.

Capital assets are recorded at historical cost or at estimated historical cost if actual historical cost is not available. Donated capital assets are recorded at the estimated fair market value at the date of donation. Construction period interest is not capitalized on constructed capital assets.

All purchases and construction costs in excess of \$10,000 are capitalized at the date of acquisition or construction, respectively, with expected useful lives of greater than one year.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

J. Capital Assets (Continued)

Government-Wide Financial Statements (Continued)

Capital assets (excluding land) are depreciated on a straight-line basis. The estimated useful lives of capital assets are as follows:

<u>Capital Asset Type</u>	<u>Estimated Useful Life (in years)</u>
Land improvements.....	20
Buildings and improvements.....	20 - 50
Machinery and equipment.....	5 - 15
Infrastructure.....	40 - 75

The cost of normal maintenance and repairs that do not add to the value of the assets or materially extend asset lives are not capitalized and are treated as expenses when incurred. Improvements are capitalized.

Governmental Fund Financial Statements

Capital asset costs are recorded as expenditures in the acquiring fund in the fiscal year of the purchase.

K. Interfund Receivables and Payables

During the course of its operations, transactions occur between and within funds that may result in amounts owed between funds.

Government-Wide Financial Statements

Transactions of a buyer/seller nature between and within governmental funds are eliminated from the governmental activities in the statement of net position.

Fund Financial Statements

Transactions of a buyer/seller nature between and within funds are not eliminated from the individual fund statements. Receivables and payables resulting from these transactions are classified as "Due from other funds" or "Due to other funds" on the balance sheet.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

L. Interfund Transfers

During the course of its operations, resources are permanently reallocated between and within funds.

Government-Wide Financial Statements

Transfers between and within governmental funds are eliminated from the governmental activities in the statement of net position.

Fund Financial Statements

Transfers between and within funds are not eliminated from the individual fund statements and are reported as transfers in and transfers out.

M. Deferred Outflows of Resources

In addition to assets, the statement of financial position will sometimes report a separate section for deferred outflows of resources. This separate financial statement element, deferred outflows of resources, represents a consumption of net position that applies to a future period(s) and so will not be recognized as an outflow of resources (expense/expenditure) until that time.

The government has deferred outflows of resources related to pension which is reported in the government-wide financial statements statement of net position.

N. Deferred Inflows of Resources

In addition to liabilities, the statement of financial position will sometimes report a separate section for deferred inflow of resources. This separate financial statement element, deferred inflows of resources, represents an acquisition of net position that applies to a future period(s) and so will not be recognized as an inflow of resources (revenue) until that time.

The government has unavailable revenue that is reported in the governmental funds balance sheet. Unavailable revenue represents billed receivables that do not meet the available criterion in accordance with the current financial resources measurement focus and the modified accrual basis of accounting.

O. Net Position and Fund Balances

Government-Wide Financial Statements (Net Position)

Net position is reported as restricted when amounts are not available for appropriation or are legally restricted by outside parties for a specific future use.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

O. Net Position and Fund Balances (Continued)

Government-Wide Financial Statements (Net Position) (Continued)

Net position has been “restricted” for the following:

“Community preservation” represents amounts restricted for open space, historic resource and affordable housing purposes.

“Affordable housing” represents amounts restricted for a fund (established in accordance with MGL, Chapter 44, Section 55C) used to account for activities related to the creation and preservation of affordable housing for the benefit of low and moderate income households.

“Loans” represents outstanding septic loans receivable.

“Debt service” represents amounts restricted for debt service.

“OPEB” represents amounts accumulated for other postemployment benefits.

“Permanent funds – expendable” represents amounts held in trust for which the expenditures are restricted by various trust agreements.

“Permanent funds – nonexpendable” represents amounts held in trust for which only investment earnings may be expended.

“Other specific purposes” represents other restrictions placed on assets from outside parties.

When an expense is incurred that can be paid using either restricted or unrestricted resources, the Town’s policy is to first apply the expense towards restricted resources, and then towards unrestricted resources.

Governmental Funds Financial Statements (Fund Balances)

The following fund balance classifications describe the relative strength of the spending constraints:

Nonspendable — represents amounts that cannot be spent either because they are in nonspendable form (i.e., prepaid amounts) or because they are legally or contractually required to be maintained intact (i.e., principal of permanent fund).

Restricted — represents amounts that can be spent only for specific purposes because of constitutional provisions or enabling legislation or because of constraints that are externally imposed by creditors, grantors, contributors, or the laws or regulations of other governments.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

O. Net Position and Fund Balances (Continued)

Governmental Funds Financial Statements (Fund Balances) (Continued)

Committed — represents amounts that can be used only for specific purposes imposed by a formal action of Town Meeting, which is the highest level of decision-making authority for the Town. Committed amounts may be established, modified, or rescinded only through actions approved by Town Meeting.

Assigned — represents amounts that do not meet the criteria to be classified as restricted or committed but are intended to be used for specific purposes. Under the Town's structure, only authorized assignments for non-contractual encumbrances can be made by individual department heads

Unassigned — represents the residual fund balance for the General Fund and the negative residual fund balance of any other governmental fund that cannot be eliminated by offsetting assigned fund balance amounts.

In circumstances when an expenditure is made for a purpose for which amounts are available in multiple fund balance classifications, fund balance is depleted in the order of restricted, committed, assigned and unassigned.

Encumbrance amounts have been assigned for specific purposes for which resources already have been allocated.

P. Long-Term Debt

Government-Wide Financial Statements

Long-term debt is reported as liabilities in the government-wide statement of net position. Material bond premiums and discounts are deferred and amortized over the life of the bonds using the straight-line method. Bond issuance costs are expensed as incurred. Bonds payable are reported net of the applicable bond premium or discount.

Governmental Fund Financial Statements

The face amount of governmental funds long-term debt is reported as other financing sources when the debt is issued. Bond premiums and discounts, as well as issuance costs, are recognized in the current period. Bond premiums are reported as other financing sources and bond discounts are reported as other financing uses. Issuance costs, whether or not withheld from the actual bond proceeds received, are reported as general government expenditures.

Q. Investment Income

Excluding the permanent funds, investment income derived from major and nonmajor governmental funds is legally assigned to the general fund unless otherwise directed by Massachusetts General Law (MGL).

TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

R. Compensated Absences

Employees are granted vacation and sick leave in varying amounts based on collective bargaining agreements, state laws and executive policies.

Government-Wide Financial Statements

Vested or accumulated vacation and sick leave are reported as liabilities and expensed as incurred.

Governmental Fund Financial Statements

Vested or accumulated vacation and sick leave, which will be liquidated with expendable available financial resources, are reported as expenditures and fund liabilities.

S. Pensions

Government-Wide and Fund Financial Statements

For purposes of measuring the net pension liability, deferred outflows of resources and deferred inflows of resources related to pensions, and pension expense, information about the fiduciary net position of the Middlesex County Retirement System (MCRS) and additions to/deductions from MCRS's fiduciary net position have been determined on the same basis as they are reported by MCRS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

T. Post-Retirement Benefits

Government-Wide and Fund Financial Statements

In addition to providing pension benefits, and as more fully described in Note 11, the Town provides health and life insurance coverage for current and future retirees and their spouses.

U. Use of Estimates

Government-Wide and Fund Financial Statements

The preparation of basic financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure for contingent assets and liabilities at the date of the basic financial statements and the reported amounts of the revenues and expenditures/expenses during the fiscal year. Actual results could vary from estimates that were used.

V. Total Column

Fund Financial Statements

The total column presented on the fund financial statements is presented only to facilitate financial analysis. Data in this column is not the equivalent of consolidated financial information.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 2 STEWARDSHIP, COMPLIANCE AND ACCOUNTABILITY

A. Budgetary Information

The municipal finance laws of the Commonwealth of Massachusetts require the adoption of a balanced budget that is approved by Town Meeting vote. The Finance Committee presents an annual budget to Town Meeting, which includes estimates of revenues and other financing sources and recommendations of expenditures and other financing uses. Town Meeting, which has full authority to amend and/or reject the budget or any line item, adopts the expenditure budget by majority vote.

Increases to the annual budget subsequent to Annual Town Meeting approval require Special Town Meeting approval.

The majority of appropriations are non-continuing which lapse at the end of each fiscal year. Others are continuing appropriations for which the governing body has authorized that an unspent balance from a prior fiscal year be carried forward and made available for spending in the current fiscal year.

Generally, expenditures may not exceed the level of spending (salaries, expenses and capital) authorized for an appropriation account. However, the Town is statutorily required to pay debt service, regardless of whether such amounts are appropriated.

An annual budget is adopted for the general fund and community preservation fund in conformity with the guidelines described above. The original fiscal year 2016 approved budget for the general fund authorized \$28,019,115 in appropriations and other amounts to be raised. During fiscal year 2016, appropriations were increased by \$63,663. The original and final fiscal year 2016 approved budget for the community preservation fund authorized \$837,000 in appropriations.

The Accountant's office has the responsibility to ensure that budgetary control is maintained. Budgetary control is exercised through the accounting system.

B. Fund Deficits

At June 30, 2016, the following fund deficit exists:

<u>Fund</u>	<u>Amount</u>	<u>Funding Source</u>
Land purchase capital projects fund (major fund)	\$ 385,000	Long-term debt

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 3 DEPOSITS AND INVESTMENTS

The municipal finance laws of the Commonwealth of Massachusetts authorize the Town to invest available cash in bank term deposits and certificates of deposits, and treasury and agency obligations of the United States government, with maturities of one year or less; U.S. treasury or agency repurchase agreements with maturities of not more than 90 days; money market accounts; and the state treasurer's investment pool – the Massachusetts Municipal Depository Trust (MMDT).

The MMDT meets the criteria of an external investment pool and operates in accordance with applicable state laws and regulations. The Treasurer of the Commonwealth of Massachusetts serves as Trustee. The reported value of the pool is the same as the fair value of pool shares.

A cash and investment pool is maintained that is available for use by all funds with unrestricted cash and investments. The deposits and investments of the permanent funds and private purpose trust funds are held separately from other Town funds.

Deposits - Custodial Credit Risk

Custodial credit risk for deposits is the risk that, in the event of a bank failure, the Town's deposits may not be recovered. The Town does not have a policy for custodial credit risk of deposits. As of June 30, 2016, \$7,034,285 of the Town's bank balance of \$9,924,516 was uninsured and uncollateralized.

Investments Summary

The Town's investments at June 30, 2016 are presented below. All investments are presented by investment type. All investments mature in less than 1 year and therefore are shown as cash and cash equivalents on the financial statements.

<u>Investment Type</u>	<u>Fair Value</u>
Money market mutual funds.....	\$ 151,020
Fixed income mutual funds.....	351,082
Equity mutual funds.....	672,194
External investment pools.....	1,496,253
Total debt securities.....	<u>\$ 2,670,549</u>

Investments - Interest Rate Risk of Debt Securities

Interest rate risk for debt securities is the risk that changes in interest rates of debt securities will adversely affect the fair value of an investment. The Town does not have a policy for interest rate risk of debt securities.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 3 DEPOSITS AND INVESTMENTS (CONTINUED)

Investments - Custodial Credit Risk

Custodial credit risk for investments is the risk that, in the event of the failure of the counterparty, the Town will not be able to recover the value of its investments or collateral securities that are in the possession of an outside party. The Town does not have a policy for custodial credit risk of investments. As of June 30, 2016, the Town was not exposed to custodial credit risk.

Investments - Credit Risk of Debt Securities

Credit risk for investments is the risk that an issuer or other counterparty to a debt security will not fulfill its obligations. The Town does not have a policy for credit risk of debt securities. As of June 30, 2016, the Town's investment in debt securities were unrated for credit quality.

NOTE 4 ACCOUNTS RECEIVABLE

At June 30, 2016, receivables for the individual major governmental funds, nonmajor governmental funds and fiduciary funds in the aggregate, including the applicable allowances for uncollectible accounts, are as follows:

	Gross Amount	Allowance for Uncollectibles	Net Amount
Receivables:			
Real estate and personal property taxes.....	\$ 122,635	\$ (2,438)	\$ 120,197
Real estate tax deferrals.....	69,653	-	69,653
Tax liens.....	23,865	-	23,865
Motor vehicle and other excise taxes.....	52,964	(33,263)	19,701
Community preservation surcharges.....	2,916	-	2,916
Departmental and other.....	18,111	-	18,111
Notes.....	107,940	(107,940)	-
Intergovernmental.....	107,549	-	107,549
Loans.....	47,526	-	47,526
	<u>\$ 553,159</u>	<u>\$ (143,641)</u>	<u>\$ 409,518</u>

NOTE 5 LONG-TERM NOTE RECEIVABLE

During fiscal year 2013, the Town issued a \$425,000 long-term note to an affordable housing developer. The note is interest free and matures on January 5, 2044. The present value of the note (based on an effective interest rate of 5%) totals \$107,940, and has been fully reserved as uncollectible at June 30, 2016.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 5 LONG-TERM NOTE RECEIVABLE (CONTINUED)

During the one-year period prior to the maturity date, the borrower may request that the Town extend the maturity date for a period of up to the original term of the note. If any portion of the note is not paid when due, unpaid amounts will bear interest until paid at the lesser of: (1) the annual rate which is five percent (5%) per annum above the Prime Rate as published by the Wall Street Journal and (2) the maximum rate of interest which may be lawfully charged or collected on account of such unpaid amounts in accordance with applicable law.

NOTE 6 CAPITAL ASSETS

Capital asset activity for the fiscal year ended June 30, 2016 was as follows:

	Beginning Balance	Increases	Decreases	Ending Balance
Governmental Activities:				
<u>Capital assets not being depreciated:</u>				
Land.....	\$ 9,718,798	\$ -	\$ -	\$ 9,718,798
Intangible assets.....	560,150	-	-	560,150
Construction in progress.....	13,168	-	(13,168)	-
Total capital assets not being depreciated.....	<u>10,292,116</u>	<u>-</u>	<u>(13,168)</u>	<u>10,278,948</u>
<u>Capital assets being depreciated:</u>				
Land improvements.....	891,535	9,950	-	901,485
Buildings and improvements.....	34,357,103	29,204	-	34,386,307
Machinery and equipment.....	5,468,450	261,655	(109,609)	5,620,496
Infrastructure.....	28,638,753	382,653	-	29,021,406
Total capital assets being depreciated.....	<u>69,355,841</u>	<u>683,462</u>	<u>(109,609)</u>	<u>69,929,694</u>
<u>Less accumulated depreciation for:</u>				
Land improvements.....	(736,276)	(12,666)	-	(748,942)
Buildings and improvements.....	(8,648,796)	(853,608)	-	(9,502,404)
Machinery and equipment.....	(4,125,857)	(306,295)	107,799	(4,324,353)
Infrastructure.....	(23,943,806)	(238,830)	-	(24,182,636)
Total accumulated depreciation.....	<u>(37,454,735)</u>	<u>(1,411,399)</u>	<u>107,799</u>	<u>(38,758,335)</u>
Total capital assets being depreciated, net.....	<u>31,901,106</u>	<u>(727,937)</u>	<u>(1,810)</u>	<u>31,171,359</u>
Total governmental activities capital assets, net.....	<u>\$ 42,193,222</u>	<u>\$ (727,937)</u>	<u>\$ (14,978)</u>	<u>\$ 41,450,307</u>

Depreciation expense was charged to functions/programs of the primary government as follows:

Governmental Activities:	
General government.....	\$ 57,837
Public safety.....	250,436
Education.....	767,413
Public works.....	304,421
Health and human services.....	1,375
Culture and recreation.....	<u>29,917</u>
Total depreciation expense - governmental activities.....	<u>\$ 1,411,399</u>

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 7 INTERFUND TRANSFERS

Interfund transfers for the fiscal year ended June 30, 2016 are summarized as follows:

Transfers Out:	Transfers In:			Total	
	General Fund	Nonmajor Governmental Funds	Land Acquisition Fund		
General Fund.....	\$ -	\$ 40,000	\$ 15,000	\$ 55,000	(1)
Nonmajor Governmental Funds.....	53,246	-	-	53,246	(2)
	<u>\$ 53,246</u>	<u>\$ 40,000</u>	<u>\$ 15,000</u>	<u>\$ 108,246</u>	

- (1) Represents transfers budgeted transfers from the general fund for BAN payments for the school construction project (\$40,000) and land acquisition (\$15,000).
- (2) Represents budgeted transfer from the Ambulance Special Revenue Fund to the General Fund (\$53,000) and a transfer to the general fund to close out the school construction fund (\$246).

NOTE 8 SHORT-TERM FINANCING

Short-term debt may be authorized and issued to fund the following:

- Current operating costs prior to the collection of revenues through issuance of revenue anticipation notes (RAN) or tax anticipation notes (TAN).
- Capital project costs and other approved expenditures incurred prior to obtaining permanent financing through issuance of bond anticipation notes (BAN) or grant anticipation notes (GAN).

Short-term loans are general obligations and carry maturity dates that are limited by statute. Interest expenditures for short-term borrowings are accounted for in the general fund and community preservation fund.

Details related to the short-term debt activity for the fiscal year ended June 30, 2016 are as follows:

Notes Payable – Governmental Funds

Type	Description	Origination Date	Maturity Date	Interest Rate	Balance at 6/30/2015	Increases	Decreases	Balance at 6/30/2016
BAN	Land Acquisition.....	3/6/15	3/6/16	0.50%	\$ 400,000	\$ -	\$ (400,000)	\$ -
BAN	School Project.....	3/6/15	3/6/16	0.50%	40,000	-	(40,000)	-
BAN	Land Acquisition.....	3/4/16	3/3/17	0.75%	-	385,000	-	385,000
					-	-	-	-
	Total.....				<u>\$ 440,000</u>	<u>\$ 385,000</u>	<u>\$ (440,000)</u>	<u>\$ 385,000</u>

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 9 LONG-TERM OBLIGATIONS

The following represents a summary of changes that occurred in long-term liabilities during the fiscal year ended June 30, 2016:

	Balance June 30, 2015	Increases	Decreases	Balance June 30, 2016	Current Portion
Bonds and notes payable.....	\$ 15,160,000	\$ -	\$ (995,000)	\$ 14,165,000	\$ 1,025,000
Unamortized premium.....	445,039	-	(39,848)	405,191	38,102
Bonds and notes payable, gross.....	15,605,039	-	(1,034,848)	14,570,191	1,063,102
Net OPEB obligation.....	5,833,388	1,128,331	(131,827)	6,829,892	-
Net pension liability.....	7,984,515	928,240	-	8,912,755	-
Compensated absences.....	277,867	51,584	-	329,451	101,101
Total.....	<u>\$ 29,700,809</u>	<u>\$ 2,108,155</u>	<u>\$ (1,166,675)</u>	<u>\$ 30,642,289</u>	<u>\$ 1,164,203</u>

Bonds and notes payable are liquidated by the General Fund, Community Preservation Fund and Title V special revenue fund. Other long-term obligations are generally liquidated by the General Fund.

NOTE 10 LONG-TERM DEBT

Details related to the outstanding indebtedness at June 30, 2016, and the debt service requirements are as follows:

Bonds and Notes Payable – Governmental Funds

Project	Interest Rate (%)	Outstanding at June 30, 2015	Additions	Deductions	Outstanding at June 30, 2016
Wastewater.....	4.0 - 5.5	\$ 660,000	\$ -	\$ (60,000)	\$ 600,000
Wastewater.....	4.0 - 5.5	605,000	-	(55,000)	550,000
Building construction - school - refunding.....	2.0 - 3.0	46,000	-	(12,000)	34,000
Land acquisition - conservation - refunding.....	2.0 - 3.0	425,000	-	(110,000)	315,000
Building addition - library - refunding.....	2.0 - 3.0	284,000	-	(78,000)	206,000
Fire truck.....	2.0 - 3.0	198,000	-	(51,000)	147,000
School boiler.....	2.0 - 3.0	124,000	-	(31,000)	93,000
Cisterns.....	2.0 - 3.0	83,000	-	(23,000)	60,000
School project.....	2.0 - 4.0	11,865,000	-	(520,000)	11,345,000
Fire truck.....	2.0 - 4.0	356,000	-	(24,000)	332,000
School design.....	2.0 - 4.0	180,000	-	(10,000)	170,000
DPW roll-off truck.....	2.0 - 4.0	126,000	-	(10,000)	116,000
Dump truck.....	2.0 - 4.0	120,000	-	(7,000)	113,000
Cisterns.....	2.0 - 4.0	48,000	-	(4,000)	44,000
Community Septic Management Program.....	0.0	40,000	-	-	40,000
Sub-total.....		15,160,000	-	(995,000)	14,165,000
Add: unamortized premium.....		445,039	-	(39,848)	405,191
Total.....		<u>\$ 15,605,039</u>	<u>\$ -</u>	<u>\$ (1,034,848)</u>	<u>\$ 14,570,191</u>

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 10 LONG-TERM DEBT (CONTINUED)

Debt service requirements for principal and interest for governmental bonds and notes payable in future fiscal years are as follows:

Fiscal Year	Principal	Interest	Total
2017.....	1,025,000	452,672	1,477,672
2018.....	975,000	423,445	1,398,445
2019.....	960,000	390,268	1,350,268
2020.....	680,000	354,716	1,034,716
2021.....	680,000	327,516	1,007,516
2022.....	680,000	300,316	980,316
2023.....	680,000	275,799	955,799
2024.....	680,000	254,103	934,103
2025.....	680,000	232,411	912,411
2026.....	680,000	210,573	890,573
2027.....	565,000	188,737	753,737
2028.....	565,000	171,787	736,787
2029.....	565,000	154,837	719,837
2030.....	565,000	137,887	702,887
2031.....	550,000	121,192	671,192
2032.....	530,000	104,962	634,962
2033.....	530,000	89,062	619,062
2034.....	515,000	73,387	588,387
2035.....	515,000	57,615	572,615
2036.....	515,000	41,522	556,522
2037.....	515,000	25,107	540,107
2038.....	515,000	8,369	523,369
Total.....	<u>\$ 14,165,000</u>	<u>\$ 4,396,283</u>	<u>\$ 18,561,283</u>

The Town is subject to various debt limits by statute and may issue additional general obligation debt under the normal debt limit. At June 30, 2016, the Town had the following authorized and unissued debt:

Purpose	Amount
Fire Truck.....	\$ 650,000
Massachusetts Clean Water Trust.....	160,000
Cisterns.....	4,000
Total.....	<u>\$ 814,000</u>

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 10 LONG-TERM DEBT (CONTINUED)

Overlapping Debt

The following table identifies the Town's overlapping debt at June 30, 2016:

	Outstanding Overlapping Debt	Overlapping Town Share (%)	Overlapping Town Share
Concord-Carlisle Regional School District.....	\$ <u>60,485,000</u>	26.39%	\$ <u>15,961,992</u>

NOTE 11 OTHER POST EMPLOYMENT BENEFITS

Plan Description – The Town provides health and life insurance coverage for its retirees and their survivors (hereinafter referred to as the “Plan”) as a single-employer defined benefit Other Post Employment Benefit (OPEB) plan. Chapter 32B of the MGL assigns authority to establish and amend benefit provisions. Changes to plan design and contribution rates must be accomplished through the collective bargaining process. The Plan does not issue a standalone financial report since there are no assets legally segregated for the sole purpose of paying benefits under the Plan.

The number of participants as of July 1, 2015, the latest actuarial valuation, is as follows:

Active employees.....	167
Retirees and surviving spouses.....	<u>58</u>
Total.....	<u>225</u>

Funding Policy – The contribution requirements of Plan members and the Town are established and may be amended by the Town. The required health insurance contribution rates of Plan members and the Town (including Medicare Part B) are 50%, respectively. The Plan members and Town each contribute 50% towards a \$5,000 term life insurance premium. The Town currently contributes enough money to the Plan to satisfy current obligations on a pay-as-you-go basis. The costs of administering the Plan are paid by the Town. During fiscal year 2016 the Town contributed \$225,000 to a separate OPEB fund and as of June 30, 2016, the balance of the fund is \$466,535. This amount is reported as restricted fund balance in the general fund. In accordance with GASB Statement No. 43 this OPEB fund does not meet the criteria of an OPEB plan. In addition, the transfers made to the OPEB do not meet the criteria of being accounted for as contributions towards the Town's net OPEB obligation per GASB Statement No. 45.

Annual OPEB Cost and Net OPEB Obligation – The Town's annual OPEB cost (expense) is calculated based on the annual required contribution (ARC) of the employer, an actuarially determined amount that is calculated in accordance with the parameters set forth in GASB Statement #45. The ARC represents a level of funding that, if paid on an ongoing basis, is projected to cover normal cost each year and amortize any unfunded actuarial liabilities (or funding excess) over a period not to exceed thirty years.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 11 OTHER POST EMPLOYMENT BENEFITS (CONTINUED)

Annual OPEB Cost and Net OPEB Obligation (Continued)

The following table identifies the components of the Town's annual OPEB cost for the year, the actual amount contributed to the plan, and changes in the Town's net OPEB obligation:

	Amount
Annual required contribution.....	\$ 1,216,371
Interest on net OPEB obligation.....	175,001
Adjustment to annual required contribution.....	<u>(263,041)</u>
Annual OPEB cost.....	1,128,331
Contributions made.....	<u>(131,827)</u>
Increase in net OPEB obligation.....	996,504
Net OPEB obligation at beginning of year.....	<u>5,833,388</u>
Net OPEB obligation at end of year.....	<u><u>\$ 6,829,892</u></u>

Trend information regarding annual OPEB cost, the percentage of the annual OPEB cost contributed and the net OPEB obligation is as follows:

Fiscal Year Ended	Annual OPEB Cost (AOPEBC)	Percentage of AOPEBC Contributed	Net OPEB Obligation
June 30, 2014.....	951,876	13.5%	4,960,605
June 30, 2015.....	993,118	12.1%	5,833,388
June 30, 2016.....	1,128,331	11.7%	6,829,892

Funded Status and Funding Progress – The funded status of the Plan at July 1, 2015, the most recent actuarial valuation, was as follows:

Actuarial Valuation Date	Actuarial Value of Assets (A)	Actuarial Accrued Liability (AAL) Projected Unit Credit (B)	Unfunded AAL (UAAL) (B-A)	Funded Ratio (A/B)	Covered Payroll (C)	UAAL as a Percentage of Covered Payroll ((B-A)/C)
07/01/15	\$ -	\$ 10,843,307	\$ 10,843,307	0.0%	\$ 11,821,964	92%

Actuarial valuations of an ongoing plan involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the annual required contributions of the employer are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The schedule of funding progress, presented as required supplementary information following the notes to the financial statements, presents multi-year trend information that shows whether the actuarial value of plan assets is increasing or decreasing over time relative to the actuarial accrued liabilities for benefits.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 11 OTHER POST EMPLOYMENT BENEFITS (CONTINUED)

Methods and Assumptions – Projections of benefits for financial reporting purposes are based on the substantive Plan (the Plan as understood by the employer and plan members) and include the types of benefits provided at the time of each valuation and the historical pattern of sharing of benefit costs between the employer and Plan members to that point. The actuarial methods and assumptions used include techniques that are designed to reduce short-term volatility in actuarial accrued liabilities and the actuarial value of assets, consistent with the long-term perspective of the calculations.

The significant methods and assumptions as of the latest actuarial valuation are as follows:

Valuation date:	July 1, 2015
Actuarial cost method:	Entry Age Normal
Amortization method:	Level percentage of projected payroll
Remaining amortization period:	30 years
Interest discount rate:	3.00%
Healthcare/Medical cost trend rate:	9.0% decreasing 1.0% for 4 years to an ultimate level of 5.0% per year
Projected salary increases:	3.50% annually

Allocation of AOPEBC – AOPEBC costs were allocated to the Town's functions as follows:

Governmental Activities:	
General government.....	\$ 104,775
Public safety.....	191,340
Education.....	730,762
Public works.....	80,513
Health and human services.....	17,114
Culture and recreation.....	<u>3,827</u>
Total AOPEBC - governmental activities.....	<u>\$ 1,128,331</u>

TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016

NOTE 12 FUND BALANCES

The constraints on fund balances as listed in aggregate in the Governmental Funds Balance Sheet are detailed as follows:

	General	Community Preservation	Land Acquisition	Nonmajor Governmental Funds	Total Governmental Funds
Nonspendable:					
Loans.....	\$ -	\$ -	\$ -	\$ 47,526	\$ 47,526
Permanent fund principal.....	-	-	-	186,820	186,820
Sub-total - Nonspendable.....	<u>-</u>	<u>-</u>	<u>-</u>	<u>234,346</u>	<u>234,346</u>
Restricted for:					
Community preservation.....	-	1,733,405	-	-	1,733,405
Affordable housing.....	-	-	-	204,304	204,304
Debt service.....	405,191	-	-	-	405,191
School lunch.....	-	-	-	24,181	24,181
Capital.....	-	-	-	186,212	186,212
General government.....	-	-	-	273,864	273,864
Public safety.....	-	-	-	517,874	517,874
Education.....	-	-	-	419,875	419,875
Public works.....	-	-	-	320,018	320,018
Health and human services.....	-	-	-	146,688	146,688
Culture and recreation.....	-	-	-	412,405	412,405
Other post employment benefits.....	466,535	-	-	-	466,535
Sub-total - Restricted.....	<u>871,726</u>	<u>1,733,405</u>	<u>-</u>	<u>2,505,421</u>	<u>5,110,552</u>
Committed to:					
Subsequent year's expenditures.....	520,000	-	-	-	520,000
Continuing appropriations.....	418,038	-	-	-	418,038
Sub-total - Committed.....	<u>938,038</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>938,038</u>
Assigned to:					
Encumbrances.....	45,223	-	-	-	45,223
Unassigned.....					
	3,971,172	-	(385,000)	-	3,586,172
	<u>\$ 5,826,159</u>	<u>\$ 1,733,405</u>	<u>\$ (385,000)</u>	<u>\$ 2,739,767</u>	<u>\$ 9,914,331</u>

NOTE 13 STABILIZATION FUNDS

The Town maintains a general stabilization fund that was established under MGL Chapter 40, Section 5B. Appropriations in and out of the stabilization fund require two-thirds vote of Town meeting. Investment income is retained by the fund.

The balance of the stabilization fund at June 30, 2016 totals \$1,163,050 and is reported as unassigned fund balance in the general fund.

TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016

NOTE 14 RISK FINANCING

The Town is exposed to various risks of loss related to torts; theft of, damage to and destruction of assets; errors and omissions; and natural disasters for which the Town carries commercial insurance.

The Town participates in a premium-based health care plan for its active and retired employees. The Town also participates in a premium-based workers' compensation plan.

The amount of claim settlements has not exceeded insurance coverage in any of the previous three fiscal years.

NOTE 15 PENSION PLAN

General Information about the Pension Plan

Plan description. Employees of the Town deemed eligible by the Middlesex County Retirement Board are provided with pensions through the MCRS - a cost-sharing multiple-employer defined benefit pension plan administered by the Middlesex County Retirement Board. Membership in the MCRS is mandatory immediately upon the commencement of employment for all permanent employees (except for school department employees who serve in a teaching capacity) working a minimum of 20 hours per week. The MCRS issues a publicly available financial report that can be obtained by contacting the MCRS located at 25 Linnell Circle, Billerica, Massachusetts, 01821.

Benefits provided. The plan provides retirement, disability and death benefits. Chapter 32 of the MGL assigns authority to establish and amend benefit provisions of the plan. Retirement benefits are provided up to a maximum of 80% of a member's highest three-year average annual rate of regular compensation for those hired prior to April 2, 2012. For persons who became members on or after April 2, 2012, average salary is calculated as the average annual rate of regular compensation received during the five consecutive years that produce the highest average, or, if greater, during the last five years (whether or not consecutive) preceding retirement. Benefit payments are based upon a member's age, length of creditable service, level of compensation, and group classification.

Members become vested after ten years of creditable service. A superannuation retirement allowance may be received upon the completion of 20 years of service or upon reaching the age of 55 with 10 years of service. Normal retirement for most employees occurs at age 65 (except for certain hazardous duty and public safety positions, whose normal retirement is at age 55).

A retirement allowance consists of two parts: an annuity and a pension. A member's accumulated total deductions and the interest they generate constitute the annuity. The differential between the total retirement benefit and the annuity is the pension.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 15 PENSION PLAN (CONTINUED)

General Information about the Pension Plan (Continued)

Members who become permanently and totally disabled for further duty may be eligible to receive a disability retirement allowance. The amount of benefits to be received in such cases is dependent on several factors, including whether or not the disability is work related, the member's age, years of creditable service, level of compensation, veterans' status and group classification.

Survivor benefits are extended to eligible beneficiaries of members whose death occurs prior to or following retirement.

Contributions. Chapter 32 of the MGL assigns authority to establish and amend contribution requirements of the plan. Active plan members contribute between 5 and 11% of their gross regular compensation. The contribution rate is based on the date plan membership commences. Members hired on or after January 1, 1979, contribute an additional 2% of annual regular compensation in excess of \$30,000. Employers are required to pay an annual actuarially determined contribution that, when combined with employee contributions, is expected to finance the pension portion of each member's retirement allowance, an amount to amortize the actuarially determined unfunded liability to zero in accordance with the plan's funding schedule, and additional appropriations in accordance with adopted early retirement incentive programs. The pension fund appropriations are allocated amongst employers based on covered payroll. Contributions to the pension plan from the Town were \$771,117 for the year ended June 30, 2016.

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At June 30, 2016, the Town reported a liability of \$8,912,755 for its proportionate share of the net pension liability. The net pension liability was measured as of December 31, 2015, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of January 1, 2014 for which update procedures were used to roll forward the total pension liability to the measurement date. The Town proportion of the net pension liability is a blended rate of the proportionate share of active employer's covered payroll, direct charges for early retirement incentives and the direct amortization of the actuarial determined net pension liability for employer members that no longer have active covered payroll.

At December 31, 2015, the Town proportion was 0.690901%. At December 31, 2014, the Town proportion was 0.665%.

For the year ended June 30, 2016, the Town recognized pension expense of \$953,492. At June 30, 2016, the Town reported deferred outflows of resources related to pensions of \$772,828.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 15 PENSION PLAN (CONTINUED)

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions (Continued)

The amount reported as deferred outflows of resources related to pensions will be recognized in pension expense as follows:

<u>Year Ending June 30</u>		
2017	\$	194,958
2018		194,958
2019		194,958
2020		187,954

Actuarial assumptions. The total pension liability was determined using the following actuarial assumptions:

Inflation rate:	4.00%
Salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4
Mortality Rates:	<p>Pre-Retirement - The RP-2000 Employee Mortality Table projected 22 years with Scale AA</p> <p>Post-Retirement - The RP-2000 Employee Mortality Table projected 17 years with Scale AA</p> <p>Disabled Retiree - The RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA</p>
Investment rate of return	7.875%, net of pension plan investment expense, including inflation

The actuarial assumptions used in the January 1, 2014 valuation were based on the results of an actuarial experience study for the period January 1, 2012 to January 1, 2014.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 15 PENSION PLAN (CONTINUED)

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions (Continued)

Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of January 1, 2014 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Domestic Equity.....	19.6%	6.5%
International Equity - Developed Markets.....	15.6%	7.1%
International Equity - Emerging Markets.....	6.5%	9.5%
Core Fixed Income.....	15.3%	1.7%
High-Yield Fixed Income.....	8.3%	4.8%
Real Estate.....	9.9%	4.4%
Commodities.....	3.9%	4.1%
Short-Term Government Money Market.....	0.0%	1.1%
Hedge Fund, GTAA, Risk Parity.....	9.8%	3.6%
Private Equity.....	11.1%	11.0%
Totals.....	<u>100.0%</u>	

Discount rate. The discount rate used to measure the total pension liability was 7.875%. The projection of cash flows used to determine the discount rate assumed that employee contributions will be made at the current contribution rate and that contributions from employers will be made at rates equal to the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the Town's proportionate share of the net pension liability to changes in the discount rate. The following presents the Town's proportionate share of the net pension liability calculated using the discount rate of 7.875%, as well as what the Town's proportionate share of the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.875%) or 1-percentage-point higher (8.875%) than the current rate:

	1% Decrease (6.875%)	Current Discount Rate (7.875%)	1% Increase (8.875%)
Town of Carlisle's Proportionate Share of the Net Pension Liability.....	\$ 10,702,536	\$ 8,912,755	\$ 7,388,630

Pension plan fiduciary net position. Detailed information about the pension plan's fiduciary net position is available in the separately issued MCRS financial report.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 16 MASSACHUSETTS TEACHERS RETIREMENT SYSTEM

General Information about the Pension Plan

Plan description. Public school teachers and certain administrators are provided with pensions through the Massachusetts Teachers' Retirement System (MTRS), a cost-sharing multiple-employer defined benefit pension plan administered by the Massachusetts Teachers' Retirement Board. The MTRS is part of the Commonwealth of Massachusetts of Massachusetts' (Commonwealth of Massachusetts) reporting entity and does not issue a stand-alone audited financial report. The MTRS is reported as a Pension Trust Fund in the Commonwealth of Massachusetts's audited financial statements that can be obtained at <http://www.mass.gov/osc/publications-and-reports/financial-reports/cafr-reports.html>.

Benefits provided. MTRS provides retirement, disability, survivor and death benefits to members and their beneficiaries. Massachusetts General Laws (MGL) establishes uniform benefit requirements. These requirements provide for superannuation retirement allowance benefits up to a maximum of 80% of a member's highest three-year average annual rate of regular compensation. For employees hired after April 1, 2012, retirement allowances are calculated on the basis of the last five years or any five consecutive years, whichever is greater in terms of compensation. Benefit payments are based upon a member's age, length of creditable service, and group creditable service, and group classification. The authority for amending these provisions rests with the Legislature.

Members become vested after ten years of creditable service. A superannuation retirement allowance may be received upon the completion of twenty years of creditable service or upon reaching the age of 55 with ten years of service. Normal retirement for most employees occurs at age 65. Most employees who joined the system after April 1, 2012 cannot retire prior to age 60.

Contributions. The MTRS' funding policies have been established by Chapter 32 of the MGL. The Legislature has the authority to amend these policies. The annuity portion of the MTRS retirement allowance is funded by employees, who contribute a percentage of their regular compensation. Member contributions for MTRS vary depending on the most recent date of membership, ranging from 5-11% of regular compensation. Members hired in 1979 or subsequent contribute an additional 2% of regular compensation in excess of \$30,000.

The Commonwealth of Massachusetts is a nonemployer contributor and is required by statute to make all actuarially determined employer contributions on behalf of the member employers. Therefore, the Town is considered to be in a special funding situation as defined by GASB Statement No. 68, *Accounting and Financial Reporting for Pensions* and the Commonwealth of Massachusetts is a nonemployer contributing entity in MTRS.

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

Since the Town does not contribute directly to MTRS, the Town does not report a proportionate share of the net pension liability of the MTRS at June 30, 2016. The Commonwealth of Massachusetts's net pension liability associated with the Town was \$21,627,992.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 16 MASSACHUSETTS TEACHERS RETIREMENT SYSTEM (CONTINUED)

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions (Continued)

The MTRS' net pension liability was measured as of June 30, 2015, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of January 1, 2015 rolled forward to June 30, 2015.

For the year ended June 30, 2016, the Town recognized pension expense of \$1,754,223 associated with MTRS and revenue of the same amount for support provided by the Commonwealth of Massachusetts.

Actuarial assumptions. The MTRS' total pension liability for the June 30, 2015 measurement date was determined by an actuarial valuation as of January 1, 2015 rolled forward to June 30, 2015. This valuation used the following assumptions:

Investment rate of return	7.5%
Salary increases	Salary increases are based on analyses of past experience but range from 4.0% to 7.5% depending on length of service
Mortality Rates:	<p>Pre-retirement - reflects RP-2000 Employees table adjusted for "white-collar" employment projected 22 years with Scale AA (gender distinct)</p> <p>Post-retirement - reflects RP-2000 Healthy Annuitant table adjusted for large annuity amounts and projected 17 years with Scale AA (gender distinct)</p> <p>Disability - reflects RP-2000 Healthy Annuitant table adjusted for large annuity amounts and projected 17 years with Scale AA (gender distinct) set forward 3 years for males</p>
Other	<p>3.5% interest rate credited to the annuity savings fund</p> <p>3.0% cost of living increase per year</p>

Investment assets of the MTRS are with the Pension Reserves Investment Trust (PRIT) Fund. The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future rates of return are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target asset allocation percentage.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 16 MASSACHUSETTS TEACHERS RETIREMENT SYSTEM (CONTINUED)

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions (Continued)

Best estimates of geometric rates of return for each major asset class included in the PRIT Fund's target asset allocation as of June 30, 2015 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Global Equity.....	40%	6.9%
Core Fixed Income.....	13%	2.4%
Private Equity.....	10%	8.5%
Real Estate.....	10%	6.5%
Value Added Fixed Income.....	10%	5.8%
Hedge Funds.....	9%	5.8%
Portfolio Completion Strategies.....	4%	5.5%
Timber/Natural Resources.....	4%	6.6%
Totals	<u>100%</u>	

Discount rate. The discount rate used to measure the MTRS' total pension liability was 7.50%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rates and the Commonwealth of Massachusetts's contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rates. Based on those assumptions, the net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Pension plan fiduciary net position. Detailed information about the MTRS' fiduciary net position is available in the Commonwealth of Massachusetts's audited financial statements.

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 2016**

NOTE 17 COMMITMENTS

The Town contracts with Wheelabrator, Inc. to dispose of solid waste and make certain payments (i.e., tipping fees) for such disposal at Wheelabrator, Inc.'s facility. The tipping fees payable under the contract for fiscal year 2016 were \$63/ton and totaled approximately \$106,000. Future tipping fees payable under the contract are as follows:

Fiscal Year	Tipping Fee (per Ton)
2017	\$ 64.58
2018	66.19
2019	67.84
2020	69.54

NOTE 18 CONTINGENCIES

Various legal actions and claims are pending against the Town. Litigation is subject to many uncertainties, and the outcome of individual litigated matters is not always predictable. Although the amount of liability, if any, at June 30, 2016, cannot be ascertained, management believes any resulting liability should not materially affect the financial position of the Town at June 30, 2016.

The Town participates in a number of federal award programs. The programs are subject to financial and compliance audits. The amount, if any, of expenditures which may be disallowed by the granting agencies cannot be determined at this time, although the Town expects such amounts, if any, to be immaterial.

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**TOWN OF CARLISLE, MASSACHUSETTS
GENERAL FUND
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
YEAR ENDED JUNE 30, 2016**

	Prior Year Encumbrances and Continuing Appropriations	Original Budget	Supplemental Appropriations and Transfers	Final Budget
REVENUES				
Real estate and personal property taxes	\$ -	\$ 24,598,543	\$ -	\$ 24,598,543
Motor vehicle and other excise taxes	-	905,000	-	905,000
Tax liens	-	-	-	-
Payments in lieu of taxes	-	6,300	-	6,300
Intergovernmental	-	1,244,056	-	1,244,056
Penalties and interest on taxes	-	40,000	-	40,000
Licenses and permits	-	119,000	-	119,000
Fines and forfeitures	-	8,250	-	8,250
Departmental and other	-	151,335	-	151,335
Investment income	-	12,500	-	12,500
	<u>-</u>	<u>27,084,984</u>	<u>-</u>	<u>27,084,984</u>
TOTAL REVENUES	-	27,084,984	-	27,084,984
EXPENDITURES				
Current:				
General government	107,061	1,545,015	72,753	1,724,829
Public safety	222,885	2,412,447	10,000	2,645,332
Education	63,167	17,951,518	(10,000)	18,004,685
Public works	300	1,174,719	8,248	1,183,267
Health and human services	24,285	317,376	-	341,661
Culture and recreation	53,601	830,054	-	883,655
Pension benefits	-	771,117	-	771,117
Employee benefits	5,000	1,050,000	(76,000)	979,000
Property and liability insurance	-	205,000	10,000	215,000
State and county charges	-	-	48,662	48,662
Debt service:				
Principal	-	1,050,000	(55,000)	995,000
Interest	-	486,869	-	486,869
	<u>476,299</u>	<u>27,794,115</u>	<u>8,663</u>	<u>28,279,077</u>
TOTAL EXPENDITURES	476,299	27,794,115	8,663	28,279,077
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	(476,299)	(709,131)	(8,663)	(1,194,093)
OTHER FINANCING SOURCES (USES)				
Transfers in	-	67,945	-	67,945
Transfers out	-	(225,000)	(55,000)	(280,000)
	<u>-</u>	<u>(157,055)</u>	<u>(55,000)</u>	<u>(212,055)</u>
TOTAL OTHER FINANCING SOURCES (USES)	-	(157,055)	(55,000)	(212,055)
NET CHANGE IN FUND BALANCE	(476,299)	(866,186)	(63,663)	(1,406,148)
FUND BALANCE AT BEGINNING OF YEAR	4,489,863	4,489,863	4,489,863	4,489,863
FUND BALANCE AT END OF YEAR	\$ 4,013,564	\$ 3,623,677	\$ 4,426,200	\$ 3,083,715

See accompanying Notes to Basic Financial Statements.

Actual	Current Year Encumbrances and Continuing Appropriations	Actual and Encumbrances and Continuing Appropriations	Variance Positive/ (Negative)
\$ 24,728,091	\$ -	\$ 24,728,091	\$ 129,548
943,401	-	943,401	38,401
4,206	-	4,206	4,206
7,303	-	7,303	1,003
1,243,393	-	1,243,393	(663)
55,968	-	55,968	15,968
99,774	-	99,774	(19,226)
6,303	-	6,303	(1,947)
170,501	-	170,501	19,166
12,694	-	12,694	194
<u>27,271,634</u>	<u>-</u>	<u>27,271,634</u>	<u>186,650</u>
1,383,424	145,669	1,529,093	195,736
2,440,002	186,134	2,626,136	19,196
17,984,819	16,203	18,001,022	3,663
1,078,544	12,131	1,090,675	92,592
290,333	16,158	306,491	35,170
795,176	81,966	877,142	6,513
771,117	-	771,117	-
920,423	5,000	925,423	53,577
209,476	-	209,476	5,524
48,662	-	48,662	-
995,000	-	995,000	-
485,857	-	485,857	1,012
<u>27,402,833</u>	<u>463,261</u>	<u>27,866,094</u>	<u>412,983</u>
<u>(131,199)</u>	<u>(463,261)</u>	<u>(594,460)</u>	<u>599,633</u>
68,191	-	68,191	246
<u>(280,000)</u>	<u>-</u>	<u>(280,000)</u>	<u>-</u>
<u>(211,809)</u>	<u>-</u>	<u>(211,809)</u>	<u>246</u>
(343,008)	(463,261)	(806,269)	599,879
<u>4,489,863</u>	<u>4,489,863</u>	<u>4,489,863</u>	<u>-</u>
<u>\$ 4,146,855</u>	<u>\$ 4,026,602</u>	<u>\$ 3,683,594</u>	<u>\$ 599,879</u>

**TOWN OF CARLISLE, MASSACHUSETTS
COMMUNITY PRESERVATION FUND
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
YEAR ENDED JUNE 30, 2016**

	Prior Year Encumbrances and Continuing Appropriations	Original Budget	Supplemental Appropriations and Transfers	Final Budget
REVENUES				
Community preservation surcharges	\$ -	\$ 395,000	\$ -	\$ 395,000
Tax liens	-	-	-	-
Penalties and interest on taxes	-	-	-	-
Intergovernmental	-	114,000	-	114,000
Investment income	-	-	-	-
	<u>-</u>	<u>509,000</u>	<u>-</u>	<u>509,000</u>
TOTAL REVENUES				
	<u>-</u>	<u>509,000</u>	<u>-</u>	<u>509,000</u>
EXPENDITURES				
Current:				
Administrative	-	2,500	-	2,500
Acquisitions and projects	92,046	834,500	-	926,546
	<u>92,046</u>	<u>837,000</u>	<u>-</u>	<u>929,046</u>
TOTAL EXPENDITURES				
	<u>92,046</u>	<u>837,000</u>	<u>-</u>	<u>929,046</u>
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES				
	<u>(92,046)</u>	<u>(328,000)</u>	<u>-</u>	<u>(420,046)</u>
NET CHANGE IN FUND BALANCE				
	(92,046)	(328,000)	-	(420,046)
FUND BALANCE AT BEGINNING OF YEAR				
	<u>1,581,983</u>	<u>1,581,983</u>	<u>1,581,983</u>	<u>1,581,983</u>
FUND BALANCE AT END OF YEAR				
	<u>\$ 1,489,937</u>	<u>\$ 1,253,983</u>	<u>\$ 1,581,983</u>	<u>\$ 1,161,937</u>

	Actual	Current Year Encumbrances and Continuing Appropriations	Actual and Encumbrances and Continuing Appropriations	Variance Positive/ (Negative)
\$	421,875	\$ -	\$ 421,875	\$ 26,875
	57	-	57	57
	823	-	823	823
	118,424	-	118,424	4,424
	<u>1,653</u>	<u>-</u>	<u>1,653</u>	<u>1,653</u>
	<u>542,832</u>	<u>-</u>	<u>542,832</u>	<u>33,832</u>
	-	-	-	2,500
	<u>391,410</u>	<u>167,654</u>	<u>559,064</u>	<u>367,482</u>
	<u>391,410</u>	<u>167,654</u>	<u>559,064</u>	<u>369,982</u>
	<u>151,422</u>	<u>(167,654)</u>	<u>(16,232)</u>	<u>403,814</u>
	151,422	(167,654)	(16,232)	403,814
	<u>1,581,983</u>	<u>1,581,983</u>	<u>1,581,983</u>	<u>-</u>
\$	<u><u>1,733,405</u></u>	<u><u>1,414,329</u></u>	<u><u>1,565,751</u></u>	<u><u>403,814</u></u>

**TOWN OF CARLISLE, MASSACHUSETTS
PENSION PLAN SCHEDULES
YEAR ENDED JUNE 30, 2016**

The following schedules provide information related to the System as a whole, for which the Town is one participating employer:

SCHEDULE OF THE TOWN'S PROPORTIONATE SHARE OF THE NET PENSION LIABILITY*

	<u>2015</u>	<u>2016</u>
Town's proportion of the net pension liability.....	0.665%	0.690901%
Town's proportionate share of the net pension liability.....	\$ 7,984,515	\$ 8,912,755
Town's covered-employee payroll.....	\$ 4,542,103	\$ 4,723,787
Town's proportionate share of the net pension liability as a..... percentage of its covered-employee payroll.....	175.79%	188.68%
Plan fiduciary net position as a percentage of the total pension liability.....	47.65%	46.13%

*The amounts presented were determined as of December 31 within the applicable fiscal year.

SCHEDULE OF TOWN CONTRIBUTIONS

	<u>2015</u>	<u>2016</u>
Actuarially Required Contribution.....	\$ 726,609	\$ 771,117
Contributions in Relation to the Actuarially Required Contribution.....	<u>(726,609)</u>	<u>(771,117)</u>
Contribution Deficiency (Excess).....	<u>\$ -</u>	<u>\$ -</u>
Town's Covered-Employee Payroll.....	\$ 4,542,103	\$ 4,723,787
Contributions as a Percentage of Covered Employee Payroll.....	16.00%	16.32%

**TOWN OF CARLISLE, MASSACHUSETTS
PENSION PLAN SCHEDULES
YEAR ENDED JUNE 30, 2016**

**SCHEDULE OF THE TOWN'S PROPORTIONATE SHARE OF THE NET PENSION LIABILITY
MASSACHUSETTS TEACHERS' RETIREMENT SYSTEM**

	<u>2015</u>	<u>2016</u>
Town's proportion of the net pension liability.....	0.00%	0.00%
Town's proportionate share of the net pension liability..... \$	-	-
Commonwealth's proportionate share of the net pension liability associated with the Town.....	16,985,552	21,627,992
Total..... \$	<u>16,985,552</u>	<u>\$ 21,627,992</u>
Town's covered-employee payroll..... \$	6,551,624	\$ 6,691,077
Town's proportionate share of the net pension liability as a percentage of its covered-employee payroll.....	N/A	N/A
Plan fiduciary net position as a percentage of the total pension liability.....	61.64%	55.38%

**SCHEDULE OF THE TOWN'S CONTRIBUTIONS
MASSACHUSETTS TEACHERS' RETIREMENT SYSTEM**

	<u>2015</u>	<u>2016</u>
Contractually required contribution..... \$	-	-
Contributions in relation to the contractually required contribution.....	-	-
Contribution deficiency (excess)..... \$	<u>-</u>	<u>-</u>
Town's covered-employee payroll..... \$	6,551,624	6,691,077
Contributions as a percentage of covered-employee payroll.....	N/A	N/A

**TOWN OF CARLISLE, MASSACHUSETTS
OTHER POSTEMPLOYMENT BENEFITS SCHEDULE
SCHEDULE OF FUNDING PROGRESS
YEAR ENDED JUNE 30, 2016**

The following schedule provides information related to the Town's other postemployment benefits plan:

Actuarial Valuation Date	Actuarial Value of Assets (A)	Actuarial Liability (AAL) Projected Unit Credit (B)	Unfunded AAL (UAAL) (B-A)	Funded Ratio (A/B)	Covered Payroll (C)	UAAL as a Percentage of Covered Payroll ((B-A)/C)
03/01/08	\$ -	\$ 6,833,708	\$ 6,833,708	0.0%	\$ 9,034,961	76%
07/01/09	-	7,956,352	7,956,352	0.0%	9,197,150	87%
07/01/11	-	7,900,998	7,900,998	0.0%	9,834,071	80%
07/01/13	-	9,115,689	9,115,689	0.0%	10,789,421	84%
07/01/15	-	10,843,307	10,843,307	0.0%	11,821,964	92%

**TOWN OF CARLISLE, MASSACHUSETTS
NOTES TO REQUIRED SUPPLEMENTARY INFORMATION
JUNE 30, 2016**

NOTE A BUDGETARY – GAAP RECONCILIATION

For budgetary financial reporting purposes, the Uniform Massachusetts Accounting System basis of accounting (established by the Commonwealth of Massachusetts) is followed, which differs from the GAAP basis of accounting. A reconciliation of budgetary-basis to GAAP-basis results for the general fund and community preservation fund (CPA) for the fiscal year ended June 30, 2016 is presented below:

General Fund

	<u>Revenues</u>	<u>Expenditures</u>	<u>Other Financing Sources (Uses)</u>
Budgetary basis as reported on the schedule of revenues, expenditures and changes in fund balance - budget and actual.....	\$ 27,271,634	\$ 27,866,094	\$ (211,809)
<u>Reclassifications</u>			
Activity of stabilization and OPEB funds recorded in the general fund for GAAP purposes.....	(7,202)	-	210,055
<u>Adjustments</u>			
Net change in recording 60-day receipts.....	(26,999)	-	-
Net change in recording tax refunds payable.....	50,000	-	-
To record encumbrances and continuing appropriations.....	-	(463,261)	-
GAAP basis as reported on the statement of revenues, expenditures and changes in fund balances.....	<u>\$ 27,287,433</u>	<u>\$ 27,402,833</u>	<u>\$ (1,754)</u>

CPA Fund

	<u>Expenditures</u>
Budgetary basis as reported on the schedule of revenues, expenditures and changes in fund balance - budget and actual.....	\$ 559,064
<u>Adjustments</u>	
To record encumbrances and continuing appropriations.....	<u>(167,654)</u>
GAAP basis as reported on the statement of revenues, expenditures and changes in fund balances.....	<u>\$ 391,410</u>



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016

4

Procedure for Delinquent Taxpayers

Requested by: Tax Collector/Finance Director

Action Sought: 11/9/16

Proposed Motion(s)

DISCUSSION

Additional Information

Attached please find Town Counsel's summary of the Municipal Modernization Act including the new provisions to withhold licenses/permits from delinquent tax payers.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>

Miyares and Harrington LLP

A private law firm in the public interest

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SUMMARY FOR TOWNS

MUNICIPAL MODERNIZATION ACT CHAPTER 218 OF THE ACTS OF 2016

This summary of statutory changes applicable to Towns is for reference purposes only. It does not describe the details of the statutes as amended. We expect that you will have questions regarding the significance or effect of some of these changes on your current operations. Please contact us for further advice.

I. New/Revised Local Option Statutes

Unless noted otherwise, acceptance is by majority vote at Town Meeting.

Agricultural Commissions

Sections 1, 23, 215, and 243, amending *M.G.L. c.20, §23, M.G.L. c.111, §31*, and inserting a new *M.G.L. c.40, §8L*: Acceptance allows Towns to establish robust municipal Agricultural Commissions for development of agricultural resources. Pre-existing Agricultural Commissions automatically gain the extensive authority provided by *M.G.L. c. 40, §8L* without Town acceptance of the new statute.

OPEB

Sections 15 and 238, amending *M.G.L. c.32B, §20*, and inserting a new §20A: Section 20(b) now allows a governmental unit to establish an OPEB trust fund that complies with standards established by the Governmental Accounting Standards Board (GASB) and the IRS. By providing for the creation of a trust instrument, this amendment resolves the conflict between the prior statute and GASB 45. The definition of political subdivisions able to establish such funds has been expanded to include housing authorities, redevelopment authorities, regional councils of government, regional school districts and educational collaboratives. Governmental entities will have a number of investment options, thereby removing the need for special legislation. Section 20(k) will also now allow a governmental unit to participate in the OPEB fund established by another governmental unit. OPEB funds established prior to the Act will continue to be governed by the prior terms of the statute unless the statute is reaccepted.

Rental Receipts Fund Income

Section 19, amending *M.G.L. c.40, §3* (see also Rental Receipts Fund): Acceptance allows Towns to retain rental income from non-School buildings in an account for upkeep and maintenance of the rented facility.

Miyares and Harrington LLP

Joint Powers Agreement

Section 20, inserting a new *M.G.L. c.40, §4A1/2*: This section allows governmental entities to enter into a joint powers agreement. In a Town, these can be entered into by the Board of Selectmen with another governmental unit for the joint exercise of any of their common powers and duties within a designated region, except for veterans' services.

Dedication of Fees to Stabilization Funds

Section 22, amending *M.G.L. c.40, §5B*: Acceptance allows Towns to dedicate by 2/3 vote of Town Meeting, without further appropriation, a percentage of not less than 25% of a particular fee, charge or receipt (except for certain taxes and surcharges) to any stabilization fund established pursuant to §5B, provided that the receipt is not reserved by law for expenditure for another purpose.

School Reserves

Section 24, inserting a new *M.G.L. c.40, §13E*: Acceptance allows School Districts, by majority vote of the School Committee and Town Meeting, to establish a reserve fund of up to 2% of the District's annual net school spending that may be spent without further appropriation for certain unanticipated expenses upon majority vote of the School Committee and Board of Selectmen. Regional School Districts may accept this provision by a majority vote of the School Committee and a majority of the member communities and may expend funds by majority vote of the School Committee and the Board of Selectmen in a majority of the member communities.

Parking Meters – Agreements for Acquisition or Installation

Section 25, amending *M.G.L. c.40, §22A*: Acceptance allows Towns to pay, over a period not to exceed five years, for acquisition or installation of parking meters from parking meter receipts without appropriation.

Off-Street Parking Areas

Section 28, amending *M.G.L. c.40, §22B*: Section 22B, related to parking meters and acquisition of land for off-street parking, is now a local option statute.

Parking Meters in Off-Street Parking Lots

Section 29, amending *M.G.L. c.40, §22C*: allows Towns that accept this provision to use receipts from parking meters in off-street lots for certain parking and transportation-related expenses and services.

Regional Refuse Disposal Planning Committee

Sections 32-34, amending *M.G.L. c.40, §§44A, 44E and 44F*: These sections enable a Board of Selectmen to establish a Regional Refuse Disposal Planning Committee.

Workforce Housing Special Tax Assessment Plan

Sections 39 and 123, adding *M.G.L. c.40, §60B* and clause 58 to *M.G.L. 59, § 5*: Acceptance allows municipalities, individually or in collaboration, to implement a special tax assessment plan intended to encourage development of middle-income housing.

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Combined Collector/Treasurer

Sections 51 and 52, amending *M.G.L. c.41, §1B*: This section allows municipalities by vote of Town Meeting and at an annual election to combine their treasurer and collector positions into one appointed office.

Special Injury Leave Indemnity Fund

Section 60, amending *M.G.L. c.41, §111F*: Acceptance allows Towns to establish a reserve fund for payment of injury leave compensation and bills incurred under Chapter 41, §§100 or 111F (indemnification and paid leave for police and firefighters).

Performance Deposits

Section 92, inserting a new *M.G.L. c. 44, §53G1/2*: This section creates a new, refundable, surety deposit fund for municipalities to deposit monies escrowed to secure performance of a condition imposed for a permit, license or approval.

The form and investment of the required financial guarantee and the criteria for determining satisfactory performance or default must be set by bylaw, rule or regulation. Upon satisfactory performance, the board or officer granting the permit, license or approval may refund the escrowed monies with appropriation. The new statute does not apply to any financial surety required for subdivision approval under *M.G.L. c. 41, §81U*.

Elections

Sections 101 and 102, inserting a new *M.G.L. c.54, §33I*, and amending *M.G.L. c.54, §67*: These sections permit municipalities to use "electronic poll books" in lieu of paper voting lists at polling stations. Any Town interested in using electronic poll books must obtain approval from the Secretary of the Commonwealth and, if approved, obtain a vote of the Board of Selectmen at least 60 days before the first election in which such technology will be used.

Exemptions, Soldiers' and Veterans' Spouses

Sections 116 and 121, amending *M.G.L. c.59, §5*: These sections add a local acceptance option to make the spouse of a sailor, soldier, or veteran who holds title to the service member's domicile as a trustee or conservator eligible for available service members' exemptions and the surviving spouse who acquired title to a deceased service member's domicile under a trust or conservatorship to retain eligibility for an exemption. DLS has noted, however, that these spouses and surviving spouses have legal title to the home and may therefore already be granted an exemption.

Property Taxes not in Excess of \$100 and Assessment of Interest

Section 140-141 and 251, amending *M.G.L. c.59, §57A* and repealing § 57B: Acceptance allows Towns to make tax bills for less than \$100 due and payable in one installment and, if unpaid, to charge interest at the same rate and from the same date as any delinquent preliminary or actual first tax installment. Once accepted, this section is effective FY '18.

Abatement for Environmental Cleanup

Sections 147 and 148, amending *M.G.L. c.59, §59A*: Acceptance permits Towns to abate real estate tax obligations, interest and costs on commercial or industrial zoned property in order to clean up releases of oil or hazardous waste.

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POW Motor Vehicle Excise Tax Exemption

Section 170, amending *M.G.L. c.60A, §1*: Acceptance allows a Town to exempt former prisoners of war from motor vehicle excise taxes.

Jet Fuel Excise

Sections 175-177, amending *M.G.L. c.64J, §§4 and 13*: Acceptance allows a municipality owning an airport in another municipality to collect the excises on the sale or use of aircraft fuel.

Adult/Continuing Education Revolving Fund

Section 189, amending *M.G.L. c.71, §71E*: This section incorporates Regional School Districts into the local option statute allowing for the collection of monies for the operation of adult education and continuing education programs. Acceptance is by vote of the Regional School Committee.

Culinary Arts Revolving Fund

Section 190, amending *M.G.L. c.74, §14B*: This section incorporates Regional School Districts into the local option statute allowing creation of a culinary arts revolving fund and removes the \$5,000 expenditure limit placed on vocational schools' revolving funds used for culinary arts or other related programs. Acceptance is my vote of the regional school committee and the board of selectmen of a majority of the member communities.

Sewer Liens

Section 192, amending *M.G.L. c.83, §16A*: Acceptance allows Towns to extend lien provisions for unpaid sewer bills to customers in neighboring communities.

Speed Limits

Section 193, inserting a new *M.G.L. c.90, §17C*: Acceptance allows a Town to establish a speed limit of 25 mph on any roadway inside a thickly settled or business district that is not a state highway.

Speed Limits – Designated Safety Zones

Section 194, inserting a new *M.G.L. c.90, §18B*: Acceptance allows a Town to establish designated safety zones with a speed limit of 20 mph on any roadway inside a thickly settled or business district that is not a state highway, as well as on state highways with the permission of the Department of Transportation.

Regional Health Districts

Sections 212-214, amending *M.G.L. c.111, §§27A and 27B*: These sections allow Boards of Selectmen to establish Regional Health Districts.

Economic Development and Industrial Corporations

Section 219, amending *M.G.L. c.121C, §3*: Economic Development and Industrial Corporations can now be formed in a Town by the Board of Selectmen rather than by Town Meeting.

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II. Municipal Finance

Retiree Health Insurance Cost Sharing

Sections 14 and 251, repealing *M.G.L. c.32B, §9A1/2*: This section repeals the statute that provided that a local governmental unit from which an employee is retired may seek reimbursement from other local governmental units for a portion of the retiree's health care premiums corresponding to the percentage of the retiree's creditable service attributable to each governmental unit. The repeal is effective January 1, 2017.

Approval of Bills/Warrants

Sections 57 and 58: amending *M.G.L. c.41, §§52 and 56*: This section allows multi-member boards, committees, and commissions heading departments, including Boards of Selectmen, to designate one of its members to review and approve bills or treasury warrants, with a report provided to the full board, committee or commission at the next meeting.

Emergency Spending

Section 71, amending *M.G.L. c.44, §31*: This section provides for automatic approval of payment for liabilities incurred as a result of emergencies and disasters when the Governor declares a State of Emergency.

Court Judgments

Sections 72 and 73, amending *M.G.L. c.44, § 31*: This section allows payment, without appropriation, of final court judgments and other final adjudicatory awards upon "town council" (*sic*) certification that no appeal can or will be taken. Currently, such payments over \$10,000 require the approval of the Director of Accounts.

Snow and Ice Deficit Spending

Section 74, amending *M.G.L. c.44, §31D*: This section permits the local chief administrative officer to authorize deficit spending for snow and ice removal expenses.

Year-End Transfers

Sections 75-76, amending *M.G.L. c.44, §33B*: These sections eliminate the limits on types and amounts of appropriation transfers that can be made by the Board of Selectmen with Finance Committee approval at the end of the Fiscal Year.

Compensating Balance Agreements

Sections 87-90, amending *M.G.L. c.44, §53F*: These sections eliminate the role of DLS in prescribing types of services that Treasurers may acquire from banking institutions under "compensating balance" arrangements. In addition, Treasurers will now submit their annual reports on these agreements to the Inspector General and local officials. DLS will no longer receive these reports.

Revenue Cash Investment

Section 94, amending *M.G.L. c.44, §55*: This section permits investment in certificates of deposit (CDs) for up to three years, an increase from the current, one-year limit. This change also eliminates an ambiguity in the statute as to whether the limit applies to these investments or solely to investments in U.S. Treasury Bonds.

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Regional School District Transportation

Section 181, amending *M.G.L. c.71, §16C*: This section clarifies that any funds to be reimbursed by the Commonwealth for Regional School District transportation are subject to appropriation.

Demolition Liens

Section 221, amending *M.G.L. c. 139, §3A*: Changes the deadlines by which Towns may convert demolition liens to the property tax.

III. Borrowing

Industrial Development Financing Authority

Sections 40-41, amending *M.G.L. c.40D, §2*: These amendments allow the Board of Selectmen, rather than Town Meeting, to declare that an industrial development financing authority is needed, and to consolidate such authority with that of another municipality.

Debt Purposes

Sections 61, 63-64, 178 and 180, amending *M.G.L. c.43B, § 8, c.44, §§7 – 9, c.70B, §6, and c.71, §16*: These sections consolidate and restructure the allowable purposes for which municipalities may borrow funds. In addition, borrowing for more than one year for the payment of a court judgment is allowed if approved by the Municipal Finance Oversight Board.

Grant Anticipation Notes

Section 62, amending *M.G.L. c.44, §§6 and 6A*: This section allows municipalities to borrow in anticipation of any state or federal grant.

Ten-Year BANs

Section 65, amending *M.G.L. c.44, §17*: This section increases the maximum term for Bond Anticipation Notes from five years to ten with the same required principal pay down as current law.

Refunding Bonds

Sections 66 and 68, amending *M.G.L. c.44, §§19 and 21A*: These sections allow final payment of notes to be made as late as June 30 of the fiscal year in which the payment would otherwise be due, instead of on the annual anniversary of prior payments. They also amend current law to allow the issuance of refunding bonds with a finding by the Board of Selectmen that refunding is necessary for federal tax compliance purposes even if the principal and interest due on the refunding bonds exceeds the present value of the principal and interest on the bonds to be refunded.

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Bond Premiums and Surplus Proceeds

Section 67, amending *M.G.L. c.44, §20*: This section allows Towns a choice with respect to the treatment of bond premiums (net of issuance costs). Towns will be able either to apply the premiums to the issuance (thereby reducing the amount to be borrowed) or to place them in a separate fund and appropriate them for a capital project. Section 67 also amends current law by increasing, from \$1,000 to \$50,000, the amount of surplus bond proceeds that can be applied to debt service.

Tax-Exempt Lease Purchase Agreements

Section 69, inserting a new *M.G.L. c.44, §21C*: This section establishes a procedure governing the use of tax-exempt lease-purchase financing agreements (TELPs) by municipal departments and allows borrowing to pay off a TELP agreement if it would result in interest savings.

Debt Report

Section 70, repealing *M.G.L. c.44, §25*: This section eliminates the requirement that the Treasurer notify the Director of Accounts when a payment is made on a note issued by the Town.

Regional School District Debt

Section 179, amending *M.G.L. c.71, §14D*: This section inserts the word "committee" to clarify that it is the Regional District School Committee that may require the approval by referendum of any particular authorized issue of indebtedness.

Municipal Debt/Urban Renewal

Sections 217-218 and 220, repealing *M.G.L. c. 121B, §22*, and amending *M.G.L. c.121B, §24* and *c.121C, §11*: These sections eliminate duplicative requirements regarding approval of debt issued by Towns to support housing and urban renewal projects. Towns are subject to an overall debt limit under *M.G.L. c.44, §10*, which may be exceeded with the approval of the Municipal Finance Oversight Board. In addition, they delete an incorrect reference to the Emergency Finance Board.

Federal Public Works Borrowing

Sections 234-235, amending Section 215 of Chapter 149 of the Acts of 2004 and Section 1 of Chapter 279 of the Acts of 1960 (Sections 1-2 of Chapter 74 of the Acts of 1945): These sections eliminate the requirement that the Governor approve local borrowing for federally funded public works projects and substitutes approval by the Municipal Finance Oversight Board instead.

IV. Collection Procedures

License/Permit Denials

Sections 37-38, amending *M.G.L. c.40, §57*: These sections allow a Town, pursuant to a bylaw accepting the provisions of this statute, to deny, suspend, revoke or decline to renew certain licenses or permits when the applicant has been delinquent on a local tax or charge for at least 12 months. Where the delinquency exists for less than 12 months, these sections allow Tax Collectors to furnish such information to their license and permit granting departments and boards in accordance with the implementing bylaw.

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Independent Water and Sewer Commissions

Sections 42 and 43, amending *M.G.L. c.40N*, §§9 and 27: clarifies that water or sewer commissions established under Chapter 40N are independent bodies politic, and that such commissions may enter into agreements with municipalities to have liens added to municipal tax bills and overdue charges collected by the Tax Collector.

Insufficient Funds Checks

Sections 98-99 and 165, amending *M.G.L. c.44*, §69 and *M.G.L. c.60*, §57A: The penalty for checks tendered with insufficient funds will now also apply to electronic payments. In addition, DLS will no longer hear appeals from taxpayers or ratepayers assessed penalties. Appeals will be made to the officer who assessed the penalty.

State Action in Lieu of Treasurer or Collector

Sections 105 and 164, amending *M.G.L. c.58*, §8 and *c.60*, §50: These sections eliminate the authority of the Division of Local Services to refer a collector to the Attorney General for failure to collect taxes or to foreclose tax titles in the place of the treasurer.

Betterment, Special Assessment and Tax Payments

Sections 138 and 248, amending *M.G.L. c. 59*, §57, and repealing *M.G.L. c. 59*, §57B: Beginning in FY2018, these sections standardize the accrual of interest on overdue betterments and special assessments and tax installments. Regardless of the billing system used by the Town, interest will accrue from the installment due date.

Abatement of *de minimis* Unpaid Taxes

Sections 153 and 155, amending *M.G.L. c.60*, §2 and repealing *M.G.L. c.59*, §72: Gives collectors the flexibility to request abatement of unpaid taxes under §25.

Mailing Property Tax Bills

Section 156, amending *M.G.L. c.60*, §3: This section clarifies that the tax collector shall mail tax bills to the taxpayer's address, if known, or to the property address, unless the taxpayer provides another address.

Foreclosure of Property with Covenants Running with Land

Section 166, amending *M.G.L. c.60*, §77: Eliminates authority of Division of Local Services over covenants running with the land before tax title foreclosure.

Foreclosure of Abandoned Property

Section 167, amending *M.G.L. c.60*, §81A: This section lets the Treasurer file an expedited petition for foreclosure upon the building inspector's affidavit that buildings are abandoned, and removes the requirement that the Commissioner of Revenue determine abandonment.

Credits to Collectors

Section 168, amending *M.G.L. c.60*, §95: This section transfers from a collector's books taxes in litigation.

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Betterment Payments

Section 191, amending *M.G.L. c.80, §13*: This section gives municipalities greater flexibility in structuring payments of betterments and special assessments for infrastructure improvements. Owners will have 30 days from the mailing of the bill, not from the commitment of the assessment, to pay without interest. Municipalities may structure annual installment payments to have level payments or to be payable in the same number of installments as the real estate tax. The alternative interest rate that can be charged to property owners can now be set at any percentage up to 2% (rather than the current fixed 2%) above the rate charged on the loan financing the improvements.

Small Claims Court Jurisdiction

Sections 232 and 233, amending *M.G.L. c.218, §21*: These sections expand the jurisdiction of Small Claims Court to include actions by municipalities to collect personal property taxes regardless of amount, as well as other claims by municipalities for up to \$15,000.

V. Tax Administration

Certification of Local Assessments

Sections 35-36 and 250, amending *M.G.L. c.40, §56*: Certification that a local board of assessors is assessing property at full and fair cash valuation will occur every five years rather than every three years. This change is effective beginning in FY '18.

District Improvement Financing

Sections 44-50, amending *M.G.L. c.40Q, §§1, 3*: Chapter 40Q permits Towns to fund infrastructure and development projects by allocating future, incremental property tax revenues collected from a predefined geographic area to pay project costs. These sections amend Chapter 40Q so that the "DIF" revenues reserved for project costs and debt service for public improvements made by a City or Town within the district equals the new property tax revenue generated by new development and added to the community's levy limit as new growth under Proposition 2 1/2 while the district exists. It also clarifies that the requirement to reserve tax increment funds ends when monies are set aside to pay all debt service.

Joint/Cooperative Assessing, Classification and Valuation of Property

Section 54, amending *M.G.L. c.41, §30B*: This section allows Boards of Selectmen to enter into intermunicipal agreements for assessing services or functions.

Affordable Housing Abatements

Sections 106 and 107, amending *M.G.L. c.58, §8C*: These sections remove the requirement that Towns obtain approval from the Commissioner of Revenue to abate up to 75% of the outstanding real estate tax obligations and up to 100% of the outstanding interest and costs in agreeing with developers who commit to developing sites or portions of sites as affordable housing or as mixed affordable housing and commercial use.

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State-Owned Land

Sections 108, 109 and 249, amending *M.G.L. c.58, §§13-17* and repealing §17A: These sections change the current procedure under which the Bureau of Local Assessment values state-owned land. The valuation will be based on a statutory formula, updated every two years using the Town's equalized valuation and the value of acquisitions and dispositions. This change is effective January 1, 2018.

Supplemental Assessments and *Pro Rata* Abatements

Sections 112-115 and 252, amending *M.G.L. c.59, §2D*: Section 2D, unless rejected by a Town by vote of its Board of Selectmen, provide for the re-assessment of real property that is improved or damaged by over 50% of its assessed value. These sections amend the law to exclude the value of the land from the calculation of the 50% change in value and gives taxpayers a year after a damaging event to apply for a *pro rata* abatement. This change is effective on January 1, 2017.

Technical Amendments

Sections 117, 157, 170 and 171: A number of technical amendments were made to exemption, collection or other local tax provisions. These include:

- (1) correcting the reference to a local acceptance sentence of *M.G.L. c.59, §5, Clause 3*, regarding exemption of certain property acquired by charitable organizations;
- (2) correcting a wrong reference to a subsection in *M.G.L. c.60, §3A*, allowing collectors to e-bill;
- (3) correcting the placement of a local acceptance motor vehicle excise exemption for former prisoners of war and their surviving spouses in *M.G.L. c.60A, §1*; and
- (4) eliminating the requirement in *M.G.L. c.60A, §2A*, that the Legislature's Joint Revenue Committee approve the form to be used by collectors to mark taxpayers with delinquent motor vehicle excises at the Registry of Motor Vehicles.

Local Assessment Approvals

Sections 128-130 and 247, amending *M.G.L. c.59, §11*: Effective January 1, 2017, assessors will no longer have to obtain prior approval from DLS to assess real estate taxes on particular parcels to owners unknown, the holder of a present interest, or the beneficial owners of cluster development open space.

Single Overlay Account

Sections 131, 133, 152 and 249, amending *M.G.L. c.59, §§23, 25, and 70A*: These sections create a single overlay reserve to cover the costs of potential abatements granted by the assessors or ordered by the ATB for any year. Existing overlay balances merge into a single account on November 7, 2016.

Central Valuation

Sections 134, 135 and 251, amending *M.G.L. c.59, §§39 and 41*: These sections set June 15 as the deadline for the Commissioner of Revenue to issue the central valuation of telephone and telegraph company assets. Companies and municipalities will now have until July 15 to appeal any such central valuation to the ATB. Tax returns for centrally valued property are still due by March 1, but DLS may now give an extension up to April 1. These sections are effective for FY 2018.

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Appellate Tax Board Jurisdiction

Sections 139, 142-143, and 149-151, amending *M.G.L. c.59, §§ 57, 57C and 64*: These sections amend the jurisdiction of the Appellate Tax Board (ATB). Under the amendments, the ATB will not hear any appeal brought by a taxpayer whose real estate tax bill is over \$5,000 and who has incurred interest on any tax installment for the year. The Act also creates a "postmark rule" for determining whether a payment is timely solely for the purpose of maintaining an appeal. If a preliminary or actual payment is mailed on or before the due date, it will be treated by the ATB as if no interest has been incurred.

Applicants for Abatement

Sections 144, 145 and 247, amending *M.G.L. c.59, §59*: These sections permit holders of mortgages on real property who have paid not less than half of the tax thereon to apply for abatement of the real estate tax during the last 10 days of the abatement period. They also make a technical change to conform language to the terms used by the Uniform Probate Code to refer to persons handling a decedent's estate. That person has standing to apply for an abatement of a tax assessed to the decedent. These amendments are in effect for FY 2017.

Apportionment Appeals

Section 154, amending *M.G.L. c.59, §81*: Increases to thirty the number of days that an owner of a portion of a parcel divided by a transfer in ownership after January 1 has to appeal the assessors' allocation of the tax and lien among the owners of the "new" parcels.

Classified Agricultural or Horticultural Land

Sections 172-174, inserting a new *M.G.L. c.61A, §2A* and amending §13: These sections define installation of renewable energy systems on land classified as agricultural or horticultural land as an agricultural or horticultural use, so that no right of first refusal or penalty tax for change in use is triggered. This applies only to systems that are used to supply energy for the exclusive use of the farmland and do not produce more than 125% of the agricultural use's energy needs.

Probate Ownership Records

Sections 231 and 252, inserting a new *M.G.L. c.271, §16A*: Effective January 1, 2018, Registrars of Probate will have to provide, upon request by Town Assessors, information regarding the filing of probate petitions for deceased persons for use in determining changes in property ownership.

Cranberry Bogs

Section 237, amending Section 276 of Ch. 165 of the Acts of 2014: A special exemption from the annual gross sales requirements for cranberry bogs is extended until 2020.

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VI. Local Tax Exemptions or Benefits

Exemption Applications

Sections 31, 100, 119, 122, 125, 126, 146 and 247, amending *M.G.L. c.40, §39M, M.G.L. c.44B, §3, and M.G.L. c.59, §§5, 5C, 5I, and 59*: Beginning in FY2017, taxpayers in all communities (regardless of the billing system used) will have until April 1 to apply for personal exemptions and deferrals from real estate taxes under *M.G.L. c.59, §5, Clauses 17, 17C, 17C1/2, 17D, 18, 18A, 22, 22A, 22B, 22C, 22D, 22E, 22F, 37, 37A, 41, 41A, 41B, 41C, 41C1/2, 42, 43, 52, 53, 56 and 57*. The April 1 deadline also applies to applications for residential exemptions and small commercial exemptions granted as part of a community's property tax classification options, if the exemptions do not appear on the actual tax bill, and to applications for exemption of Community Preservation and Municipal Water Infrastructure surcharges. In addition, applications for abatement and exemption of Community Preservation surcharges will be confidential, and taxpayers may appeal the assessors' denial of their applications to the ATB in the same manner as denied property tax abatement and exemption applications.

Commercial Fishing Exemption

Section 120, amending *M.G.L. c.59, §5*: This section increases the value of the property tax exemption for boats, nets and gear used in commercial fishing to \$50,000. It also increases eligibility for the exemption by eliminating the current requirement that the exempt property be used "exclusively" in commercial fishing, requiring instead that at least half of the taxpayer's income is from commercial fishing.

Residential Exemption

Section 124, amending *M.G.L. c.59, §5C*: This section increases the maximum residential exemption that can be granted by a municipality as one of its property tax classification options. Beginning in FY2017, communities may grant a residential exemption of up to 35%, instead of 20%, of the average assessed valuation of residential parcels.

Senior Work Abatement

Section 127, amending *M.G.L. c.59, §5K*: This section increases the maximum abatement allowed to Towns that have accepted the senior work-off abatement statute to \$1,500.

Exemptions, Veterans' Spouses

See Local Option Statutes.

Workforce Housing Special Tax Assessment

See Local Option Statutes.

VII. Special Purpose Funds

Rental Receipts Fund

Section 19, amending *M.G.L. c.40, §3*: This section allows Towns to create a special account for proceeds from rental of surplus non-school properties and authorizes expenditures without appropriation for upkeep of such properties. By default, any funds remaining in the account at the close of the fiscal year are paid to the general fund. A local option provision has been added, however, that allows sums to remain in the account.

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Stabilization Funds

Section 22, amending *M.G.L. c.40, §5B*: This section permits appropriations into stabilization funds by majority vote and eliminates the cap on the amount so segregated. See also Local Option Statutes.

Parking Meter Revenue Use

Sections 26-27 and 30, amending *M.G.L. c.40, §§22A and 22C* and inserting a new §22A1/2: These sections expand the allowable use of parking meter funds and allow rates to be set for the purpose of managing the parking supply. They also allow for the establishment of Parking Benefit Districts, geographically defined areas in which parking revenue collected may be designated for use through a dedicated fund.

Insurance/ Restitution Funds

Section 84, amending *M.G.L. c.44, §53*: This section increases to \$150,000 the amount of insurance proceeds that may be spent without appropriation to restore or replace damaged property, and updates the lost or damaged school book and materials restitution exception to include electronic devices and equipment provided to students.

Grant Available Funds

Section 85, amending *M.G.L. c.44, §53A*: This section makes all reimbursable grants from federal or state government available for expenditure once approved by the granting agency.

Departmental Revolving Fund

Section 86, amending *M.G.L. c.44, §53E1/2*: This section provides for revolving funds to be established by bylaw instead of by an Annual Town Meeting vote, broadens the types of receipts for which revolving funds can be established, and eliminates caps on revolving fund expenditures. Towns must annually vote the limit on the total amount that may be spent from each revolving fund.

Refundable Consulting Fees

Section 91, amending *M.G.L. c.44, §53G*: This section allows bylaws and regulations to establish consultant fees to be imposed by any municipal permitting officer or board to pay the costs of their reviewing applications for permits or licenses and, if monies remain after the officer or board makes its determination, to refund them to the applicant, without appropriation.

Special Events Fund

Section 93, amending *M.G.L. c.44, §53I*: This section broadens the municipal celebration fund to include any special event, rather than certain anniversary celebrations.

Betterment Reserve

Section 93, inserting a new *M.G.L. c. 44, §53J*: This section specifically reserves betterment and special assessment revenue for appropriation for the payment of debt service on any bonds issued to finance the improvements for which the betterments were assessed.

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Community Preservation Act (CPA) Appropriations

Sections 95-97 and 246, amending *M.G.L. c.44, §55C*: These sections amend the Municipal Affordable Housing Trust statute to ensure that CPA fund monies appropriated to a municipality's trust are used for purposes consistent with both CPA and trust purposes with respect to community housing. The trust purposes have been amended to match the CPA allowable community housing purposes. The trust must separately track the use of CPA appropriations and report annually to the municipality on the use of the monies. The changes apply to all CPA funds held by the trust on the November 7, 2016, as well as to future appropriations to the trust.

Scholarship and Educational Funds

Sections 159-162, amending *M.G.L. c.60, §3C*: This section clarifies the authority of Towns to form scholarship and supplemental educational funds and the purposes for which such funds can be used.

Regional School District Stabilization Fund

Section 183, amending *M.G.L. c.71, §16G1/2*: Under *M.G.L. c.71, §16G1/2*, a Regional School District can have a stabilization fund, not to exceed 5% of the total assessment upon member communities. This section substitutes the Commissioner of Elementary and Secondary Education in place of the Director of Accounts to approve a higher level of stabilization fund appropriation and expenditures from the fund for other than capital purposes.

Extended School Programs

Sections 185-187, amending *M.G.L. c.71, §§26A, 26B and 26C*: Under §§26A, 26B, and 26C, School Committees may provide preschool and extended school services for certain children and establish a separate account for payments made by parents and other monies received in connection with these programs to be expended by the School Committee without appropriation.

Community School Program Fund

Section 188, amending *M.G.L. c.71, §71C*: This section increases the community school fund's expenditure limit for material and equipment purchases within a fiscal year to \$10,000.

Special Injury Leave Indemnity Fund

See Local Option Statutes.

Special Education Reserve Fund

See Local Option Statutes.

Jet Fuel Excise

See Local Option Statutes.

Parking Meters – Agreements for Acquisition or Installation

See Local Option Statutes.

Performance Deposits

See Local Option Statutes.

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Adult/Continuing Education Revolving Fund

See Local Option Statutes.

Culinary Arts Revolving Fund

See Local Option Statutes.

VIII. Construction and Procurement

Procurement of Goods and Services

Sections 6-12, amending *M.G.L. c.30B*, §§ 4, 5, 6, 6A and 7: These sections amend the *Uniform Procurement Act* by increasing the dollar threshold for contracts requiring full competitive bidding from \$35,000 to \$50,000. Now, supply and service contracts valued between \$10,000 and \$50,000 may be solicited by process of obtaining three written quotes. Oral quotes are no longer permitted and the Town is required to record specific information about the process used. In addition, section 5 of the Act removes the existing exemption from Chapter 30B for contracts for bank services that are subject to the maintenance of a compensating balance.

Public Works Construction and Small Building Contracts.

Sections 2-4 and 224-230, amending *M.G.L. c.30*, §39M and *M.G.L. c.149*, §§§§A, 44F and 44J: These sections amend the laws governing procurement of public works construction and small building construction contracts by making the procurement methods for such contracts consistent with other municipal procurement statutes by adding a "middle tier" of contracts valued at between \$10,000-\$50,000, for which public entities are not required to solicit sealed bids and may instead either give public notification of the contract and seek written responses from at least three persons that customarily perform such work or use Operational Services Division statewide contracts or other "blanket" contracts to solicit a minimum of three bids. The contract must be awarded to the to the responsible bidder offering to perform the contract at the lowest price.

Section 39M(a) of Chapter 30 of the General Laws has also been amended to provide a method of procurement for public works contracts valued at less than \$10,000. Consistent with *M.G.L. c.149*, §44A and *M.G.L. c.30B*, §4, municipalities will need to use "sound business practices," as defined in *M.G.L. c.30B*, §2, prior to entering into such contracts. The law also permits Towns to utilize a vendor on a statewide contract or a blanket contract on any public works or public construction contract valued at less than \$10,000.

These sections also increase the dollar thresholds for public works and public construction contracts requiring competitive bidding (from \$100,000 to \$150,000 for first tier) and for triggering the requirement to submit "sub-bids" and "sub-trade" bids.

Miyares and Harrington LLP

IX. Regionalization

Grants – Facilitation of Intermunicipal Cooperation

Sections 240 and 241 encourage executive agencies to evaluate all grant, loan, and technical assistance programs under their offices for opportunities to promote intermunicipal cooperation, collaboration, and regional service delivery and to prioritize funding shared municipal programs.

X. Other

Civil Service Exams for Police Officers and Firefighters

Section 13, amending *M.G.L. c.31, §58*: This section allows an applicant who reached 19 years of age while serving on active military duty but was not yet 19 on or before the date of an original examination to be eligible for any subsequent make-up examination that is offered. Still, no person is eligible for original appointment to the position of police officer in a municipality until that person has reached the age of 21.

Local Autonomy

Sections 53, 55-56, repealing *M.G.L. c.41, §§27, 37 and 39B*: These sections eliminate state commissioners' roles in approving or removing assessors, collectors, deputy collectors and treasurers from office for nonperformance.

Local Audits

Sections 77-83 and 182, amending *M.G.L. c.44, §§35, 38-44 and 46A* and *M.G.L. c. 71, §16E* and repealing *M.G.L. c.44, §§36-37 and 46*: These section change Town and Regional School District audit, accounting and reporting standards regarding periodic audits and establish uniformity in accounting.

Tax Forms

Sections 104, 111, 136-137, 163 and 169, amending *M.G.L. c.58, §§5 and 31, M.G.L. c.59, 45 and 50, and M.G.L. c.60, 6 and 105*: These sections no longer require the Division of Local Services to print and distribute forms or approve electronic formats, but it continues to prescribe the content of forms.

State Aid to Cities and Towns

Section 110, amending *M.G.L. c.58, §18F*: Extends to November 30 the date for submission of Schedule A for prior year and permits withholding payments until Schedule A is submitted.

E-Citations

Sections 195-211, amending *M.G.L. c.90C, §§1-4*: These sections allow for the implementation of the new "E-Citations" project being jointly administered by Executive Office of Public Safety and Security and the Registry of Motor Vehicles. Municipal police departments will now be able to issue tickets electronically for civil motor vehicle infractions.

Miyares and Harrington LLP

Housing Authority Appointments

Section 216, amending *M.G.L. c.121B*, §5: This section allows a municipality to make an appointment to fill a vacancy on the Housing Authority if the Department of Housing and Community Development does not fill the vacancy of its appointed member within 120 days.

Penalties for Unlicensed Electricians

Section 222, amending *M.G.L. c.141*, §5: This section increases fines that can be imposed by local electrical inspectors on unlicensed electricians. The new penalty structure is \$1,000 to \$1,500 for a first offense, \$1,500 to \$2,000 for a second offense, and \$2,000 to \$2,500 for each subsequent offense.

Police Cadet Program

Section 223, amending *M.G.L. c.147*, §21A: This section prevents anyone applying to become a police cadet from aging out as long they applied while they were age-eligible.

Reduced Cost of Textbooks/Educational Materials

Section 244, inserting a new outside requirement: This section requires the Operational Services Division to develop procedures allowing for the reduction of the cost of textbooks and other educational materials through bulk purchasing.

Manufactured Housing Study / Qualification under Ch. 40B

Section 245, inserting a new outside requirement: This section requires the Department of Revenue to conduct a study evaluating each manufactured housing community in the Commonwealth to determine what percentage of residential households in each such community would qualify for low- or moderate-income housing under *M.G.L. c.40B*.



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016



FY2017 BOS Goals

Requested by: Chair Nathan Brown and TA Timothy Goddard

Action Sought 11/9/2016

Proposed Motion(s)

DISCUSSION

Additional Information

See attached updated list of goals.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>

FY '17 Board of Selectmen Goals

FINAL DRAFT

Sustainable Budget

- Work with all departments, Boards, Committee's etc. to create a three-year plan that includes long term caps and operational funding needs.
- Focus on maintaining sustainable operating budget for the town with a goal not to increase taxes more than 2.5%.
- Support common sense initiatives that reduce operating and capital costs.
- Make long term debt decisions based on modeling of tax incidence under various operational and debt assumptions.
- Assure strong ongoing oversight of the overall budget.
- Develop a budgeting process that goes beyond a cash accounting and looks at all costs such as depreciation, pension benefits, interest expense, income, expense reduction savings, etc and presents new budget items in an apple to apples comparison.

Infrastructure

- Support the Information Technology Group.
- Facilities.
- Support in house IT support town wide.
- Address audit issues.

Focus on Staff

- Focus on staff development
- Improve communication within Town Hall to build a team environment

Citizen Services

- Ensure citizens are well informed as to activities and issues in town.
- Provide easy access to all rules and regulations.
- Host forums on various topics to encourage participation.

Excellence in Public Safety

- Support the Communications Plan.
- Attend and show support when FD conducts community education events about the FD.
- Formulate a succession plan for the Fire Chief.
- Provide assistance to the Fire Chief to increasing department moral.

Environment

- Encourage local farming
- Support the Planning Board in creating a solar bylaw for town meeting consideration.

Schools

- Support the Carlisle School and the Carlisle School committee in maintaining a high level of performance
- Support the Carlisle School committee in the transition out of the Minute Man School District.

Effective Board/Committee/Working Group communication

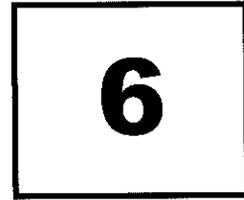
- Host an all board/department meeting.
- Request all Selectman appointed committees and groups provide semi-annual updates including goals.
- Establish a Sub Committee to review the Benfield project for lessons learned and establish a process to incorporate this review into all major town projects.
- Create a town policy or bylaw that requires all developments that have 2 or more dwellings to have a pre-design meeting with the land use Boards and the building department prior beginning the process with any individual Board.
- Better communication between BOS and Fin Com
 - Begin early
 - Stick to timelines
 - Work together to evaluate financials short and long term impacts to Town/residents to keep tax rates “down”

Town Issues

- Determine a strategy to address 40B issues
- Support the Master Plan process



**Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016**



Action Items from previous meetings

Requested by: TA Timothy Goddard

Updated list of Action Items

1. **Review Town Bylaw & Building Regulations** - Notification to abutters/30-day comment period for building permits and review current zoning for the allowed size of a secondary building on two-acre parcel.
 - New software will allow permit to be posted on-line as they are approved by Building Inspector
 - Sent request to the Planning Board. 10/4/16 – No update
 2. **LED Streetlights**
 - BOS needs to approve plan to move forward with the installation of streetlights.
 3. **LED Crosswalk Signals**
 - Proceeding with LED Pedestrian signals at 142 Bedford. Soliciting price quotes from vendors.
 4. **Comcast** – request for town-wide coverage
 - Still attempting to schedule meeting in with Comcast Representatives
 5. **Greenough Barn Property** – Selectman Ascolillo - Informal discussions with demolition/salvage companies
 6. **Municipal Aggregation Plan**
 - Awaiting scheduling of preliminary conference with DPU.
 7. **Personnel Board** – Reduce membership from 5 to 3 members not including the 2 citizen- at-large positions.
 - Personnel Board will discuss at 11/10/2016 meeting.
 8. **BOS** – upload meeting packet material to the town website.
 - BOS meeting packets for 10/25/16 and 11/9/16 are now online.
-



Carlisle Board of Selectmen
AGENDA ACTION REQUEST
November 9, 2016

7

Municipal Facilities/Town Building Committee charges

Requested by: Nathan Brown, chair

Action Sought: 11/9/16

Proposed Motion(s)

DISCUSSION

Additional Information

Attached is the draft Municipal Building Committee charge and a copy of Article 9 of the June 29, 1972 Special Town Meeting establishing a Town Building Committee.

Board Action

<i>Motion</i>	<i>Second</i>	<i>In favor</i>	<i>Opposed</i>	<i>Disposition</i>

CARLISLE MUNICIPAL FACILITIES COMMITTEE

The Town shall have a Municipal Facilities Committee consisting of five (5) interested and qualified people appointed by the Board of Selectmen for annual terms. At least one member shall be a member of the School Committee, or its designee, pursuant to M.G.L. c. 71, §68. The Committee shall be responsible, when authorized by the Board of Selectmen, and/or Town Meeting vote, for investigating and advising the Town regarding the design, construction, reconstruction, maintenance alteration or enlargement of all buildings and facilities owned by the Town or constructed on land owned, leased or operated by the Town. The buildings within the scope of the Committee include, but are not limited to, the waste water treatment plant, Library, Town Hall, police and fire buildings, Department of Public Works, Highland, and all school buildings.

The Committee will also be responsible for developing and implementing long term maintenance plans and overseeing selection of maintenance contractors and major maintenance activities for all municipal facilities.

The Committee will also approve all Facility Projects that will be submitted to the long term capital committee for funding requests. The committee will establish and maintain a 10-year master plan for each facility that will assure that the facility will maintain level performance and does not deteriorate.

All solicitations for maintenance and designer services and invitations for bids for construction shall be coordinated with the Town Administration through its Chief Procurement Officer, to assure compliance with the applicable provisions of the General Laws. The Town Administrator and Facilities Building Committee chair shall award and co-execute all services contracts and construction contracts.

In support of construction projects, the Board of Selectmen shall appoint the department head and/or two (2) committee members for which a project is being planned or constructed as non-voting ex officio members of the Permanent Municipal Facilities Committee for the duration of said project.

Appropriations.

A. The funds for construction activities for facilities and for capital expenses of existing facilities shall be appropriated to and expended under the direction of the Committee.

B. Whenever funding approval is sought from Town Meeting, the Committee and the Board or committee for which a project is being planned, or capital expenses for a building being requested, shall provide a detailed report to Town Meeting that includes an explanation of the project need, scope of work, alternatives, schedule, costs, and how it fits into an overall cohesive plan.

C. Funding for some projects may also come from existing department budgets to enable the town to leverage services and contracts across municipal facilities.

Jenn Gibbons

From: William Risso <chriswilliam@comcast.net>
Sent: Tuesday, October 25, 2016 3:05 PM
To: 'Kerry Kissinger'
Cc: 'Tim Goddard'
Subject: RE: Muni Facilities Cmtee

Kerry,

Sorry for the late response, been a little busy this week.

Below in blue are some of my thoughts on your questions and I am sure it will provoke additional questions and edits by all. These should be brought up in discussions about this committee so the residents can also provide input.

The discussion on this committee has been going on for over a year with many drafts by Nathan and John Gorecki. My input has been to review and make comments on each draft.

Last question we can talk about since it could be a lengthy answer.

Thanks

Bill

From: Kerry Kissinger [<mailto:kerrykissinger@aol.com>]
Sent: Monday, October 24, 2016 2:20 PM
To: chriswilliam@comcast.net
Subject: Muni Facilities Cmtee

Hi Bill, I had a couple of questions regarding the Muni Facilities Cmtee:

In Paragraph 1, 3rd sentence - Did you intend to have a comma between "maintenance" and "alteration"? I see that maintenance is covered in the next paragraph, so maybe it should be "maintenance alteration" without a comma, meaning "alteration of maintenance".

I believe the intent was mainly for alteration, probably should drop the word maintenance. The intent was not to include routine items like janitorial, oiling motors, checking antifreeze concentration in heating systems etc. it was also to help with making better decisions on maintenance items and not just relying on a contractor's recommendation. EX. Our librarian making decisions on when to replace an expansion tank or replace a chiller etc.

Also, for paragraph 1 - Should the Cranberry Bog be included as one of the "Facilities"? I think it is included by the words "not limited to" but adding it to the list makes it clearer.

Under Appropriations -

A. Who appropriates funds? Town Meeting. I agree words should be added to make this clear. The intent is to make sure capital expenditures are following the 10 year plan /getting the most bang for the bucks spent etc..

B. Does the term "Board" refer to the BOS? Yes

How do the BOS and committee agree before hand who is to be responsible for providing the "detailed report"? The Committee is under the BOS. I believe the intent was that the committee is responsible for getting the detailed report put together and convincing/getting buy in with the Selectman each year for items that money should be appropriated for. This 10 year plan should be a living document and reviewed yearly to make sure timing for new and old items make sense.

If it is intended that the Committee develop the "detailed report" in all cases, rather than the BOS, one must assume that the BOS has final approval of the contents, conclusions and recommendations of the Committee's "detailed report" before a request can be made by the BOS at Town Meeting.

Yes, agree

Also, who decides whether a project or line item should be studied by the Committee and not by another committee with a similar or overlapping function? I am thinking about the School Committee and the Long Range Capital Requirements Committee.

I would envision the process would be that any long term cap requirements would be submitted by this committee to the BOS and FinCom/long term caps upon approval by the BOS. (Only on projects the facility committee is responsible for), so the School Committee would be proposing additional (assuming the 10 year plan is in place) projects for its buildings to the facilities committee. We need review of these items by people that work with facilities everyday not just finance people. On the appropriation side this would ensure funds were spent on that specific project, not on other things.

Does the School Committee's having one or more people on the Muni Facilities Committee imply that the Muni Facilities Committee trumps the School Committee in terms of responsibility for completing the "detailed report"? I think it should be a partnership, also I envision these types of projects would be outside the operational school budget. The detailed report is the responsibility of the facilities committee.

What about LRCap? Who decides which is in charge of doing the report? Perhaps given the nature of these two committees, it will be the Muni Facilities Committee's responsibility to do the report and use the conclusions of the report regarding capital requirements and other costs as input to the LRCap Committee. Is this what you intended? Yes

C. How would this process have worked for the "stabilization" of the Highland Building? How will it work for the Cranberry Bog?

Thanks, Kerry

Jenn Gibbons

From: Tim Goddard <TGoddard@Carlisle.mec.edu>
Sent: Tuesday, October 25, 2016 2:07 PM
To: Bill Risso; Claude Von Roesgen; Kerry Kissinger; Luke Ascolillo
Subject: Town Building Committee

Nathan asked me forward to you all this section of the Town Bylaws passed in 1962 re: Town Building Committee:

3.16 Town Building Committee

3.16.1 The Building Committee was established by vote under Article 2 of the warrant for the special town meeting held April 9, 1962, and further amended under Article 9 of the warrant for the special town meeting held June 29, 1972.

3.16.2 The committee shall have general supervision over the design, construction and renovation of public buildings.

Timothy D. Goddard
Carlisle Town Administrator
Carlisle Town Hall
66 Westford Street
Carlisle, MA 01741
978-371-6688 (ph)
tgoddard@carlisle.mec.edu

The Secretary of the Commonwealth has ruled that email is a public record.

STM 6-29-72

Arti
propria
School
plans, sp
facilities
both.

Article 9

s voted that the Town raise and ap-
pe Concord-Carlisle Regional District
or the preparation of preliminary
tion, renovation and rehabilitation of
hool, or for the conduct of studies, or

Art
it was voted that the Town raise and
appropriate the sum of \$1,200.00 to defray the increased expenses of the Health Depart-
ment during the remainder of 1972.

* Article 9. On motion of Mr. Bickford, it was voted to revoke the vote adopted
under Article 2. of the warrant for the Special Town Meeting held April 9, 1962.
It was further voted that the Board of Selectmen be authorized and directed to
appoint a Committee to be known as the Town Building Committee, said Committee to
consist of five members; that when the Committee is first established, three members
shall be appointed for a term of two years, two shall be appointed for a term of one year
and their successors shall be appointed for terms of two years each; and that said Com-
mittee shall have general supervision over the design and construction of public
buildings, including the authority to employ professional assistance and, subject to
specific authorization by the Town, to enter into contracts on behalf of the Town for the
preparation of construction plans, specifications and for the construction of building
and other structures; such vote to be effective as of April 9, 1962 for the purpose of
clarification and to reflect the practice that has been followed since that date.

There being no further business to come before the meeting, it was adjourned at
10:05 P.M.

ELEANOR S. COCHRAN
Town Clerk of Carlisle

MINUTES OF SPECIAL TOWN MEETING NOVEMBER 28, 1972

A Special Town Meeting was held in the Robbins School on November 28, 1972. The
meeting was called to order at 7:30 P.M. by the Moderator, Marshall Simonds, and there
were 288 qualified voters present. On motion duly seconded, it was voted to waive reading
of the warrant in its entirety. However, the Moderator requested that the meeting vote
ratify the change of meeting place from Spalding to Robbins School, and it was so voted
unanimously.

Article 1. On motion of James M. DeMott, this article was passed over.

Article 2. On motion of John W. Shay, it was unanimously voted that the sum
\$13,835.00 be appropriated from the amount received by the Town in 1972 from
Federal government under the provisions of Public Law 874 of the 81st Congress, st

TOWN OF CARLISLE
Office of
TOWN ADMINISTRATOR

66 WESTFORD STREET,
CARLISLE, MASSACHUSETTS 01741

6. TOWN ADMINISTRATOR'S REPORT—November 9, 2016

1. Energy Manager draft job description

I have drafted a proposed Energy Manager job description for your (and the CETF's) review. Please let me know if you have any edits or comments.

2. Minuteman Regional School Committee appointment

Moderator Wayne Davis has discovered that under the provisions of the new Minuteman Regional Agreement he no longer has the authority to make appointments to the District School Committee – the Board of Selectmen does. Christine Lear is still willing to serve as the Town's representative so I would recommend that the Board appoint her at tonight's meeting.

Motion: "I move to appoint Christine Lear of 120 Oak Knoll Road to serve as Carlisle's representative to the Minuteman Regional District School Committee until June 30, 2017, pursuant to the Board's appointment authority under Section I, (C) of the Regional School District Agreement."

3. Town Counsel Seminar on OML/New Public Records Act

On Tuesday, November 29th we have scheduled a seminar for all town officials, board/committee members and interested citizens on the provisions of the Open Meeting Law and the newly-enacted Public Records Act. The training will be here in the Clark Room at 7:00pm. It should be a very interesting and informative evening.

Upcoming Meeting Schedule:

Tuesday, November 22, 2016 – License Renewals, Town Counsel – Presentation on Open Meeting Law and Changes to the Public Records Act, CETF Update on Streetlighting Project

ENERGY MANAGER

Position Purpose:

Responsible for the administrative, technical and supervisory tasks related to all renewable energy and energy efficiency and conservation policies, practices and projects for the town; for management and coordination duties to identify, develop, implement and manage innovative and effective programs and policies to achieve a high level of energy and resource sustainability for municipal, commercial, and residential sectors; all other related work that is logical to the position as required.

Supervision:

Receives general direction from the Town Administrator or designee, following town rules, regulations and policies; requires the ability to plan and perform operations; to independently complete assigned tasks according to a prescribed time schedule.

Job Environment:

Minimal physical effort required in performing duties under typical busy office conditions. Operates standard office equipment. Noise levels are usually quiet to moderate.

Performs varied and highly responsible duties and functions requiring independent initiative and judgment to ensure compliance with applicable laws, rules, regulations, and town policies, procedures and methods.

Has access to or control of town-wide records which may be subject to non-disclosure or limited disclosure pursuant to statutory or departmental prescript, including bid proposals.

Makes constant contacts with the general public; other town departments, officials, boards and committees; employees; state and federal officials or agencies, outside organizations, vendors, contractors; and other business, legal and civic leaders.

Errors in judgment, duties or performance may cause an adverse impact on employee morale or public opinion; confusion and delay, legal or financial repercussions, waste of public funds, and lower standards of service for the town.

Essential Functions:

(The essential functions or duties listed below are intended only as illustrations of the various types of work that may be performed. The omission of specific statements of duties does not exclude them from the position if the work is similar, related or a logical assignment to the position.)

Responsible for implementing municipal and community-wide projects and initiatives, including but not limited to:

Preparing and managing the Town's energy contracts while targeting a diversified energy portfolio that includes renewable energy and alternative fuels where economically and environmentally beneficial.

Within established guidelines and objectives, provides staff support to municipal personnel, elected officials, members of the Carlisle Energy Task Force, representatives of the Franklin Regional Council of Governments, and thers as required.

Responsible for implementing municipal and community wide projects and initiatives; for monitoring, measuring and reporting on programs and performances, including but not limited to:

- Ensure Carlisle maintains Green Community status and meets all goals including taking the lead with DOER for Green Community Reporting and Grant Opportunities and the submission of annual reports and application for annual competitive grants.
- Develop and implement clean energy projects for the town or for town buildings.
- Coordinate with departments to reduce energy consumption at town buildings and properties through upgrade projects or operational adjustments such as LED or WWTP upgrades through the Eversource Energy Efficiency Program.
- Serve as resource for departmental capital improvement projects to incorporate energy efficiency and green materials as indicated or appropriate in cost effective manner.
- Apply for grants and programs as indicated to support departmental goals.
- Develop and maintain Mass Energy Insight to track town wide energy consumption.
- Take lead on Municipal Aggregation as it pertains to green options.
- Serve as Advisor to Carlisle Energy Task Force; facilitate Sustainable Master Plan Implementation as it relates to energy and sustainability.
- Manage existing projects and processes for fuel efficient vehicle policy compliance and electric vehicle charging stations.
- Research energy and/or sustainability related programs or processes that may be applicable and deemed beneficial to the Town.
- Keep public informed on projects and successes through press and outreach.

- Develop and maintain Town webpage on energy and sustainability.
- Seeking grants, rebates, incentives, bonding initiatives, and savings-reinvestment opportunities that support and expand the Town's sustainability programs while providing positive economic development; creating, maintaining or assisting other responsible entities with baseline inventories of all municipally owned and operated buildings, vehicles, street lights, and traffic lights.
- Managing energy use in municipal facilities; Developing and implementing "best practices guidelines" that promote high performance/efficiency strategies in new construction and building retrofits in all sectors.
- Promoting greenhouse gas reduction goals in the municipal, commercial, and residential sectors to provide economic benefits and to significantly reduce the community's dependency on fossil fuels in keeping with the Town's Green Communities designation to reduce fuel consumption by 20% within specified timelines and other initiatives for by 2050 including reducing climate change emissions by 80%.

Recommended Minimum Qualifications:

Education and Experience: Bachelor's degree in field of environmental sciences or environmental policy/Management or similar field preferred.

Two (2) years direct experience, preferably in a municipal setting, developing and implementing energy efficiency and renewable energy programs; energy management, environmental climate change, or sustainability programs. Experience in dealing with the public strongly preferred; computer experience including general office software applications, spreadsheets and database management required; experience in research, policy development and report writing; or any equivalent combination of education and experience that enables performance of all aspects of the position.

Knowledge, Ability and Skill: Knowledge and experience in environmental management, climate change, energy efficiency, renewable energy and environmental sustainability principals.

Must possess a high level of interpersonal skills to handle situations or information with considerable knowledge of the rules, regulations, procedures and functions of the office and to represent the Town in a broad array of constituency groups. Knowledge of the Town of Carlisle preferred. Position continually requires tact, diplomacy and the ability to interact in a positive and effective manner with a wide variety of individuals, including the general public, employees, town, state and federal leaders or

personnel; vendors and individuals at all levels of authority. Strong administrative, organizational, communication skills in a multi-task environment; Ability to plan, delegate, and work independently. Must perform all aspects of job responsibilities with honesty and integrity.

Ability to perform projects and assignments on the basis of general outlines or directions without specific instructions as to details, and to perform continuing assignments independently. Ability to prepare routine correspondence, reports and analyses and to communicate effectively orally and in writing; ability to keep accurate and detailed records; apply organizational skills efficiently with attention to detail; ability to meet deadlines and work effectively in pressure situations in a multi-task environment.

Comprehensive knowledge of principles and techniques of energy and sustainability. Knowledge of legal and procedural operations in a municipal setting including procurement requirements. Ability to understand and prepare documents efficiently and accurately; comprehend and make inferences from written material; learn job-related material primarily through oral instruction and observation.

Performs varied and responsible duties requiring a thorough knowledge of town operations and the exercise of judgment and initiative in responding to inquiries, particularly in situations not clearly defined by precedent or established procedures.

Physical Requirements:

Frequent sitting, talking, hearing and mental concentration for prolonged periods required; frequent use of hands and fingers to handle, feel or operate objects, tools, or controls and reach with hands and arms in operating/using various office equipment; occasionally required to lift or move records or objects of up to 15 pounds; specific vision requirements include close vision for extended periods of time at computer monitor, and ability to adjust focus, color vision and depth perception. Must be able to communicate verbally and in writing and be understood clearly; ability to operate a personal computer or other keyboard device utilizing a windows environment and to operate a keyboard and standard office equipment at efficient speed.

Special Requirements: Must have valid license to operate a motor vehicle.



Massachusetts Department of Elementary and Secondary Education

75 Pleasant Street, Malden, Massachusetts 02148-4906

Telephone: (781) 338-3000
TTY: N.E.T. Relay 1-800-439-2370

Mitchell D. Chester, Ed.D.
Commissioner

March 11, 2016

Edward A. Bouquillon, Superintendent
Minuteman Regional Vocational-Technical School District
758 Marrett Road
Lexington, MA 02421-7313

Dear Superintendent Bouquillon:

The Department of Elementary and Secondary Education has received the district's amended agreement and copies of the votes of the member towns of the Minuteman Regional Vocational-Technical School District, certifying that they have approved the amendment to the regional school district agreement. The amendment provides comprehensive changes and updates to the language of your agreement. The amendment further allows for the withdrawal of the Towns of Carlisle, Sudbury, Wayland, Lincoln, Boxborough and Weston. The above-named towns, through separate votes, have approved their withdrawal from the Minuteman Regional School District, effective July 1, 2017.

We have found this amended agreement to be in compliance with applicable law and regulation. I, therefore, approve this most recent amendment to the Minuteman Regional Vocational-Technical School District Agreement. The amended agreement will be effective upon my approval. As noted, the effective date of the withdrawal of the above-named towns will be July 1, 2017 in accordance with the town votes and 603 CMR 41.03.

My best wishes for continued success in all your future endeavors.

Sincerely,

A handwritten signature in black ink, appearing to read "Mitchell D. Chester".

Mitchell D. Chester, Ed.D.

Commissioner of Elementary and Secondary Education

c: Debra Comfort
Christine M. Lynch

Amended: 1973, 1979, 1980, 2016

REGIONAL AGREEMENT

This Agreement is entered into pursuant to Chapter 71 of the General Laws of Massachusetts, as amended, among the towns of Acton, Arlington, Belmont, Boxborough, Carlisle, Concord, Lexington, Lincoln, Stow, Sudbury, Wayland, Weston, Bolton, Dover, Lancaster, and Needham, hereinafter sometimes referred to as member towns. In consideration of the mutual promises herein contained, it is hereby agreed as follows:

SECTION I: THE REGIONAL DISTRICT SCHOOL COMMITTEE

(A) Composition

The Regional School Committee, hereinafter sometimes referred to as "the Committee," shall consist of one member from each member city or town (the term "city" and the term "town" will hereinafter be referred to jointly as "community"). The members of the Committee shall be appointed as hereinafter provided. All members will serve until their respective successors are appointed and qualified.

(B) Staggering of Terms

The terms of office shall begin on July 1 and shall be for three years. In order to have approximately one third of the terms of office expire at the end of each year, the initial term of office of a Committee member representing a newly admitted community may be for shorter than three years, said determination to be made by vote of the Committee (or by lot, if there is more than one community being newly admitted at the same time).

(C) Appointing Authority

Members who have been appointed to the School Committee by their respective Town Moderators prior to the July 1 date on which this amended language becomes effective shall serve out the remaining one, two or three years of their term. Beginning on the July 1 when this amended language becomes effective, each member shall thereafter be appointed by vote of the Board of Selectmen of that town (or by the Mayor in the case of a city), except that in the case of a town, the town may by bylaw or charter provide for appointment of that community's member by the Moderator. The language of the preceding sentence will also apply to any community newly admitted to the District whose membership in the District commences on or after the July 1 effective date of this amended language.

(D) Subsequent Terms of Office

Just prior to the conclusion of the Initial terms spoken of in the subsection (B) above, the Appointing Authority of the member community will appoint a member of the Regional School Committee to serve a three year term beginning on July 1.

(E) Vacancies

Should a vacancy occur on the Regional School Committee for any reason, the unexpired term will be filled within sixty (60) days by the Appointing Authority of the community having the vacancy.

(F) Organization

At the first meeting of the Regional School Committee held after July 1, the Committee shall

organize and choose a Chairman and a Vice-Chairman from among its membership and will choose a Secretary, who may or may not be from among its membership.

(G) Power and Duties

The Committee shall have all the powers and duties conferred and imposed upon school committees by law and conferred and imposed upon it by this Agreement, and such other additional powers and duties as are specified in Section 16 to 16I, inclusive, of Chapter 71 of the General Laws and any amendments or additions thereto now or hereafter enacted, or as may be specified in any other applicable general or special law.

(H) Weighted Voting

Each member of the Regional School Committee will exercise a weighted vote, rounded to the nearest hundredth of a percent, which will be calculated and established as of July 1 of each year as follows. The first half of the weighted vote for all of the member communities will be the same. (For example, if hypothetically there were 16 member communities, then the first half of each member's weighted vote will be 1/16 of 50%, which would be 3.125%). The second half of each member community's weighted vote will be computed as follows. Based on the official October 1 student enrollment figures as determined by the Department of Elementary and Secondary Education ("DESE"), or its successor agency, a four year "rolling average" of the school's enrollment from member communities, using the most recent year's October 1 enrollment figures and those from the three preceding years, will be established. Using the same methodology, each member community's average percentage of student enrollment from all of the member communities for that period, rounded to the nearest hundredth of a percent, will be established and will be used as the second half of that member community's weighted vote to become effective on the following July 1. (For example, if over the four year period a member community supplied an average of 8.67% of the school's enrollment from all of the member communities, then, beginning on the following July 1 and extending for the next year, the second half of that member community's weighted vote would be 8.67% of 50%, which would be 4.335%). The two halves will then be added together, and rounded to the nearest hundredth of a percent, to establish that community's total weighted vote. (For example, using the hypotheticals expressed above in this paragraph, the hypothetical community's total weighted vote as of the July 1 in question would be 3.125% plus 4.335%, which would add to 7.46%). Assuming that a quorum as defined in subsection (I) below is present, and except for a vote to approve the annual budget, to incur debt, or to approve an amendment to this Agreement, a combined total of weighted votes amounting to over 50% of the weighted votes present shall constitute majority approval.

In order to approve the District's annual budget, a combined total of weighted votes equal to or exceeding 66.67% of the weighted vote of the entire Committee (i.e., not merely two thirds of the weighted vote of those present) shall be required.

In order to incur debt, a two-thirds (2/3) vote of all of the members of the Regional School Committee, without regard for the weight of the vote, shall be required. In order to approve an amendment to this Agreement, a three-fourths (3/4) vote of all of the members of the Regional School Committee, without regard for the weight of the votes, shall be required.

(I) Quorum

A majority of the total number of members of the Regional School Committee (regardless of the weighted votes) shall constitute a quorum. A quorum is necessary for the transaction of business, but an assemblage less than a quorum may adjourn a meeting.

SECTION II TYPE OF REGIONAL SCHOOL DISTRICT

The regional district school shall be a technical and vocational high school consisting of grades nine through twelve, inclusive. The Committee is also hereby authorized to establish and maintain such kinds of education, acting as trustees therefore, as may be provided by communities under the provisions of Chapter 74 of the General Laws and acts amendatory thereof, in addition thereto or dependent thereon, including courses beyond the secondary school level in accordance with the provisions of Section 37A of said Chapter 74.

SECTION III LOCATION OF THE REGIONAL DISTRICT SCHOOL

The regional district school shall be located within the geographical limits of the District, or within a radius of 5 miles from the intersection of Route 2 and Bedford Road, which intersection is in the town of Lincoln, provided that if a community where the school is located ceases to be a district member, the school may continue to be located in that community.

SECTION IV APPORTIONMENT AND PAYMENT OF COSTS

(A) Classification of Costs

For the purpose of apportioning assessments levied by the District against the member communities, costs shall be divided into two categories: capital costs and operating costs.

(B) Capital Costs

Capital costs shall include all expenses in the nature of capital outlay such as the cost of acquiring land, the cost of constructing, reconstructing, or adding to a school building or buildings, the cost of remodeling or making extraordinary repairs to a school building or buildings, the cost of constructing sewerage systems and sewerage treatment and disposal facilities or the cost of the purchase or use of such systems with a municipality, and any other item of capital outlay for which a regional school district may be authorized to borrow, or which could be categorized as a capital expense in conformance with applicable law and regulation, including without limitation the cost of original equipment and furnishings for such school buildings or additions, plans, architects' and consultants' fees, grading and other costs incidental to placing school buildings and additions, sewerage systems and sewerage treatment and disposal facilities, and any premises related to the foregoing in operating condition. Capital costs shall also include payment of principal of and interest on bonds, notes and other obligations issued by the District to finance capital costs.

(C) Operating Costs

Operating costs shall include all costs not included in capital costs as defined in subsection IV (B), but including interest on temporary notes issued by the District in anticipation of revenue.

(D) Apportionment of Capital Costs

1. The following method will be used for apportioning capital costs incurred prior to July 1,

2016:

After first deducting any other sources of revenue that are appropriately applied against capital costs, capital costs shall be annually apportioned to the towns which were members of the District as of June 30, 2016 for the ensuing fiscal year in the following manner. Each member town's share of capital costs for each fiscal year shall be determined by computing the ratio which the town's pupil enrollment in the regional district school on October 1 of the fiscal year next preceding the fiscal year for which the apportionment is determined bears to the total pupil enrollment from all the member towns on the said date, except that if there is an enrollment of fewer than five pupils from any member town in the regional district school on said date, such member town shall be deemed to have an enrollment of five pupils in the regional district school. For the purpose of this subsection, in computing this apportionment the persons enrolled in courses or programs referred to in subsection IV (F) shall not be included.

2. The following method will be used for apportioning capital costs incurred on or after July 1, 2016:

After first deducting any other sources of revenue that are appropriately applied against capital costs, capital costs which are incurred on or after July 1, 2016 shall be apportioned to the member communities annually for the ensuing fiscal year in the following manner (for illustration purposes only, examples of these calculations appear in Appendix A.)

a. Fifty percent (50%) of the capital costs will be apportioned to each of the member communities by computing the ratio which that community's pupil enrollment in the regional district school, using a rolling average based on the four (4) most recent annual October 1 enrollment figures, bears to total pupil enrollment in the regional district school from member communities, using a rolling average based on the four (4) most recent annual October 1 enrollment figures, except that if there were an enrollment of fewer than one (1) pupil from any member community in the regional district school on any of the four (4) most recent October 1 dates, such member community will be deemed to have had an enrollment of one (1) pupil in the regional district school on said date.

b. An additional one percent (1%) of these costs will be apportioned to each of the member communities regardless of student enrollment.

c. The balance of these costs will be apportioned by applying DESE's combined effort yield (a measure of a community's ability to pay for education using property values and household incomes) to the percentage of each community's students (as defined by foundation enrollment) that are enrolled at Minuteman. The specific calculation is as follows:

- Each member community's pupil enrollment in the regional district school, using a rolling average based on the four (4) most recent annual October 1 enrollment figures, including the one (1) pupil minimum spoken of in 2,a above, will be identified.
- This average regional enrollment figure for each member community will be compared to that community's most recent October 1 "foundation enrollment" figure (determined by DESE), and the percentage of that community's most recent foundation enrollment figure which is comprised of that town's average regional enrollment figure will be computed.
- This percentage amount will be multiplied by the lesser of the "combined effort yield" or 100% of the "foundation budget" (using the most recent "final" numbers determined by DESE) for that community, resulting in a number to be called "combined effort yield at Minuteman".

- The numbers representing each community's "combined effort yield at Minuteman" will be totaled, and each community's percentage of that total (this percentage to be called "combined effort capital assessment share") will be computed.
- Each community's "combined effort capital assessment share" will be used to calculate the apportionment of the capital costs under this paragraph. (An example of the calculations described in this paragraph is found in the chart headed "Calculation Factor - Ch. 70 Combined Effort Capital Allocation" appearing on page 2 of Appendix A.)

In the event that changes occur at the state level in either the terminology or the calculation formulas that lie behind the terms used in this paragraph, the Committee will use a calculation approach which replicates the apportionment outcomes that would result from this paragraph if the terms of this paragraph were applied as of the effective date of this Regional Agreement.

(E) Apportionment of Operating Costs

The District will utilize the statutory method in the apportionment of operating costs. Pursuant to this method, the District will deduct from operating costs the total of any revenue from Chapter 70 state aid, Chapter 71 Regional Transportation Reimbursement, and any other revenue as determined by the Regional School Committee. The balance of all operating costs, except those described in subsection IV,F below, shall be apportioned to each member community as follows. Each member community's share of operating costs will be the sum of the following: (a) the member's required local contribution to the District as determined by the Commissioner of Elementary and Secondary Education (hereinafter "the Commissioner"); (b) the member's share of that portion of the District's net school spending, as defined by G.L. chapter 70, section 2, that exceeds the total of the required local contributions for all of the members; and (c) the member's share of costs for transportation and all other expenditures (exclusive of capital costs as defined in subsection IV,(B) above) that are not included in the District's net school spending. A member's share of (b) and (c) above will be calculated by computing the ratio which that member's pupil enrollment in the regional district school, using a rolling average based on the four (4) most recent annual October 1 enrollment figures, bears to the total pupil enrollment in the regional district school from member communities, using a rolling average based on the four (4) most recent annual October 1 enrollment figures.

(F) Special Operating Costs

The Committee shall determine the operating costs for each fiscal year for any courses or programs which are offered by the District to persons other than secondary students attending the regular day regional vocational school. Each member community's share of such special operating costs shall be apportioned by identifying each member community's enrollment and/or participation rate in said courses or programs as compared to the overall enrollment and/or participation rate in said courses or programs. Normally said share shall be paid by the members as a special assessment in the fiscal year following the year of the course or program offering, although exceptions may be made whereby the payment will be made during the fiscal year of the course or program offering.

(G) Times of Payment of Apportioned Costs

Each member shall pay to the District in each fiscal year its proportionate share, certified as provided in subsection V(B), of the capital and operating costs. The annual share of each member community shall be paid in such amounts and at such times that at least the following percentages of such annual share shall be paid on or before the dates indicated, respectively:

September 1	25%
December 1	60%
March 1	75%
May 1	100%

(H) Apportionment of Costs to New Members

1. The share of operating costs which will be paid by a new member community will be determined consistent with subsection IV(E) except that, for purposes of calculating that community's four (4) year rolling average of pupil enrollment, the number of "out of district" students from that community which were enrolled in the regional district school during each of the applicable four (4) years will be regarded as that community's "pupil enrollment" during those years for purposes of this calculation.

2. The Regional School Committee, prior to the admittance of a new member community, will have the option of negotiating a phase in of the amount of capital costs which will be assessed to that new member community during the first three years of membership in the District. Beginning no later than the fourth year of membership and thereafter, however, the new member community will be assessed the full capital cost apportionment that will result from an application of subsection IV(D).

(I) Incurring of Debt

Other than short-term borrowing for cash-flow purposes, the incurring of debt for purposes expressed in G.L. Chapter 71, section 16(d), will require at least a two-thirds (2/3) vote of all of the members of the Regional School Committee, without regard for the weight of the votes. If such a margin exists, the Committee must seek authorization for incurring debt by following the approach set out in G.L. Chapter 71, section 16, subsection (d). If one or more member communities vote disapproval of the debt, the Committee, by a majority of the weighted vote, may then seek authorization for the debt via Chapter 71, section 16, subsection (n). If and when subsection (n) is utilized, and if the incurring of debt is approved via subsection (n), the following option will be open to a member community if a majority of the registered voters voting on the question from that community voted to disapprove the incurring of debt in the subsection (n) election. Said community may seek to withdraw from the District consistent with the procedure in Section IX, and, if the notice of withdrawal is sent consistent with Section IX within sixty (60) days of the subsection (n) election, that community will not be responsible for a share of the debt service attributable to this new debt even if that community's withdrawal from the District is not approved by a majority of the member communities as required by Section IX, or even if the withdrawal of said community is disapproved by the Commissioner. Communities whose resident voters disapprove the incurring of the debt in the subsection (n) election but which do not give a notice of withdrawal consistent with Section IX will remain members of the District and will share in the debt service for the new debt consistent with the apportionment process in this Section IV.

SECTION V BUDGET

(A) Tentative Operating and Maintenance Budget

The Committee shall annually prepare a tentative operating and maintenance budget for the ensuing fiscal year, attaching thereto provision for any installment of principal or interest to

become due in such fiscal year on any bonds or other evidence of indebtedness of the District and any other capital costs to be apportioned to the member communities. The said Committee shall mail a copy to the chairman of the Board of Selectmen and the Finance or Advisory Committee, if any, of each member town at least fifteen days prior to the date on which the final operating and maintenance budget is adopted by the Committee, said copy to be itemized in a fashion consistent with DESE's chart of accounts.

(B) Final Operating and Maintenance Budget

After conducting a public hearing consistent with G.L. Chapter 71, section 38M, the Committee shall adopt an annual operating and maintenance budget for the ensuing fiscal year not later than forty-five days prior to the earliest date on which the business session of the annual town meeting of any member town is to be held, but in no event later than March 31, provided that said budget need not be adopted earlier than February 1. Said adoption of the budget will require a combined total of weighted votes equal to or exceeding 66.7% of the weighted vote of the entire Regional School Committee (i.e., not merely two-thirds of the weighted vote of those present at the meeting). Said annual operating and maintenance budget shall include debt and interest charges and any other current capital costs as separate items, and the said Committee shall apportion the amounts necessary to be raised in order to meet the said budget in accordance with the provisions of Section IV. The amounts so apportioned to each member community shall be certified by the district treasurer to the treasurer of such member community within thirty days from the dates on which the annual operating and maintenance budget is adopted by the Committee, and each such community shall, at the next annual town meeting or meeting of the city council, appropriate the amounts so certified. The annual Regional School District budget shall require approval by the local appropriating authorities of at least two-thirds (2/3) of the member communities consistent with G.L. Chapter 71, section 16B.

SECTION VI TRANSPORTATION

School transportation shall be provided by the regional school district and the cost thereof shall be apportioned to the member communities as an operating cost.

SECTION VII AMENDMENTS

(A) Limitation

This Agreement may be amended from time to time in the manner hereinafter provided, but no such amendment shall be made which shall substantially impair the rights of the holders of any bonds or notes or other evidences of indebtedness of the District then outstanding, or the right of the District to procure the means for payment thereof, provided that nothing in the section shall prevent the admission of new communities to the District and the reapportionment accordingly of capital costs of the District represented by bonds or notes of the District then outstanding and of interest thereon.

(B) Procedure

Any proposal for amendment, except a proposal for amendment providing for the withdrawal of a member community (which shall be acted upon as provided in Section IX), may be initiated by a vote of at least three-fourths (3/4) of all of the members of the Regional School Committee, without regard for the weight of the votes, so long as the proposed amendment was discussed

as an agenda item at no less than one prior Committee meeting. Alternatively, a proposal for amendment may be initiated by a petition signed by at least 10 per cent of the registered voters of any one of the member communities. In the latter case, said petition shall contain at the end thereof a certification by the Municipal Clerk of such member community as to the number of registered voters in said community according to the most recent voting list and the number of signatures on the petition which appear to be the names of registered voters of said community and said petition shall be presented to the secretary of the Committee. In either case, the Secretary of the Committee shall mail or deliver a notice in writing to the Board of Selectmen, or City Council, of each of the member communities that a proposal to amend this Agreement has been made and shall enclose a copy of such proposal (without the signatures in the case of a proposal by petition). The Selectmen of each member town shall include in the warrant for the next annual or a special town meeting called for the purpose an article stating the proposal or the substance thereof, and the City Council in each member city shall vote on said proposed amendment within two months of its submittal by the Committee. Such amendment shall take effect upon its acceptance by all of the member communities, acceptance by each community to be by a majority vote at a town meeting in the case of a town, or by majority vote of the City Council in the case of a city, and after approval by the Commissioner.

(C) Approval by Commissioner

All amendments to this Agreement are subject to the approval of the Commissioner.

SECTION VIII ADMISSION OF NEW COMMUNITIES

By an amendment of this Agreement adopted under and in accordance with Section VII above, any other community or communities may be admitted to the regional school district. The effective date for the admission of each such new member shall be the July 1 following the adoption by the District of such an amendment, the acceptance by all of the existing members, and the approval by the Commissioner. All of the above approvals must be completed by December 31 for the new member to be admitted on the following July 1. Such admission also shall be subject to compliance with such provisions of law as may be applicable and such terms as may be set forth in such amendment.

SECTION IX WITHDRAWAL

(A) Procedure

Consistent with 603 CMR 41.03(2) the withdrawal of a member community can occur only as of July 1 of a given fiscal year. A notice of desire to withdraw must be initiated by a two-thirds (2/3) vote of the legislative body of the member community, which must occur no less than three (3) years prior to the desired July 1 withdrawal date. The Municipal Clerk of the community seeking to withdraw must notify the Regional School Committee in writing within seven (7) days of the vote of the legislative body that the two-thirds (2/3) vote has occurred, and the receipt of the notice of withdrawal will be acknowledged in the minutes at a Regional School Committee meeting. Within seven (7) days of its receipt, the District's Clerk will notify in writing the Municipal Clerks of all of the member communities that a notice of withdrawal has been received. Once this notice of withdrawal is given, it may not be rescinded without the unanimous consent of the members of the Regional School Committee. The withdrawal of a community will be allowed only if it is approved by a majority of the other member communities. A failure of the legislative body of a member community to vote disapproval of a requested withdrawal within sixty (60)

days of the notice of withdrawal being submitted to the Regional School Committee will constitute approval. During this three (3) year notice period, the departing member will continue to be responsible for the following:

1. Payment of its share of operating costs apportioned by way of subsection IV(E).
2. Payment of its share of capital costs apportioned by way of subsection IV(D), except that no apportionment for a withdrawing member will be made for a share of debt that was disapproved by the voters of said withdrawing member in a G.L. Chapter 71, subsection 16(n) election and after said disapproval a notice of withdrawal was sent by said member consistent with the terms of subsection IV(I). Similarly, no apportionment for a withdrawing member will be made for a share of any debt incurred after the member has given a notice of withdrawal.
3. The withdrawing community shall continue to have a right to appoint and be represented by its member on the School Committee will full voting authority until the date of final withdrawal, on which date the withdrawing community member's term shall end.

(B) Continuing Obligations After Withdrawal

A departing member shall have no right or claim to the assets of the District, and a departing member shall continue to be responsible, after withdrawal, for the following:

1. Payment of its share of capital costs incurred prior to withdrawal apportioned by way of subsection IV(D), provided that for purposes of this apportionment the withdrawn community's enrollment shall be deemed to be its enrollment determined pursuant to subsection IV(D) immediately prior to the date of its notice of intent to withdraw, except that:
 - a. no apportionment for a withdrawing member will be made for a share of debt that was disapproved by the voters of said withdrawing member in a G.L. Chapter 71, subsection 16(n) election and after which disapproval a notice of withdrawal was sent by said member consistent with the terms of subsection IV(I); and,
 - b. no apportionment for a withdrawing member will be made for a share of debt that was incurred by the District following receipt of the withdrawing member's notice of intent to withdraw, such notice having not been rescinded.

(C) Commissioner's Approval

Consistent with 603 CMR 41.03(2) the withdrawal of any member requires the approval of the Commissioner of Education, and all requisite approvals must be obtained no later than the December 31 preceding the July 1 effective date of withdrawal.

(D) Amendment to Agreement

The withdrawal of a member which occurs consistent with this Section will, upon its completion, constitute an amendment to the Regional Agreement, regardless of the fact that said amendment was not processed via the procedure contained in Article VII.

(E) Initial Procedure for Withdrawal

Consistent with 603 CMR 41.03(2), the communities of Boxborough, Carlisle, Dover, Lincoln, Sudbury, Wayland, and Weston may withdraw from the District effective on the first July 1 after the first December 1 following the Commissioner of Education's approval of the 2016 Amended Regional Agreement, all of the following requirements having been met by each departing member:

- (a) On or before March 1, 2016, voted by simple majority of its legislative body to confirm its commitment to withdraw from the District;
- (b) On or before March 1, 2016, voted to approve the 2016 Amended Regional Agreement;
- (c) Approval of the 2016 Amended Regional Agreement by the Commissioner of Education.

A vote by any member to adopt the 2016 Amended Regional Agreement shall also constitute approval of the withdrawal of any or all of the communities of Boxborough, Carlisle, Dover, Lincoln, Sudbury, Wayland, and Weston from the District pursuant to the Initial Procedure for Withdrawal.

The terms of School Committee members representing communities which withdraw under this Initial Procedure for Withdrawal shall end on the withdrawal date of the community which the member represents. No such community shall have any right or claim onto the assets of the District. Such communities shall continue to be responsible for their respective shares of the District's indebtedness as of the withdrawal date, except that no community withdrawing under this Initial Procedure for Withdrawal shall be responsible for District debt incurred after December 10, 2015.

SECTION X TUITION STUDENTS

(A)

The Committee may accept for enrollment in the regional district school pupils from communities other than member communities on a tuition basis. Income received by the District from tuition pupils and not previously deducted from operating costs shall be deducted from the total operating costs in the next annual budget to be prepared after the receipt thereof, prior to apportionment under Section IV to the member communities, provided that income identified as a contribution to capital costs shall be applied to the capital budget.

(B)

Subject to state law, and applicable regulations, effective June 30, 2018, it shall be the policy of the District to admit out-of-district students only based on tuitions and charges equal or greater than the District's similarly-calculated average per pupil cost for in-district communities as determined by the Committee. Exceptions to this policy may only be made by two-thirds weighted vote of the Committee. The provisions of this paragraph (B) shall not apply to incoming school choice students under M.G.L. c. 76, § 12B.

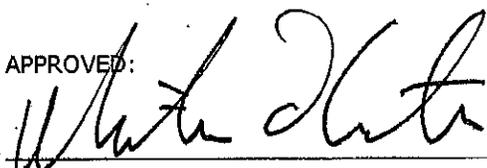
SECTION XI FISCAL YEAR

The fiscal year for the district shall run from July 1 to June 30.

SECTION XII SUBMISSION FOR APPROVAL

This Agreement shall be submitted for approval pursuant to the applicable provisions of Chapter 71 of the General Laws.

APPROVED:



Commonwealth of Massachusetts
Commissioner of the Department of Elementary
and Secondary Education

March 11, 2016

Dated

BOARD OF SELECTMEN

Tuesday, October 25th, 2016

Minutes

The Board of Selectmen met on Tuesday, October 25, 2016 at 7:00 p.m. at the Town Hall (Clark Room). Those present were Acting Chair Luke Ascolillo, William Risso, Claude von Roesgen, Kerry Kissinger (attending by remote participation) and Town Administrator Timothy Goddard..

Not present was Nathan Brown.

Community Input:

Lyn Lemaire (West St.) explained that she has returned to talk more about the Open Meeting Law (OML) requirements and the transparency of items being discussed in open meetings. She suggested that the Board of Selectmen agendas include more detail about the actual items being discussed such as previous action items and goals. She also requested that all documents being reviewed and discussed be made available to the public.

Approve Municipal Facilities Committee charge

Luke Associllo noted that the comments from the School Committee have not yet been received.

Town Administrator Tim Goddard explained that the Finance Committee has reviewed the Municipal Facilities Committee draft charge and have recommended that the committee work in concert with the Long Term Capital Requirements Committee (LTCRC) and change the word “approve” to “recommend” in the 1st sentence of the third paragraph... “The Finance Committee will also approve all Facility Projects that will be submitted to the long term capital committee for funding requests.”

Town Administrator Tim Goddard explained that the Town of Carlisle passed a bylaw in 1972 establishing a Town Building Committee. This committee was established by vote under Article 2 of the warrant for the special town meeting held April 9, 1962, and further amended under Article 9 of the warrant for the special town meeting held June 29, 1972. The Building Committee shall have general supervision over the design, construction and renovation of public buildings.

William Risso explained that the intent of the Municipal Facilities Committee was to help out the Library and other town owned facilities to keep up with necessary building repairs by creating 10-year capital improvement plans for each building. His biggest concern is that the Municipal Facilities Committee would involve oversight by the Board of Selectmen and the bylaw committee does not. Important repairs may be pushed back or overlooked and become even more expensive.

Town Administrator Tim Goddard confirmed that the bylaw committee is not active and there are no appointed members. He suggested that the board continue to develop a charge for the Municipal Facilities Committee and work towards amending the bylaw for the Town Building Committee at the spring Town Meeting.

Lyn Lemaire (West St.) suggested that the committee charge include regular scheduled meetings, informative agendas, advertise hearings with public input welcomed and relevant documents be made available to the public along with the meeting minutes to avoid having disputes similar to the Minuteman School Building Project.

Approve Deer Committee charge

Luke Ascolillo explained that based upon comments received from the Carlisle Conservation Committee the charge was amended to include "land trusts and agencies such as the U.S. Fish and Wildlife Services which currently allows hunting on the refuge."

Lyn Lemaire (West St.) and Dave Smith (Rutland St.) expressed their concerns about the formation of this committee and its charge. She handed out excerpts of MGL ch.53 Section 18A and Section 18B and explained that her concern is that the ballot question at the 2015 Town Meeting was a nonbinding public opinion advisory question whereas the requirements under ch.53 Section 18B would have required full text of the question along with a summary statement describing the effect of a yes or no vote and arguments for and against the question. She is concerned that there should have been two questions asked. First question should have been "Shall the Town of Carlisle allow hunting on Town owned lands?" and the 2nd question "Shall the Town of Carlisle request the Selectmen to place an article on the next Town Meeting Warrant to regulate bow hunting on Town owned lands as an approach to deer management?"

Davis Smith stated that residents who were opposed to hunting did not have an opportunity to express their concerns. There was a brochure handed out at the 2015 Town Meeting which he feels was pro hunting. He is concerned that the Board of Selectmen is taking the 2015 ballot question as the final vote on the issue of allowing hunting on Town owned property by establishing this committee.

Lyn Lemaire strongly urged the Board of Selectmen to postpone establishing this committee until a town-wide discussion has been held and the question to allow hunting on town owned property has been asked.

Selectmen Ascolillo and Risso explained that the purpose of the Deer Committee would be to hold these types of discussions to include: To allow hunting allowed on Town owned property; determine which parcels of land would be open to hunting; location restrictions within the parcels of land with respect to borders, trails, natural features; qualifications of hunters; permitting process; permitting fees; authority of the Conservation Commission; and the need for a game warden or another enforcement official; and any other aspects related to deer hunting that might be discovered during the process of investigating these matters.

William Risso pointed out that the Conservation Commission also raised a serious issue about protecting vegetation at risk due to the deer population during the 2015 Board of Health public forum discussion about creating a committee to review the pros and cons of allowing hunting which resulted in a non-binding ballot question at the 2015 Town Meeting. Mr. Risso stated that stopping the conversation after a ballot question passed would be wrong.

Luke Ascolillo pointed out that State officials are considering allowing hunting on State parks.

Lyn Lemaire requested that the Board of Selectmen also appoint someone that is opposed to hunting to the committee to balance out the bias. She also requested that the selectmen add a section under the purpose of committee to determine whether or not hunting should be allowed on Town property and a require regular scheduled meetings and reasonable notice of posted agendas along with comprehensive minutes posted to the Town website so that residents can be kept informed.

Mr. Kissinger commented that it is a good time to start the conversation and hold these types of discussions in order to get a leg up since State officials are already considering allowing hunting on State Park property as a way to reduce the deer herd.

On the motion made by William Risso and seconded by Claude von Roesgen it was VOTED to approve the Deer Committee charge as *presented* on October 25, 2016. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Risso-Aye and K. Kissinger-Aye.*

DOG Control Subcommittee

Purpose: To evaluate the need for action concerning dog related issues. The Subcommittee will evaluate whether the Town should amend its current bylaws, adopt new bylaws, or take no action. The main areas to be evaluated are

- 1) Public Safety – the Town of Carlisle does not currently have a leash law and this should be evaluated. Information on incidents should be collected through open meetings with the public as well as statistics collected from Carlisle Police Department, Board of Health, Conservation Commission and the Dog Officers. Thorough evaluation of leash laws in surrounding towns should be evaluated and their impacts should be determined.
- 2) Animal Waste – The Town of Carlisle currently has a bylaw pertaining to the non-removal of animal waste from private property, it does not necessarily pertain to Town owned land. The Committee should determine if this bylaw is adequate and if it is truly enforceable and the need for a bylaw on Town owned land as well.
- 3) Dog Licensing – Based on numbers from the Clerk’s Office there are a significant number of unregistered/unlicensed dogs in Carlisle. The committee should investigate registration requirements and determine possible enforcement actions for owners who do not register their animals.
- 4) Prolonged Barking - The Town of Carlisle currently has a bylaw pertaining to prolonged barking. Is the current bylaw adequate and enforceable? Review the number of registered complaints and consult with the Dog Officer regarding effectiveness.
- 5) Authority of Dog Officer – Evaluate the current authority the dog officer has and determine if it is adequate or should, and can be, expanded to include enforcement.

The subcommittee should include 2 members from the community, one dog owner and one non-dog owner. The subcommittee will also include one member designated to represent the Board of Selectmen, one member designated to represent the Board of Health, one member designated to represent the Recreation, one member designated to represent the Conservation Commission, one of the Town Dog Officers, and a member of the Carlisle Police Department (or significant input from CPD on enforcement potential)

If the Subcommittee determines that it would be in the best interests of the Town to adopt bylaw changes, the Subcommittee will be responsible for drafting a proposed bylaw or bylaw change to address the issue. The Subcommittee should also consider whether the bylaw changes should apply to all Town owned land or if certain Town parcels should be excluded. Town owned land includes public ways as well as parcels of land subject to the jurisdiction of the Board of Selectmen, Conservation Commission, School, Recreation, and land governed by other Town departments.

Luke Ascolillo updated the board on the designated members from other town boards/committee to include:

- Todd Brady – Board of Health
- Dan Wells – Conservation Commission
- Drew McMorrow – Recreation Committee
- Lt. Leo Crowe – Police Department
- Luke Ascolillo – Board of Selectmen

Remaining positions to be filled include:

- Dog Officer Appointment (email sent Matt Svatek to confirm his availability)
- Two (2) members from the community, one dog owner and one non-dog owner.

The Board agreed to invite the three applicants interested in serving on the committee to attend the Nov. 9th Board of Selectmen Meeting.

BOS Liaisons

On the motion of William Risso and seconded by Claude von Roesgen, it was VOTED to approve the FY2017 Liaisons for the Board of Selectmen as presented on October 25, 2017. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Risso-Aye and K. Kissinger-Aye.*

Department

Liaisons

Audit Committee	Bill and Luke
Board of Appeals	Bill
Board of Assessors	Bill and Luke
Board of Health	Bill
Building Inspection Services	Bill and Nathan
Carlisle Public School	Bill and Luke
CCHS	Kerry
Minuteman High School	Kerry
CCTV	Kerry
Community Preservation Act Committee	Luke
Communications Center	Nathan
Conservation Commission	Luke
Council on Aging	Kerry
Department of Public Works	Nathan
Energy Task Force Committee	Claude and Bill
Finance Committee	Bill and Luke
Finance Director	Bill and Luke
Financial Management Team	Bill and Luke
Fire Department	Bill and Nathan
Historical Commission	Nathan
Housing Authority	Claude
Library	Kerry and Bill
Long Term Capital Requirements Committee	Kerry and Bill
Pathways Committee II	Claude
Personnel Board	Kerry and Nathan
Planning Board	Claude and Nathan
Police Department	Luke and Nathan
Recreation Commission	Luke
Technology	Nathan and Bill
Town Accountant	Bill and Luke
Town Clerk	Nathan
Veterans Committee	Claude
Dog Committee	Luke
Bow Hunting Committee	Kerry

Municipal Facilities Committee	Bill
Agriculture Commission	Claude
Center Park Standing Committee	Kerry
Conservation Restriction Advisory Committee	Claude
Land Stewardship Committee	Claude
Scholarship Advisory Committee	Kerry and Claude
Senior Tax Advisory Committee	Kerry

Streetlights Discussion

The Board received a copy of the updated LED Streetlight Project Report. The Energy Task Force (ETF) received 24 written responses to the article published in the Mosquito newspaper requesting feedback for residents about the recommendation to reduce the number of existing streetlights. The newspaper article also contained a link to the online map showing which light poles would remain and which ones would be turned off.

Jim Getty (Oak Knoll Rd.) submitted several documents concerning streetlights entitled "Adverse Health Effects of Nighttime Lighting" and "New American Medical Association statement on street lighting: the current "white" LEDs are too bright for optimum safety and health", AMA's new policy statement on street lighting, "Health Effects Light at Night", "Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting", and General Electric's white paper: "Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting."

Mr. Getty's cautioned the Board of Selectmen on its decision regarding color, brightness and installation/shielding of lights to avoid adverse health and environmental effects from the new LED street lighting systems.

Claude von Roesgen explained that the Energy Task Force (ETF) consulted Dr. Alan Lewin of Carlisle who is an expert on the matter. His many qualifications include being a member of Illuminating Engineering Society of North America (IESNA) and the American Academy of Optometry. Dr. Lewis reviewed the lamp specification to ensure that the light from the lamp only illuminates the road. He also met with the Safety Committee to advise them of exactly what will be installed.

William Risso pointed out that the Board of Selectmen will need to take a vote to reduce the number of LED Streetlight Replacements and approve the scope options (fixed vs. dimmable settings).

Claude von Roesgen requested that the job description for Green Communities Grant Administrator position be reviewed to see how many hours can be absorbed by the Town Administrator/Town staff.

This agenda item will be continued to a future meeting pending further updates.

Action Items from previous meetings

The Board reviewed the updated list of action items from previous meetings as follows:

1. **Review Town Bylaw & Building Regulations** - Notification to abutters/30-day comment period for building permits and review current zoning for the allowed size of a secondary building on two-acre parcel.
 - New software will allow permit to be posted on-line as they are approved by Building Inspector

- Sent request to the Planning Board. 10/4/16 – No update
- 2. **Delinquent Tax Payers** – Withhold approval of licenses and permits.
 - Scheduled for 11/09/16 BOS Meeting
- 3. **LED Streetlights** –
 - Board of Selectmen vote to reduce the number of LED Streetlight replacements and approve scope options
- 4. **LED Crosswalk Signals**
 - Police Chief researching options on low profile fixtures at the request of the Historical Commission.
- 5. **Comcast** – request for town-wide coverage
 - Still attempting to schedule meeting in with Comcast Representatives
- 6. **Greenough Barn Property**
 - Final report to be made public soon w/disclaimer that alternatives presented may not be feasible
- 7. **Deer Task Force Committee Charge** – approved charge on 10/25/16.
- 8. **Municipal Aggregation Plan** - Submitted to the DPU. No update.
- 9. **Personnel Board** – Reduce membership from 5 to 3 members not including the 2 citizen- at-large positions.
 - Personnel Board to discuss on 11/10/16
- 10. **BOS** – Add meeting packet material to Town Website.

Town Administrator's Report

1. **TILL Open House on November 3rd** - Open House for the TILL Group Home located at 338 Bedford Road on Thursday, November 3rd from 4:00pm – 6:00pm have been mailed to all Town officials.
2. **Procurement Policy Revisions** - Due to the recent passage of the Municipal Modernization Act, the procurement threshold for Goods and Services have been amended. The Board received a revised copy of the Town's procurement policy to reflect the new limits.

On the motion made by William Risso and seconded by Claude von Roesgen, it was VOTED to amend the Town of Carlisle Policy on Procurement of Supplies and Services as presented on October 25, 2016 to bring the policy into compliance with the Municipal Modernization Act. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Risso-Aye and K. Kissinger-Aye.*

3. **MAPC Appointment** - Selectman William Risso volunteered to serve as the Town's representative to the Metropolitan Area Planning Council (MAPC), the regional planning commission for the Boston Metro Area.

On the motion made by Claude von Roesgen and seconded by William Rizzo it was VOTED to appoint William Rizzo as Carlisle's representative on the Metropolitan Area Planning Council for a term to expire on June 30, 2017. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

- 4. Community Preservation Committee Appointments** - The terms on the Community Preservation Committee are for three year. The designees from the Conservation Commission, Historical Commission and Planning Board need to be reappointed

On the motion made by William Rizzo and seconded by Claude von Roesgen, it was VOTED to re-appoint Angie Verge, Annette Lee and Ed Rolfe to three year terms on the Community Preservation Committee to expire on June 30, 2019. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

- 5. Conservation Commission** - The Conservation Commission has requested that the Board of Selectmen approve the use of the Wetlands Protection Aid, "Intents" account for the purpose of funding 80 additional hours during FY17 for the Conservation Administrative Assistant. Funds in this account accrue from the filing fees paid by applicants to the Conservation Commission under the Massachusetts Wetland Protection Act. The Personnel Board approved this last Thursday and the Board has routinely approved the use of these funds for this purpose this past June. A suggested motion follows.

On the motion made by William Rizzo and seconded by Claude von Roesgen, it was VOTED to approve the use of the Wetlands Protection Aid, "Intents" account for the purpose of funding 80 additional hours at a cost not to exceed \$2,000.00 for the Conservation Commission administrative assistant. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

Upcoming Meeting Schedule:

Wednesday, November 9, 2016

- FY16 Audit Report
- FY17 Tax Classification hearing
- Policy re: delinquent taxpayers
- Finalize BoS FY17 Goals
- Dog & Deer Committee Appointments

Tuesday, November 22, 2016

- License Renewals
- Town Counsel – Presentation on Open Meeting Law and the New Public Records Act
- CETF Update on Streetlighting Project

Appointments/Resignations:

Agricultural Commission - On the motion made by William Rizzo and seconded by Claude von Roesgen, it was VOTED to accept with gratitude and appreciation the resignation of Judy Asarkof from Agricultural Commission. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

Liaison Reports

Claude von Roesgen-

1. Solar committee finalized the bylaw and they are scheduled to meet with the Planning Board for a preliminary review. esentation.
2. Claude von Roesgen requested a formal vote to direct DPW Superintendent to log vehicle fuel consumption as discussed at the last meeting.

On the motion of Claude von Roesgen and seconded by William Rizzo, it was VOTED to direct DPW Superintendent Gary Davis record all vehicles that are replenished with fuel log the vehicle mileage and identification of vehicle. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

William Rizzo – 10/25/16 Financial Management Team meeting highlights:

- Department of Revenue approved the FY17 property values for the Town of Carlisle.
- New growth expected to be lower next year
- Real Estate Tax Bills due next week
- 12-15% increase expected for employee health insurance
- Health plan coverage changes to be revisited next year.
- 2.4M Free Cash Certification

Luke Ascolillo

1. Cranberry Bog Update – Final report to become public with a disclaimer to explain that the alternatives presented may not be feasible.
2. CPC Plan Public Hearing will be published in the Mosquito

Kerry Kissinger -

1. Minuteman Regional High School – Kerry Kissinger stated the Town of Belmont will be vote whether not to stay in district. Currently 9 members in and 7 members out.
2. Center Park Committee looking for guidance and support with the responsibility of managing the park from a private citizen into a town committee. There are three members appointed on the committee.

Minutes Approval

On the motion made by William Rizzo and seconded by Claude von Roesgen, it was VOTED to approve the amended minutes of October 25, 2016. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

On the motion made by William Rizzo and seconded by Claude von Roesgen, it was VOTED to adjourn the meeting. *Roll Call Vote: Ascolillo-Aye, C. von Roesgen-Aye, W. Rizzo-Aye and K. Kissinger-Aye.*

9:35PM Adjourn.

Respectfully submitted by Jennifer Gibbons

Adverse Health Effects of Nighttime Lighting

The problems associated with light pollution, such as energy waste, sky glow, and environmental impact are now becoming well known. But less well known is the burgeoning growth of research that demonstrates direct human-health issues related to excess light. Though we certainly need to be mindful of wasting energy, health effects might ultimately be the most important reason to control light pollution. The energy wasted by excessive lighting is produced primarily by burning fossil fuels, leading directly to air pollution that causes higher asthma rates and increased respiratory problems for people with lung disease and other medical issues.

Glare is the most common health safety problem resulting from poorly designed outdoor lighting. You have probably noticed poor vision stemming from glare on a dirty windshield. Over time, calcifications build up in the lenses of our eyes, which eventually develop into a cataract. These calcifications and other lens and eye imperfections scatter light in a similar fashion to a dirty windshield. This effect grows more severe with age, and is the primary reason why the elderly have a difficult time driving at night near poorly designed street lights. Most people with this problem are not even aware that it's the glare that's the main cause of their poor night vision, and that they would be able to drive more safely if street lights were properly designed. Recognizing that our streets could be safer places at night, the American Medical Association (AMA) adopted a resolution in 2009 urging full shielding for all public street lighting.

Ultimately, the most significant human effect of night lighting is on circadian-rhythm disruption. Numerous papers over the past 15 years have led medical researchers to conclude that night light increases the incidence of certain cancers, most notably breast cancer. In fact, researchers now estimate that a not insignificant fraction of breast cancers are secondary to light at night suppressing circadian rhythm. The research basis for this conclusion has become so compelling that the World Health Organization recently declared circadian-rhythm disruption as a class 2A carcinogen — placing it on the same level of severity as the effects of tobacco smoke on lung cancer.

The biochemical mechanism for this has been thoroughly researched and is thought to result from the suppression of melatonin production by the pineal gland in the center of our brain. This gland produces the hormone melatonin while we sleep. Repeated shift changes of night workers or repeated exposure to

night lighting in our bedrooms markedly suppresses melatonin production. Previous research has shown that this hormone helps the immune system suppress the development of several types of cancers. In 2012, the AMA adopted as policy, a monograph entitled: “Adverse Health Effects of Nighttime Lighting”, summarizing an extensive world literature on this subject.

Mario Motta, MD, FACC

REPORT 4 OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH (A-12)

Light Pollution: Adverse Health Effects of Nighttime Lighting

Authors: David Blask, PhD, MD (Tulane University School of Medicine); George Brainard, PhD (Jefferson Medical College); Ronald Gibbons, PhD (Virginia Tech); Steven Lockley, PhD (Brigham and Women's Hospital, Harvard Medical School); Richard Stevens, PhD (University Connecticut Health Center); and Mario Motta, MD (CSAPH, Tufts Medical School).

EXECUTIVE SUMMARY

Objective. To evaluate the impact of artificial lighting on human health, primarily through disruption of circadian biological rhythms or sleep, as well as the impact of headlamps, nighttime lighting schemes, and glare on driving safety. Concerns related to energy cost, effects on wildlife and vegetation, and esthetics also are briefly noted.

Methods. English-language reports in humans were selected from a PubMed search of the literature from 1995 to March 2012 using the MeSH terms “circadian/biological clocks/rhythm,” “chronobiology/disorders,” “photoperiod,” “light/lighting” “sleep,” “work schedule,” or “adaptation,” combined with the terms “physiology,” “melatonin,” “adverse effects/toxicity,” “pathophysiology,” “neoplasm,” “epidemiology/etiology,” “mental disorders,” “energy metabolism,” and “gene expression.” Additional articles were identified by manual review of the references cited in these publications; others were supplied by experts in the field who contributed to this report (see Acknowledgement).

Results. Biological adaptation to the sun has evolved over billions of years. The power to artificially override the natural cycle of light and dark is a recent event and represents a man-made self-experiment on the effects of exposure to increasingly bright light during the night as human societies acquire technology and expand industry. In addition to resetting the circadian pacemaker, light also stimulates additional neuroendocrine and neurobehavioral responses including suppression of melatonin release from the pineal gland improving alertness and performance. Low levels of illuminance in the blue or white fluorescent spectrum disrupt melatonin secretion. The primary human concerns with nighttime lighting include disability glare (which affects driving and pedestrian safety) and various health effects. Among the latter are potential carcinogenic effects related to melatonin suppression, especially breast cancer. Other diseases that may be exacerbated by circadian disruption include obesity, diabetes, depression and mood disorders, and reproductive problems.

Conclusion. The natural 24-hour cycle of light and dark helps maintain precise alignment of circadian biological rhythms, the general activation of the central nervous system and various biological and cellular processes, and entrainment of melatonin release from the pineal gland. Pervasive use of nighttime lighting disrupts these endogenous processes and creates potentially harmful health effects and/or hazardous situations with varying degrees of harm. The latter includes the generation of glare from roadway, property, and other artificial lighting sources that can create unsafe driving conditions, especially for older drivers. More direct health effects of nighttime lighting may be attributable to disruption of the sleep-wake cycle and suppression of melatonin release. Even low intensity nighttime light has the capability of suppressing melatonin release. In various laboratory models of cancer, melatonin serves as a circulating anticancer signal and suppresses tumor growth. Limited epidemiological studies support the hypothesis that nighttime lighting and/or repetitive disruption of circadian rhythms increases cancer risk; most attention in this arena has been devoted to breast cancer. Further information is required to

evaluate the relative role of sleep versus the period of darkness in certain diseases or on mediators of certain chronic diseases or conditions including obesity. Due to the nearly ubiquitous exposure to light at inappropriate times relative to endogenous circadian rhythms, a need exists for further multidisciplinary research on occupational and environmental exposure to light-at-night, the risk of cancer, and effects on various chronic diseases

REPORT OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH

CSAPH Report 4-A-12

1 INTRODUCTION

2
3 Current AMA Policy H-135.937 (AMA Policy Database) advocates for light pollution control and
4 reduced glare from (electric) artificial light sources to both protect public safety and conserve
5 energy. Lighting the night has become a necessity in many areas of the world to enhance
6 commerce, promote social activity, and enhance public safety. However, an emerging consensus
7 has come to acknowledge the effects of widespread nighttime artificial lighting, including the: 1)
8 impact of artificial lighting on human health, primarily through disruption of circadian biological
9 rhythms or sleep; 2) intersection of ocular physiology, vehicle headlamps, nighttime lighting
10 schemes, and harmful glare; 3) energy cost of wasted and unnecessary electric light; and 4) impact
11 of novel light at night on wildlife and vegetation. In addition to these health and environmental
12 effects, an esthetic deficit is apparent with the progressive loss of the starry night sky and
13 interference with astronomical observations. With the assistance of experts in the field, this report
14 evaluates the effects of pervasive nighttime lighting on human health and performance. Concerns
15 related to energy cost, effects on wildlife and vegetation, and esthetics are also briefly noted.

16 METHODS

17
18
19 English-language reports in humans were selected from a PubMed search of the literature from
20 1995 to March 2012 using the MeSH terms “circadian/biological clocks/rhythm,”
21 “chronobiology/disorders,” “photoperiod,” “light/lighting” “sleep,” “work schedule,” or
22 “adaptation,” combined with the terms “physiology,” “melatonin,” “adverse effects/toxicity,”
23 “pathophysiology,” “neoplasm,” “epidemiology/etiology,” “mental disorders,” “energy
24 metabolism,” and “gene expression.” Additional articles were identified by manual review of the
25 references cited in these publications; others were supplied by experts in the field who contributed
26 to this report (see Acknowledgement).

27 LIGHT AND HUMAN PHYSIOLOGY

28
29
30 The solar cycle of light and dark provides the essential basis for life on Earth. Adaptation to the
31 solar cycle has resulted in fundamental molecular and genetic endogenous processes in virtually all
32 life forms that are aligned with an approximately 24-hour period (circadian biological rhythm).
33 The circadian genetic clock mechanism is intimately involved in many, if not most, facets of
34 cellular and organismal function.¹ Although the circadian system spontaneously generates near-24-
35 hour rhythms, this master clock must be reset daily by the light-dark cycle to maintain proper
36 temporal alignment with the environment. In humans and other mammals, this daily entrainment is
37 achieved primarily by novel photoreceptors that project directly to the site of the circadian clock
38 (suprachiasmatic nuclei (SCN) of the hypothalamus).²⁻⁵ The tandem development of an endogenous
39 rhythm sensitive to light presumably evolved to allow for precise 24-hour regulation of rest and
40 activity, and for adapting to seasonal changes in night-length, while maintaining the advantages of
41 an underlying physiology that anticipates day and night. Understanding the molecular and

1 physiological basis of endogenous rhythms, how light information is communicated, and the health
2 implications of disruptions to this system are topics of intensive study.

3 4 ELECTRIC LIGHTING AND HUMAN HEALTH

5
6 Biological adaptation to the sun has evolved over billions of years. The power to artificially
7 override the natural cycle of light and dark is a recent event and represents a man-made self-
8 experiment on the effects of exposure to increasingly bright light during the night as human
9 societies acquire technology and expand industry. At the same time, increasing numbers of people
10 work inside buildings under electric lighting both night and day. Artificial lighting is substantially
11 dimmer than sunlight and provides a very different spectral irradiance. Sunlight is strong at all
12 visible wavelengths, peaking in the yellow region, whereas electric lighting has either extreme
13 characteristic wavelength peaks (fluorescent) or exhibits a monotonic increase in irradiance as
14 wavelength lengthens (incandescent). In contrast to outdoor lighting conditions, much of the
15 modern world now lives and works in relatively dim light throughout the day in isolation from the
16 sun, with often poor contrast between night and day, even for those who live and work in sunny
17 environments.⁶

18
19 Extensive nighttime lighting is required for contemporary society and commerce. Therefore, it is
20 imperative to evaluate the unintended adverse health consequences of electric lighting practices in
21 the human environment, and determine their physiological bases so that effective interventions can
22 be developed to mitigate harmful effects of suboptimal light exposure. For example, engineers
23 have already developed less disruptive night lighting technologies, and continued progress in this
24 area is anticipated. That such technologies exist, however, does not guarantee that they will be
25 purchased, installed and properly implemented. The medical community and public can take the
26 lead on advocating a healthier environment, as illustrated by recent changes in public smoking
27 policies worldwide. As the research on the biology of circadian rhythms has advanced, the range
28 of potential disease connections due to disrupted circadian rhythms and sleep has expanded.

29 30 *Biological Impact of Light on Human Physiology*

31
32 Light is the most powerful stimulus for regulating human circadian rhythms and is the major
33 environmental time cue for synchronizing the circadian clock. In addition to resetting the circadian
34 pacemaker, light also stimulates additional neuroendocrine and neurobehavioral responses,
35 including suppression of melatonin release from the pineal gland, directly alerting the brain, and
36 improving alertness and performance.⁷⁻⁹ Melatonin is one of the most studied biomarkers of the
37 human physiological response to light.¹⁰ This substance is the biochemical correlate of darkness
38 and is only produced at night, regardless of whether an organism is day-active (diurnal) or night-
39 active (nocturnal). Conceptually, melatonin provides an internal representation of the
40 environmental photoperiod, specifically night-length. The synthesis and timing of melatonin
41 production requires an afferent signal from the SCN. Ablation of this pathway, which occurs in
42 some patients from upper cervical spinal damage, completely abolishes melatonin production.
43 Certain other circadian rhythms (e.g., cortisol, body temperature, sleep-wake cycles) do not depend
44 on this pathway and persist if the SCN pathway is damaged.

45 Light is not required to generate circadian rhythms or pineal melatonin production. In the absence
46 of a light-dark cycle (e.g., totally blind individuals), the circadian pacemaker generates rhythms
47 close to, but not exactly a 24-hour periodicity, reflecting the timing of processes under SCN
48 control.² However, as previously noted, the timing of SCN rhythms and consequently the rhythms
49 controlled by the circadian clock are affected by light, and require daily exposure to the light-dark
50 cycle to be synchronized with the 24-hour day.

1
2 When light information fails to reach the SCN to synchronize the clock and its outputs, the
3 pacemaker reverts to its endogenous non-24-hour period (range 23.7-25.0 h). Consequently, the
4 timing of physiology and behavior that is controlled by the circadian system, for example the sleep-
5 wake cycle, alertness and performance patterns, the core body temperature rhythm, and melatonin
6 and cortisol production, becomes desynchronized from the 24-hour day.² The resultant clinical
7 disorder is termed “non-24-hour sleep-wake disorder” and is characterized by alternating episodes
8 of restful sleep, followed by poor night-time sleep and excessive day-time napping, as the non-24-
9 hour circadian pacemaker cycles in and out of phase with the 24-hour social day.¹¹ Another effect
10 of light exposure at night is the immediate suppression of melatonin production. Under natural
11 conditions, organisms would never be exposed to light during the night in substantial amounts and
12 would not experience melatonin suppression. Electric light, however, efficiently suppresses
13 melatonin at intensities commonly experienced in the home at night.¹²

14 15 *Measures of Illumination*

16
17 Luminous flux is the measure of the perceived power of light. The lumen is the standard
18 international unit of luminous flux, a measure of the total “amount” of visible light emitted by a
19 source, while illumination is a measure of how much luminous flux is spread over a given area
20 (intensity of illumination). One lux is equal to one lumen/m². Luminous flux measurements take
21 into account the fact that the human eye and visual system is more sensitive to some wavelengths
22 than others. The peak luminosity function is in the green spectral region; white light sources
23 produce far fewer lumens. To provide some perspective, the illuminance associated with a full
24 moon is less than 1 lux, versus 50 lux for a typically incandescent lit family room, 80 lux in a
25 narrower hallway, 325-500 lux for office lighting, 1,000 lux for an overcast day, and 32,000-
26 130,000 lux for direct sunlight.

27
28 Initially it was thought that bright light of at least 2,500-20,000 lux was needed to suppress
29 nighttime melatonin secretion or phase shift the melatonin rhythm (as in jet lag) in humans.¹³⁻¹⁵ It
30 is now established that when exposure of the human eye is carefully controlled, illuminance as low
31 as 5–17 lux of monochromatic green light or 100 lux of broadband white light can significantly
32 suppress melatonin in normal human volunteers.^{12,16-18} Similarly, circadian phase shifts of the
33 melatonin rhythm can be evoked with an illuminance of 5 lux of monochromatic blue light or <100
34 lux of white fluorescent light, however, exposure to red light is not disruptive.^{18,19} Typical lighting
35 in bedrooms in the evening after dusk (but before bedtime) can also suppress melatonin and delay
36 its nocturnal surge.¹² Acute enhancement of both subjective and objective measures of alertness
37 can be evoked with as little as 5 lux of monochromatic blue light.²⁰ Dose-response curves for
38 melatonin suppression by night-time light exposure to fluorescent light show that ~100 lux of light
39 induces 50% of the maximal response observed with 1,000-10,000 lux of light.^{18,21}

40 41 *Ocular Physiology Mediating Photic Effects*

42
43 Factors that alter the amount and spectral quality of light reaching the retina include gaze behavior
44 relative to a light source, age (of the ocular lens), and pupillary dilation. Once a light stimulus
45 reaches the retina, physiology within the retina and within the nervous system determines the
46 capacity of the stimulus to evoke circadian, neuroendocrine or neurobehavioral responses. This
47 physiology includes: 1) the sensitivity of the operative photopigments and photoreceptors; 2)
48 location of these photoreceptors within the retina; 3) the ability of the nervous system to integrate
49 photic stimuli spatially and temporally; and, 4) the state of photoreceptor adaptation.
50 In particular, both short and long-term photoreceptor adaptation can significantly modify the
51 biological and behavioral responses to light and acutely suppress melatonin in humans.²² For

1 example, a full week of daytime exposure to bright light (by daylight and/or indoor light boxes at ~
 2 5,000 lux) or a three-day period of exposure to moderate indoor lighting (200 lux) reduces an
 3 individual's sensitivity to light suppression of nighttime melatonin compared with exposure to dim
 4 indoor lighting (0.5 lux); similar dim light conditions also enhance circadian phase shifting.²³⁻²⁵
 5 Two hours of exposure to 18 lux of white incandescent light versus full dark exposure in a single
 6 evening modifies the sensitivity of an individual for light-induced melatonin suppression later that
 7 same night.²⁶ Hence, photoreceptor adaptation, like the other ocular and neural elements noted
 8 above, can significantly modify the biological and behavioral responses to light.¹⁶
 9

10 In general, photobiological responses to light are not all-or-none phenomena. In the case of acutely
 11 suppressing high nighttime levels of melatonin or phase-shifting the entire melatonin rhythm, light
 12 works in a dose-response fashion. Once threshold is exceeded, increasing irradiances of light elicit
 13 increasing acute plasma melatonin suppression or longer-term phase-shifts of the melatonin rhythm
 14 in healthy individuals.^{16,18,27} All humans, however, are not equally sensitive to light; significant
 15 individual differences exist in sensitivity to light for both neuroendocrine and circadian
 16 regulation.^{16,18} For a detailed description of the molecular and cellular basis for how
 17 photoreceptive input regulates circadian and neuroendocrine system function, see the Addendum.
 18

19 HUMAN CONCERNS-DISABILITY AND DISCOMFORT GLARE

20
 21 Glare from nighttime lighting can create hazards ranging from discomfort to frank visual disability.
 22 Disability glare has been fairly well-defined based on the physiology of the human eye and
 23 behavior of light as it enters the ocular media. Discomfort glare is less well-defined and more
 24 subjective as it is not based on a physical response per se but rather a psychological response.
 25 Accordingly, the respective bases of (and research into) these two responses are fundamentally
 26 different.
 27

28 *Disability Glare*

29
 30 Disability glare is unwanted and poorly directed light that temporarily blinds, causes poor vision by
 31 decreasing contrast, and creates an unsafe viewing condition, especially at night, by limiting the
 32 ability of the person to see. There are natural causes of disability glare, such as solar glare at sunset
 33 on a dirty windshield which can be lessened by cleaning the windshield. Unfortunately, nighttime
 34 glare while driving is not easily remedied. It is caused by the misapplication of luminaires that
 35 comprise the lighting design which are generally overly bright and unshielded, and/or sources of
 36 poorly directed light that enters the eye and scatters among ocular structures resulting in
 37 diminished contrast and impeded vision. Such effects dramatically worsen as the human eye ages,
 38 contributing to poor night vision and difficulty in driving at night for older drivers.
 39

40 Disability glare is caused by light scatter from ocular media.²⁸ As light enters the eye, it collides
 41 with cornea, lens, and vitreous humor, scattering photons and casting a veil of light across the
 42 retina²⁹⁻³¹ (see Figure 1). The veil of light reduces the contrast of the object that the driver is trying
 43 to see, having the same effect as increasing the background luminance of the object. This veiling
 44 light is represented by the term veiling luminance. Veiling luminance is directly related to the
 45 illuminance of the light source and inversely related to the square of the angle of eccentricity of the
 46 light source with an age dependent multiplier across the entire equation.²⁸ This means that the
 47 disability from a light source is lessened the farther the source is from the line of sight.^a

^a As an example, high mast lighting systems where the roadway lighting is over 100 feet in the air have significantly less glare than traditional systems, which are typically located 30–50 feet in the air. Because of

1
2 Accordingly, proper design techniques and consideration for the glare caused by lighting systems
3 need to be considered. One of the primary difficulties, especially for roadways, is that the lighting
4 is not governed by a single jurisdiction. Roadway lighting may be designed properly and provide a
5 low level of glare; however lighting can emanate from adjacent properties, spilling out into the
6 roadway thus affecting the driver and overall performance and suitability of a lighting system.
7 Control over all environmental sources of nighttime lighting is therefore critical for the overall
8 control of disability glare.

9 10 *Discomfort Glare*

11
12 Discomfort glare is less well defined but emanates from a glare source that causes the observer to
13 feel uncomfortable. The definition of discomfort is not precise, and some research has shown that
14 a person's response to a glare source is based more on his/her emotional state than on the light
15 source itself. Discomfort glare may be based primarily on the observer's light adaptation level, the
16 size, number, luminance and location of the light sources in the scene.³²

17
18 Both overhead roadway lighting and opposing headlamps are involved with discomfort glare in the
19 driver. A numerical rating scale based on the dynamic nature of glare in simulations is available to
20 measure the discomfort level experienced by drivers (Appendix).³³ The overall impact of
21 discomfort glare on fatigue and driver safety remains an issue.

22
23 Lighting and Glare. Both discomfort and disability glare have specific impacts on the user in the
24 nighttime environment. Research has shown that both of these glare effects occur simultaneously.
25 Research also shows that the effects of the glare are cumulative, meaning that the glare from two
26 light sources is the sum of the glare from the individual light sources. As a result, every light
27 source within the field of view has an impact on the comfort and visual capability of the driver.

28 29 *Overhead lighting*

30
31 For overhead roadway lighting, design standards include a methodology for controlling the
32 disability glare through a ratio of the eye adaptation luminance to the veiling luminance caused by
33 the light source. As the veiling luminance is related to the illuminance the light source produces at
34 the eye, a roadway luminaire that directs light horizontally has a much greater effect on the driver
35 than a light source that cuts off the horizontal light. A trend towards flat glass luminaires, which
36 provide a cut off of light at horizontal angles, provides a lower level of both disability and
37 discomfort glare.

38
39 Decorative luminaires (e.g., acorn or drop lens) have a high level of horizontal light and typically
40 are used in areas where pedestrians are the primary roadway users. The horizontal light in this
41 situation is useful for facial recognition of a pedestrian, but it limits the driver's ability to perceive
42 other objects in the roadway. As a result, many cities are designing and installing two lighting
43 systems, one for the pedestrian and one for the roadway.

44 Luminaires employing solid state technologies and light-emitting diodes (LED) provide light from
45 an array of small sources rather than a single large source. These designs either rely on each small
46 source to provide a component of the light distribution, or the components of the lighting array
47 provide individual luminating fields of the light distribution. In the first instance, the arrays are

the inverse squared relationship, a high mast system reduces glare by 75% compared with a traditional system.

1 typically flat and have an optic to provide the light distribution; if a single LED fails, the others still
2 provide the light distribution. In the second method, the components of the array are aimed to
3 different areas of the beam distribution. This approach typically results in light aimed at the driver
4 and pedestrians causing a higher glare impact. The other issue with the multiple sources used in
5 LED luminaires is that each of the sources typically has a very high luminance itself as the source
6 is very small and very bright; in the absence of sufficient diffusion, they cause significant glare.
7 Accordingly, solid state lighting systems typically have a higher glare impact than traditional
8 sources.

9
10 The final issue with glare from overhead lighting is the cyclic nature of the impact. As drivers
11 course along a roadway, they pass from one luminaire to another. The glare experience increases
12 as they approach the luminaire and then diminishes as they pass beyond. While typically not an
13 issue for disability glare, this repetitive process can cause discomfort and fatigue.³⁴

14 15 Opposing vehicle headlamps

16
17 Vehicle headlamps are aimed at the opposing driver eye level resulting in very high ocular
18 illuminance and significant disability glare. The impact of opposing headlamps on the ability of
19 the oncoming driver to observe beyond the headlamps is significant. For example, the visibility of
20 a pedestrian standing behind a vehicle can be reduced by as much as 50%.³⁵

21
22 In order to minimize the glare impact, headlamps are designed with lower left side light intensity
23 than the right side. This reduces the glare to an opposing vehicle but does not eliminate it. New
24 technologies such as turning headlamps and headlamps that hide part of the headlamp beam when a
25 vehicle passes are possible solutions for this issue. With the advent of high intensity discharge
26 Xenon headlamps and LED-based technologies, the glare issue has become more serious. While
27 the intensity towards a driver is limited, the small but brighter source generates a much higher
28 impression of glare than traditional technologies. These “blue” headlamp sources have a higher
29 complaint rate for glare than for any other light source.

30 31 *Effects of Lighting Design on Traffic Accidents*

32
33 Adult, and especially elderly drivers, experience increased glare sensitivity, and elderly drivers
34 may not be able to sufficiently fulfill the criteria for night driving ability because of contrast and
35 glare sensitivity.³⁶ Prospective studies indicate that reduction in the useful field of view, visual
36 field loss, and glare sensitivity increase crash risk in older drivers.^{37,38} Crash risk begins to increase
37 around age 50 years of age and continues to increase with aging.³⁹ No studies have explicitly
38 compared traffic accident rates under different highway lighting conditions.

39 40 HEALTH EFFECTS OF DISRUPTED CIRCADIAN RHYTHMS

41
42 Epidemiological studies are a critical component of the evidence base required to assess whether or
43 not light exposure at night affects disease risk, including cancer. These studies, however, are
44 necessarily observational and can rarely provide mechanistic understanding of the associations
45 observed. Carefully designed and controlled basic laboratory studies in experimental animal
46 models have the potential to provide the empiric support for a causal nexus between light exposure
47 at night and biological/health effects and to help establish plausible mechanisms. One area of
48 considerable study on the possible effects of nighttime light exposure involves cancer.

49 50 CANCER

51

1 *Light at Night, Melatonin and Circadian Influences on Carcinogenesis*

2
3 Experimental Evidence. The majority of earlier studies in experimental models of either
4 spontaneous or chemically-induced mammary carcinogenesis in mice and rats demonstrated an
5 accelerated onset of mammary tumor development accompanied by increased tumor incidence and
6 number in animals exposed to constant bright fluorescent light during the night as compared with
7 control animals maintained on a strict 12 hours light/12 hours dark cycle.⁴⁰⁻⁵¹

8
9 More recent work has focused on the ability of light at night to promote the growth progression and
10 metabolism in human breast cancer xenografts. Nocturnal melatonin suppresses the growth of both
11 estrogen receptor negative (ER-) and estrogen receptor positive (ER+) human breast cancer
12 xenografts; the essential polyunsaturated fatty acid, linoleic acid is necessary for the growth of such
13 (ER-) tumors, and its metabolism can be used as a biomarker of cellular growth.⁵²⁻⁵⁵ Exposure of
14 rats with such cancer xenografts to increasing intensities of white, fluorescent polychromatic light
15 during the 12 hour dark phase of each daily cycle results in a dose-dependent suppression of peak
16 nocturnal serum melatonin levels and a corresponding marked increase in tumor metabolism of
17 linoleic acid and the rate of tumor growth. Exposure to even the very dimmest intensity of light
18 during the night (0.2 lux) suppressed the nocturnal peak of circulating melatonin by 65% and was
19 associated with marked stimulation in the rates of tumor growth and linoleic acid metabolic
20 activity. In this model, measurable effects on xenograft growth and linoleic acid metabolism were
21 apparent with 15% suppression in nocturnal melatonin levels.

22
23 The ability of light exposure at night to stimulate tumor growth (including dim exposures) has been
24 replicated in rat hepatoma models.^{54,56-58} The reverse also is true; gradually restoring circulating
25 melatonin by reducing initial exposure to light at night (24.5 lux) is accompanied by a marked
26 reduction in tumor growth and linoleic acid metabolic activity to baseline rates in the breast cancer
27 and hepatoma models.⁵⁹

28
29 The important role of melatonin as a nocturnal anticancer signal is further supported by the growth
30 responses of human breast cancer xenografts perfused with human whole blood collected from
31 young, healthy premenopausal female subjects exposed to complete darkness at night (e.g., high
32 melatonin), compared with xenografts that were perfused with blood collected from the same
33 subjects during the daytime (e.g., low melatonin).⁵⁴ The growth of xenografts perfused with blood
34 collected during the dark was markedly reduced. Addition of a physiological nocturnal
35 concentration of melatonin to blood collected from light-treated subjects restored the tumor
36 inhibitory activity to a level comparable to that observed in the melatonin-rich blood collected at
37 night during total darkness. Moreover, the addition of a melatonin receptor antagonist to the blood
38 collected during darkness (i.e., high melatonin) eliminated the ability of the blood to inhibit the
39 growth and metabolic activity of perfused tumors. Some evidence also exists that circadian
40 disruption by chronic phase advancement (e.g., simulating jet lag) may increase cancer growth in
41 laboratory animals.^{60,61}

42

1 *Potential Anticancer Mechanisms of Melatonin*

2
3 The preponderance of experimental evidence supports the hypothesis that under the conditions of
4 complete darkness, high circulating levels of melatonin during the night not only provide a potent
5 circadian anticancer signal to established cancer cells but help protect normal cells from the
6 initiation of the carcinogenic process in the first place.^{62,63} It has been postulated that disruption in
7 the phasing/timing of the central circadian pacemaker in the SCN, in general, and the suppression
8 of circadian nocturnal production of melatonin, in particular, by light at night, may be an important
9 biological explanation for the observed epidemiological associations of cancer risk and surrogates
10 for nocturnal light exposure (such as night shift work, blindness, reported hours of sleep, etc.) (see
11 below).⁶⁴

12
13 Melatonin exerts several cellular effects that may be relevant in this regard. It exhibits
14 antiproliferative and antioxidant properties, modulates both cellular and humoral responses, and
15 regulates epigenetic responses.⁶⁵⁻⁶⁷ Melatonin also may play a role in cancer cell apoptosis and in
16 inhibiting tumor angiogenesis.^{68,69}

17 *Human Studies*

18
19
20 While the experimental evidence from rodent cancer models links disruption of circadian rhythms
21 and circulating melatonin concentrations (inversely) with progression of disease, the human
22 evidence is indirect and based on epidemiological studies. Breast cancer has received the most
23 study.

24
25 The hypothesis that the increasing use of electricity to light the night might be related to the high
26 breast cancer risk in the industrialized world, and the increasing incidence and mortality in the
27 developing world was first articulated in 1987.⁷⁰ Potential pathways include suppression of the
28 normal nocturnal rise in circulating melatonin and circadian gene function.^{54,71,72} Conceptually,
29 this theory would predict that non-day shift work would raise risk, blind women would be at lower
30 risk, reported sleep duration (as a surrogate for hours of dark) would be inversely associated with
31 risk, and population nighttime light level would co-distribute with breast cancer incidence
32 worldwide.^{72,73} Only the first hypothesis has been systematically evaluated. Based on studies of
33 non-day shift occupation and cancer (mostly breast cancer) published through 2007, the
34 International Agency for Research on Cancer (IARC) concluded “shift-work that involves
35 circadian disruption is *probably carcinogenic* to humans” (Recommendation Level 2A).⁷⁴ A
36 detailed review of the individual studies supporting this conclusion is available.⁷⁵

37
38 Since the IARC evaluation was conducted, several new studies of breast cancer and nighttime light
39 have been published with mixed results.⁷⁶⁻⁷⁹ Two found no significant association between shift
40 work and risk of breast cancer.^{76,77} A large case-control study of nurses in Norway⁷⁸ found a
41 significantly elevated risk in subjects with a history of regularly working five or more consecutive
42 nights between days off, and another found that as the type of shift (e.g., evening, night, rotating)
43 became more disruptive, the risk increased.^{79,80} In the Nurses Health Study cohort, increased
44 urinary excretion of melatonin metabolites also was associated with a lower risk of breast cancer.⁸¹
45 Each of these studies has strengths and limitations common to epidemiology, particularly in
46 exposure assessment and appropriate comparison groups (e.g., no woman in the modern world is
47 unexposed to light-at-night, but quantifying that exposure is difficult).

48
49 Although shiftwork represents the most extreme example of exposure to light at night and circadian
50 disruption, perturbation of circadian rhythms and the melatonin signal is also experienced by non-
51 shift workers with a normal sleep/wake-cycle.¹² Anyone exposing themselves to light after dusk or

1 before dawn is overriding the natural light-dark exposure pattern as noted in the earlier discussion
2 on measures of illumination.

3
4 After lights out for bedtime, it is not yet clear whether the ambient background light from weak
5 sources in the bedroom or outside light coming through the window could influence the circadian
6 system; a brief exposure at these levels may not have a detectable impact in a laboratory setting,
7 although long-term chronic exposure might. Four case-control studies have now reported an
8 association of some aspect of nighttime light level in the bedroom with breast cancer risk.⁸²⁻⁸⁵ The
9 elevated risk estimate was statistically significant in two of them.^{83,85} As case-control designs, in
10 addition to the limitation of recall error, there is also the potentially significant limitation of recall
11 bias.

12
13 Despite the difficulty of gathering reliable information on bedroom light level at night, the
14 possibility that even a very low luminance over a long period of time might have an impact is
15 important. The lower limit of light intensity that could, over a long time period, affect the
16 circadian system is not established. In the modern world few people sleep in total darkness. When
17 eyelids are shut during sleep, only very bright light can penetrate to lower melatonin and only in
18 some individuals.⁸⁶ Frequent awakenings with low level light exposure in the bedroom and certain
19 nighttime activities (e.g., bathroom visits) may disrupt the circadian system, but any related health
20 effects are unknown.⁸⁷

21 22 *Other Cancers*

23
24 Light-at-night and circadian disruptions have been suggested to play a role in other cancers
25 including endometrial, ovarian, prostate, colorectal, and non-Hodgkins lymphoma but evidence
26 comparable to that obtained for breast cancer has not yet been developed.⁸⁸ On the other hand,
27 engaging in night shift work may protect against skin cancer and cutaneous melanoma.⁸⁹

28 29 *Other Diseases*

30
31 Obesity, Diabetes, and Metabolic Syndrome. The modern world has an epidemic of obesity and
32 diabetes that may be influenced by lack of sleep, lack of dark, and/or circadian disruption.⁹⁰ Non-
33 day shift workers have a higher incidence of diabetes and obesity.⁹¹ Epidemiological studies also
34 show associations of reported sleep duration and risk of obesity and diabetes.⁹² Circadian
35 disruption may be a common mechanism for these outcomes and potential links between the
36 circadian rhythm and metabolism.⁹³⁻⁹⁵

37
38 Other Disorders. Although in the early stage of development, emerging evidence suggests that
39 other chronic conditions also may be exacerbated by light at night exposure and ongoing disruption
40 of circadian rhythms, including depression and mood disorders, gastrointestinal and digestive
41 problems, and reproductive functions.⁸⁸

42 43 DARK VERSUS SLEEP

44
45 The circadian rhythm and sleep are intimately related but not the same thing. Adequate daily sleep
46 is required for maintenance of cognitive function and for a vast array of other capabilities that are
47 only partially understood. Sleep is not required to synchronize the endogenous circadian rhythm,
48 whereas a stable 24-hour light-dark cycle is required. The epidemiological and laboratory research
49 on sleep and health cannot entirely separate effects of sleep duration from duration of exposure to
50 dark, because the sleep-wake cycle partitions light-dark exposure to the SCN and pineal gland.⁹⁶
51 The distinction is important because a requirement for a daily and lengthy period of dark to

1 maintain optimal circadian health has different implications than a requirement that one must be
2 asleep during this entire period of dark; many individuals normally experience a wakeful episode in
3 the middle of a dark night.⁸⁷

4
5 Light during the night will disrupt circadian function as well as sleep, and the health consequences
6 of short sleep and of chronic circadian disruption are being intensively investigated.⁹⁷ A growing
7 number of observational and clinical studies on sleep and metabolism suggest short sleep periods
8 have substantial harmful effects on health; however, it is not yet clear that sleep and dark have been
9 entirely disentangled in these studies.^{97,98} For example, in one study, sleep duration (verified by
10 polysomnography) was associated with morning blood levels of leptin, a hormone that plays a key
11 role in energy expenditure and appetite.⁹⁹ However, the duration of typical sleep reported by each
12 subject was more strongly associated with leptin concentrations. Mean verified sleep was 6.2
13 hours, whereas mean reported sleep was 7.2 hours. Reported “sleep duration” probably reflects the
14 time from when a person turns out their light for bed and falls asleep and when they get up in the
15 morning (i.e., actual hours of dark exposure). An important question is to determine what portion
16 of the health effects of dark disruption is due to sleep disruption and what portion is due directly to
17 circadian impact of electric light intrusion on the dark of night.

18
19 Media use at night (i.e., televisions, computer monitors, cell phone screens) negatively affects the
20 sleep patterns of children and adolescents and suppresses melatonin concentrations.¹⁰⁰⁻¹⁰² The
21 American Academy of Pediatrics recommends removing televisions and computers from bedrooms
22 to assist in limiting total “screen time” on a daily basis.¹⁰¹ This action also may help in improving
23 sleep patterns.

24 25 ENERGY COST

26
27 Electric lighting accounts for about 19% of electricity consumption worldwide and costs about
28 \$360 billion.¹⁰³ Much of the light that is produced is wasted, for example, by radiating light into
29 space away from the task or environment intended to be illuminated. Estimates of how much is
30 wasted vary; one estimate from the International Dark-Sky Association is 30% in the United
31 States.¹⁰⁴ Such a percentage worldwide would account for an annual cost of about \$100 billion.

32 33 ENVIRONMENTAL ISSUES

34
35 Although not directly under the purview of human health and disease, the following considerations
36 are indirectly related to human well-being.

37 38 *Esthetics*

39
40 The Milky Way is no longer visible to the majority of people in the modern world. As societies
41 have increasingly used electricity to light the night, it has become difficult to see more than a few
42 of the innumerable stars from Earth's surface.¹⁰⁵ This has been carefully documented in a cover
43 story by National Geographic Magazine in November 2008, which includes extensive visual
44 documentation on its website.¹⁰⁶ Though the major impact of electric light at night is in major
45 metropolitan areas, even the once pristine nights of the U.S. National Parks are beginning to be
46 degraded, more rapidly in the East but also in parks in the West as well.¹⁰⁷

47 48 *Impact on Wildlife*

49
50 Life on the planet has evolved to accommodate the 24-hour solar cycle of light and dark. Human
51 imposition of light at night and disruption of the natural dark-light cycle represents a dramatic

1 change to the environment.¹⁰⁸ Study of the effects of light at night on animal and plant life is in the
2 early stages, but the entire spectrum of life, including animal, plant, insect, and aquatic species,
3 may be affected.

4
5 About 30% of all vertebrate species and 60% of invertebrate species on Earth are nocturnal and
6 depend on dark for foraging and mating.¹⁰⁸ Documented wildlife destruction by light at night has
7 been evident in bird species, which fly into lit buildings at night in enormous numbers when
8 migrating, and in the disruption of migration and breeding cycles in amphibians.¹⁰⁸⁻¹¹¹ The most
9 studied case in reptiles involves sea turtle hatchlings on the coast of Florida, which historically
10 have scurried from their nest directly to the ocean. With increased development along the coast,
11 and attendant increased electric lighting at night, these hatchlings become confused and often
12 migrate away from shore to the lights. Hundreds of thousands of hatchlings are believed to have
13 been lost as a result of this stray electric lighting at night in Florida.¹⁰⁹ Furthermore, many billions
14 of insects are lost to electric light annually, which reduces food availability for other species in
15 addition to unnecessarily reducing living biomass. It is concerning that light at night also may be
16 vector attractant for diseases such as malaria.¹¹²

17
18 The circadian biology of plants is as robust as animals, and the impact of light at night on plant life
19 may also be considerable due to the role of light in photosynthesis and the fact that many plants are
20 pollinated at night.^{113,114}

21 22 POLICY AND PUBLIC HEALTH IMPLICATIONS OF LIGHT AT NIGHT

23
24 Some responses to public health concerns associated with light-at-night exposures are readily
25 apparent, such as developing and implementing technologies to reduce glare from vehicle
26 headlamps and roadway lighting schemes, and developing lighting technologies at home and at
27 work that minimize circadian disruption, while maintaining visual efficiency and aesthetics.
28 Additionally, clinical studies support efforts to reduce child and adolescent night-time exposure
29 from exogenous light derived from various media sources, especially in the bedroom environment.
30 Recommendations to use dim lighting in residences at night raise issues for elderly patients. The
31 American Geriatrics Society recommends ensuring well lit pathways within households to reduce
32 the incidence of falls in elderly patients.¹¹⁵

33
34 Individuals who are subject to shift work experience disrupted circadian rhythms, fatigue, and
35 cognitive dysfunction. Many industries, including hospitals, require a 24-hour workforce. The
36 American College of Occupational and Environmental Medicine has established guidelines to
37 address fatigue risk management in the workplace.¹¹⁶ In healthcare workers, such as nurses who
38 experience rapidly rotating shifts, brief morning light exposure improves subjective symptoms and
39 performance.¹¹⁷ The judicious use of bright light and/or melatonin supplements can improve
40 adaptation to permanent, long-term night work.¹¹⁸

41 42 SUMMARY AND CONCLUSIONS

43
44 The natural 24-hour cycle of light and dark helps maintain precise alignment of circadian
45 biological rhythms, the general activation of the central nervous system and various biological and
46 cellular processes, and entrainment of melatonin release from the pineal gland. Pervasive use of
47 nighttime lighting disrupts these endogenous processes and creates potentially harmful health
48 effects and/or hazardous situations with varying degrees of harm. The latter includes the
49 generation of glare from roadway, property, and other artificial lighting sources that can create
50 unsafe driving conditions, especially for older drivers. Current AMA policy advocates that all
51 future outdoor lighting be of energy efficient designs to reduce energy use and waste. Future

1 streetlights should incorporate fully shielded or similar non-glare design to improve the safety of
2 our roadways for all, but especially vision impaired and older drivers.

3
4 More direct health effects of nighttime lighting may be attributable to disruption of the sleep-wake
5 cycle and suppression of melatonin release. Even low intensity nighttime light has the capability of
6 suppressing melatonin release. In various laboratory models of cancer, melatonin serves as a
7 circulating anticancer signal and suppresses tumor growth. Limited epidemiological studies
8 support the hypothesis that nighttime lighting and/or repetitive disruption of circadian rhythms
9 increases cancer risk; most attention in this arena has been devoted to breast cancer. The quality
10 and duration of sleep and/or period of darkness affect many biological processes that are currently
11 under investigation. Further information is required to evaluate the relative role of sleep versus the
12 period of darkness in certain diseases or on mediators of certain chronic diseases or conditions
13 including obesity. Due to the nearly ubiquitous exposure to light at inappropriate times relative to
14 endogenous circadian rhythms, a need exists for further multidisciplinary research on occupational
15 and environmental exposure to light-at-night, the risk of cancer, and exacerbation of chronic
16 diseases.

17 18 RECOMMENDATIONS

19
20 The Council on Science and Public Health recommends that the following statements be adopted
21 and the remainder of the report be filed:

22
23 That our American Medical Association:

- 24
25 1. Supports the need for developing and implementing technologies to reduce glare from vehicle
26 headlamps and roadway lighting schemes, and developing lighting technologies at home and at
27 work that minimize circadian disruption, while maintaining visual efficiency. (New HOD
28 Policy)
- 29
30 2. Recognizes that exposure to excessive light at night, including extended use of various
31 electronic media, can disrupt sleep or exacerbate sleep disorders, especially in children and
32 adolescents. This effect can be minimized by using dim red lighting in the nighttime bedroom
33 environment. (New HOD Policy)
- 34
35 3. Supports the need for further multidisciplinary research on the risks and benefits of
36 occupational and environmental exposure to light-at-night. (New HOD Policy)
- 37
38 4. That work environments operating in a 24/7 hour fashion have an employee fatigue risk
39 management plan in place. (New HOD Policy)
- 40
41 5. That Policy H-135.937 be reaffirmed. (Reaffirm HOD Policy)

Fiscal Note: Less than \$500

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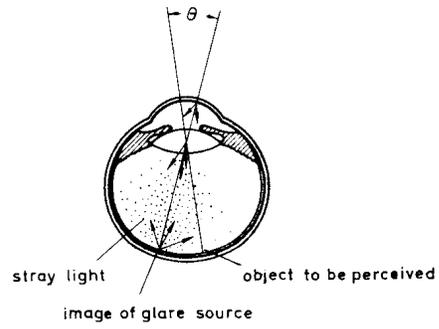
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Figure 1. Stray light in the ocular media



Appendix

DeBoer Scale

DeBoer Numerical Rating	Glare Intensity
1	Unbearable
3	Disturbing
5	Just Admissible
7	Satisfactory
9	Unnoticeable

Addendum

Molecular and Cellular Basis for Photoreceptive Regulation of Circadian and Neuroendocrine System Function

In the past decade, there has been an upheaval in the understanding of photoreceptive input to the human circadian and neuroendocrine systems. A study on healthy human subjects confirmed that the three-cone system that mediates human vision during the daytime is not the primary photoreceptor system that transduces light stimuli for acute melatonin suppression.¹¹⁹ That discovery was rapidly followed by the elucidation of two action spectra in healthy human subjects that identified 446-477 nm as the most potent wavelength region for melatonin suppression.^{3,4} To date, ten published action spectra have examined neuroendocrine, circadian, and neurobehavioral responses in humans, monkeys, and rodents. The action spectra demonstrate peak sensitivities in the blue region of the visible spectrum, with calculated peak photosensitivities ranging from 459 nm to 484 nm.¹²⁰⁻¹²² Further, a set of studies has confirmed that shorter wavelength, monochromatic light is more potent than equal photon densities of longer wavelength light for evoking circadian phase shifts, suppressing melatonin, enhancing subjective and objective correlates of alertness, increasing heart rate, increasing body temperature, and inducing expression of the circadian clock gene *Per2* in humans.^{19,20,123-126}

Studies using both animal and human models are clarifying the neuroanatomy and neurophysiology of the photosensory system that provides input for circadian, neuroendocrine, and neurobehavioral regulation. A recently discovered photopigment, named melanopsin, has been localized both in the retinas of rodents and humans.¹²⁷ More specifically, melanopsin is found in a subtype of intrinsically photoreceptive retinal ganglion cells (ipRGCs).^{128,129} These light sensitive ganglion cells project to nuclei and regions of the central nervous system that mediate the biological and behavioral effects of light.^{130,131} Although ipRGCs provide the strongest input for regulation of biology and behavior, studies on genetically manipulated rodents, normal monkeys, and humans demonstrate that the visual rod and cone photoreceptors integrate into this physiology.^{5,132-134} Continued advances in understanding the physiology of this phototransduction will undoubtedly yield further insights into potential health impacts of electric lighting.

New American Medical Association statement on street lighting: the current “white” LEDs are too bright for optimum safety and health

The American Medical Association (AMA) has just adopted an official policy statement about street lighting: cool it and dim it. This is because the new LED street lighting that is sweeping the country is too harsh and bright for optimum safety and health. The statement was adopted unanimously by the AMA House of Delegates at its annual meeting in Chicago this week (1). It states that outdoor lighting at night, particularly street lighting, should have a color temperature of no greater than 3000K. Color temperature (CT) is a measure of the spectral content of light from a source (2); how much blue, green, yellow, and red there is in it. Higher CT generally means greater blue content, and the whiter the light appears.

A white LED at CT 4000K or 5000K contains a high level of short wavelength, blue light; this has been the choice for a number of cities that have recently retrofitted their street lighting such as Seattle (3) and New York (4). Complaints about the harshness of these lights in these cities are surging. An extreme example is the city of Davis, California where the residents demanded a complete replacement of these high CT street lights (5). An incandescent bulb at color temperature of 2,400K contains far less blue and far more yellow and red wavelengths. Before electric light, we burned wood and candles at night; this artificial light has a CT of about 1800K, quite yellow/red and almost no blue.

A color temperature wrinkle

Color Temperature reliably predicts spectral content of light (i.e., how much of each wavelength) from a true “black body radiator” which is approximated by the tungsten filament in an incandescent bulb. However, for other types of light sources such as fluorescent and LED, it does not so reliably do so. Another technical term is used for these sources called correlated color temperature (CCT). It adjusts the spectral content of the light source to the color sensitivity of human vision. So, even at the preferable 3000K CCT compared to 5000K CCT for street lighting, two such light sources could have fairly large differences in blue light content.

Color rendering is an important consideration for lighting designers for use inside buildings. The more light across the wavelength spectrum (from blue to red), the better objects will be faithfully rendered for their color; in other words, the closer the colors of the object will be to what they are in sunlight. However, for outdoor lighting at night, another important aspect is the amount of blue light; the less the better, both to reduce glare and to minimize affects of human circadian health.

The reason color temperature matters

The AMA policy statement is particularly timely because the new Atlas of world light pollution just appeared last week (6), and street lighting is an important component of light pollution. One of the considerations of lighting the night is its impact on human health. I have been writing about this for The Conversation for a while, and have described how lighting affects our normal circadian physiology (7), how this could lead to some serious health consequences (8), and most recently how lighting the night affects sleep (9)

Bright electric lighting can also adversely affect wildlife (10)

Two problems with LED street lighting

The new “white” LED street lighting that is rapidly being retrofitted to cities throughout the country, has two problems according to the AMA. The first is discomfort and glare. Because LED light is so concentrated, it can cause severe glare, resulting in pupillary constriction that defeats the purpose of lighting the night for safe driving or walking. You can sense this easily if you look directly into one of the control lights on your new washing machine or other appliance: it is very difficult to do because it hurts. Street lighting can have this same effect if its blue content is high and there is not appropriate shielding.

The other issue addressed by the AMA statement is the impact on human circadian rhythmicity.

Street lighting and human health

The AMA has made three recommendations in its new policy statement:

First, the AMA supports a “proper conversion to community based Light Emitting Diode (LED) lighting, which reduces energy consumption and decreases the use of fossil fuels.”

Second, the AMA “encourage[s] minimizing and controlling blue-rich environmental lighting by using the lowest emission of blue light possible to reduce glare.”

Third, the AMA “encourage[s] the use of 3000K or lower lighting for outdoor installations such as roadways. All LED lighting should be properly shielded to minimize glare and detrimental human and environmental effects, and consideration should be given to utilize the ability of LED lighting to be dimmed for off-peak time periods.”

There is almost never a completely satisfactory solution to a complex problem. We must have lighting at night, not only in our homes and businesses, but also outdoors on our streets. The need for energy efficiency is serious, but so too is minimizing human risk, both from glare and human circadian disruption, from bad lighting. LED technology can optimize both when properly designed (11).

1. <http://www.ama-assn.org/sub/meeting/>
2. <http://www.ies.org/lighting/science/color.cfm>
3. <http://crosscut.com/2013/03/streetlights-seattle-led/>
4. http://www.nytimes.com/2015/03/24/nyregion/new-led-streetlights-shine-too-brightly-for-some-in-brooklyn.html?_r=0
5. <http://volt.org/lessons-learned-davis-ca-led-streetlight-retrofit/>
6. <https://theconversation.com/new-atlas-shows-extent-of-light-pollution-what-does-it-mean-for-our-health-60836>
7. <https://theconversation.com/a-dark-night-is-good-for-your-health-39161>
8. <https://theconversation.com/the-mystery-of-breast-cancer-40036>
9. <https://theconversation.com/are-we-sleep-deprived-or-just-darkness-deprived-49412>
10. <http://www.sciencedirect.com/science/article/pii/S0169534715001603>
11. <http://www.edisontechcenter.org/LED.html>

REPORT OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH

CSAPH Report 2-A-16

Subject: Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting

Acknowledgement: The Council thanks George Brainard, PhD (Thomas Jefferson University); Richard Stevens, PhD (University Connecticut Health Center); and Mario Motta, MD (CSAPH, Tufts Medical School) for their contributions in preparing the initial draft of this report, and the commentary by Travis Longcore, PhD, on the ecological impact of nighttime electrical lighting.

1 INTRODUCTION

2
3 With the advent of highly efficient and bright light emitting diode (LED) lighting, strong economic
4 arguments exist to overhaul the street lighting of U.S. roadways.¹⁻³ Valid and compelling reasons
5 driving the conversion from conventional lighting include the inherent energy efficiency and longer
6 lamp life of LED lighting, leading to savings in energy use and reduced operating costs, including
7 taxes and maintenance, as well as lower air pollution burden from reduced reliance on fossil-based
8 carbon fuels.

9
10 Not all LED light is optimal, however, when used as street lighting. Improper design of the lighting
11 fixture can result in glare, creating a road hazard condition.^{4,5} LED lighting also is available in
12 various color correlated temperatures. Many early designs of white LED lighting generated a color
13 spectrum with excessive blue wavelength. This feature further contributes to disability glare, i.e.,
14 visual impairment due to stray light, as blue wavelengths are associated with more scattering in the
15 human eye, and sufficiently intense blue spectrum damages retinas.^{6,7} The excessive blue spectrum
16 also is environmentally disruptive for many nocturnal species. Accordingly, significant human and
17 environmental concerns are associated with short wavelength (blue) LED emission. Currently,
18 approximately 10% of existing U.S. street lighting has been converted to solid state LED
19 technology, with efforts underway to accelerate this conversion. The Council is undertaking this
20 report to assist in advising communities on selecting among LED lighting options in order to
21 minimize potentially harmful human health and environmental effects.

22
23 METHODS

24
25 English language reports published between 2005 and 2016 were selected from a search of the
26 PubMed and Google Scholar databases using the MeSH terms “light,” “lighting methods,”
27 “color,” “photostimulation,” and “adverse effects,” in combination with “circadian
28 rhythm/physiology/radiation effects,” “radiation dosage/effects,” “sleep/physiology,” “ecosystem,”
29 “environment,” and “environmental monitoring.” Additional searches using the text terms “LED”
30 and “community,” “street,” and “roadway lighting” were conducted. Additional information and
31 perspective were supplied by recognized experts in the field.
32

1 ADVANTGAGES AND DISADVANAGES OF LED STREET LIGHTS

2
3 The main reason for converting to LED street lighting is energy efficiency; LED lighting can
4 reduce energy consumption by up to 50% compared with conventional high pressure sodium (HPS)
5 lighting. LED lighting has no warm up requirement with a rapid “turn on and off” at full intensity.
6 In the event of a power outage, LED lights can turn on instantly when power is restored, as
7 opposed to sodium-based lighting requiring prolonged warm up periods. LED lighting also has the
8 inherent capability to be dimmed or tuned, so that during off peak usage times (e.g., 1 to 5 AM),
9 further energy savings can be achieved by reducing illumination levels. LED lighting also has a
10 much longer lifetime (15 to 20 years, or 50,000 hours), reducing maintenance costs by decreasing
11 the frequency of fixture or bulb replacement. That lifespan exceeds that of conventional HPS
12 lighting by 2-4 times. Also, LED lighting has no mercury or lead, and does not release any toxic
13 substances if damaged, unlike mercury or HPS lighting. The light output is very consistent across
14 cold or warm temperature gradients. LED lights also do not require any internal reflectors or glass
15 covers, allowing higher efficiency as well, if designed properly.^{8,9}

16
17 Despite the benefits of LED lighting, some potential disadvantages are apparent. The initial cost is
18 higher than conventional lighting; several years of energy savings may be required to recoup that
19 initial expense.¹⁰ The spectral characteristics of LED lighting also can be problematic. LED
20 lighting is inherently narrow bandwidth, with "white" being obtained by adding phosphor coating
21 layers to a high energy (such as blue) LED. These phosphor layers can wear with time leading to a
22 higher spectral response than was designed or intended. Manufacturers address this problem with
23 more resistant coatings, blocking filters, or use of lower color temperature LEDs. With proper
24 design, higher spectral responses can be minimized. LED lighting does not tend to abruptly “burn
25 out,” rather it dims slowly over many years. An LED fixture generally needs to be replaced after it
26 has dimmed by 30% from initial specifications, usually after about 15 to 20 years.^{1,11}

27
28 Depending on the design, a large amount blue light is emitted from some LEDs that appear white
29 to the naked eye. The excess blue and green emissions from some LEDs lead to increased light
30 pollution, as these wavelengths scatter more within the eye and have detrimental environmental
31 and glare effects. LED’s light emissions are characterized by their correlated color temperature
32 (CCT) index.^{12,13} The first generation of LED outdoor lighting and units that are still widely being
33 installed are “4000K” LED units. This nomenclature (Kelvin scale) reflects the equivalent color of
34 a heated metal object to that temperature. The LEDs are cool to the touch and the nomenclature has
35 nothing to do with the operating temperature of the LED itself. By comparison, the CCT associated
36 with daylight light levels is equivalent to 6500K, and high pressure sodium lighting (the current
37 standard) has a CCT of 2100K. Twenty-nine percent of the spectrum of 4000K LED lighting is
38 emitted as blue light, which the human eye perceives as a harsh white color. Due to the point-
39 source nature of LED lighting, studies have shown that this intense blue point source leads to
40 discomfort and disability glare.¹⁴

41
42 More recently engineered LED lighting is now available at 3000K or lower. At 3000K, the human
43 eye still perceives the light as “white,” but it is slightly warmer in tone, and has about 21% of its
44 emission in the blue-appearing part of the spectrum. This emission is still very blue for the
45 nighttime environment, but is a significant improvement over the 4000K lighting because it
46 reduces discomfort and disability glare. Because of different coatings, the energy efficiency of
47 3000K lighting is only 3% less than 4000K, but the light is more pleasing to humans and has less
48 of an impact on wildlife.

49
50 *Glare*

51

1 Disability glare is defined by the Department of Transportation (DOT) as the following:

2
3 “Disability glare occurs when the introduction of stray light into the eye reduces the ability to
4 resolve spatial detail. It is an objective impairment in visual performance.”

5 Classic models of this type of glare attribute the deleterious effects to intraocular light scatter in the
6 eye. Scattering produces a veiling luminance over the retina, which effectively reduces the contrast
7 of stimulus images formed on the retina. The disabling effect of the veiling luminance has serious
8 implications for nighttime driving visibility.¹⁵

9
10 Although LED lighting is cost efficient and inherently directional, it paradoxically can lead to
11 worse glare than conventional lighting. This glare can be greatly minimized by proper lighting
12 design and engineering. Glare can be magnified by improper color temperature of the LED, such as
13 blue-rich LED lighting. LEDs are very intense point sources that cause vision discomfort when
14 viewed by the human eye, especially by older drivers. This effect is magnified by higher color
15 temperature LEDs, because blue light scatters more within the human eye, leading to increased
16 disability glare.¹⁶

17
18 In addition to disability glare and its impact on drivers, many residents are unhappy with bright
19 LED lights. In many localities where 4000K and higher lighting has been installed, community
20 complaints of glare and a “prison atmosphere” by the high intensity blue-rich lighting are common.
21 Residents in Seattle, WA have demanded shielding, complaining they need heavy drapes to be
22 comfortable in their own homes at night.¹⁷ Residents in Davis, CA demanded and succeeded in
23 getting a complete replacement of the originally installed 4000K LED lights with the 3000K
24 version throughout the town at great expense.¹⁸ In Cambridge, MA, 4000K lighting with dimming
25 controls was installed to mitigate the harsh blue-rich lighting late at night. Even in places with a
26 high level of ambient nighttime lighting, such as Queens in New York City, many complaints were
27 made about the harshness and glare from 4000K lighting.¹⁹ In contrast, 3000K lighting has been
28 much better received by citizens in general.

29 30 *Unshielded LED Lighting*

31
32 Unshielded LED lighting causes significant discomfort from glare. A French government report
33 published in 2013 stated that due to the point source nature of LED lighting, the luminance level of
34 unshielded LED lighting is sufficiently high to cause visual discomfort regardless of the position,
35 as long as it is in the field of vision. As the emission surfaces of LEDs are highly concentrated
36 point sources, the luminance of each individual source easily exceeds the level of visual
37 discomfort, in some cases by a factor of 1000.¹⁷

38
39 Discomfort and disability glare can decrease visual acuity, decreasing safety and creating a road
40 hazard. Various testing measures have been devised to determine and quantify the level of glare
41 and vision impairment by poorly designed LED lighting.²⁰ Lighting installations are typically
42 tested by measuring foot-candles per square meter on the ground. This is useful for determining the
43 efficiency and evenness of lighting installations. This method, however, does not take into account
44 the human biological response to the point source. It is well known that unshielded light sources
45 cause pupillary constriction, leading to worse nighttime vision between lighting fixtures and
46 causing a “veil of illuminance” beyond the lighting fixture. This leads to worse vision than if the
47 light never existed at all, defeating the purpose of the lighting fixture. Ideally LED lighting
48 installations should be tested in real life scenarios with effects on visual acuity evaluated in order to
49 ascertain the best designs for public safety.

50

1 *Proper Shielding*

2
3 With any LED lighting, proper attention should be paid to the design and engineering features.
4 LED lighting is inherently a bright point source and can cause eye fatigue and disability glare if it
5 is allowed to directly shine into human eyes from roadway lighting. This is mitigated by proper
6 design, shielding and installation ensuring that no light shines above 80 degrees from the
7 horizontal. Proper shielding also should be used to prevent light trespass into homes alongside the
8 road, a common cause of citizen complaints. Unlike current HPS street lighting, LEDs have the
9 ability to be controlled electronically and dimmed from a central location. Providing this additional
10 control increases the installation cost, but may be worthwhile because it increases long term energy
11 savings and minimizes detrimental human and environmental lighting effects. In environmentally
12 sensitive or rural areas where wildlife can be especially affected (e.g., near national parks or bio-
13 rich zones where nocturnal animals need such protection), strong consideration should be made for
14 lower emission LEDs (e.g., 3000K or lower lighting with effective shielding). Strong consideration
15 also should be given to the use of filters to block blue wavelengths (as used in Hawaii), or to the
16 use of inherent amber LEDs, such as those deployed in Quebec. Blue light scatters more widely
17 (the reason the daytime sky is “blue”), and unshielded blue-rich lighting that travels along the
18 horizontal plane increases glare and dramatically increases the nighttime sky glow caused by
19 excessive light pollution.

20 21 POTENTIAL HEALTH EFFECTS OF “WHITE” LED STREET LIGHTING

22
23 Much has been learned over the past decade about the potential adverse health effects of electric
24 light exposure, particularly at night.²¹⁻²⁵ The core concern is disruption of circadian rhythmicity.
25 With waning ambient light, and in the absence of electric lighting, humans begin the transition to
26 nighttime physiology at about dusk; melatonin blood concentrations rise, body temperature drops,
27 sleepiness grows, and hunger abates, along with several other responses.

28
29 A number of controlled laboratory studies have shown delays in the normal transition to nighttime
30 physiology from evening exposure to tablet computer screens, backlit e-readers, and room light
31 typical of residential settings.²⁶⁻²⁸ These effects are wavelength and intensity dependent,
32 implicating bright, short wavelength (blue) electric light sources as disrupting transition. These
33 effects are not seen with dimmer, longer wavelength light (as from wood fires or low wattage
34 incandescent bulbs). In human studies, a short-term detriment in sleep quality has been observed
35 after exposure to short wavelength light before bedtime. Although data are still emerging, some
36 evidence supports a long-term increase in the risk for cancer, diabetes, cardiovascular disease and
37 obesity from chronic sleep disruption or shiftwork and associated with exposure to brighter light
38 sources in the evening or night.^{25,29}

39
40 Electric lights differ in terms of their circadian impact.³⁰ Understanding the neuroscience of
41 circadian light perception can help optimize the design of electric lighting to minimize circadian
42 disruption and improve visual effectiveness. White LED streetlights are currently being marketed
43 to cities and towns throughout the country in the name of energy efficiency and long term cost
44 savings, but such lights have a spectrum containing a strong spike at the wavelength that most
45 effectively suppresses melatonin during the night. It is estimated that a “white” LED lamp is at
46 least 5 times more powerful in influencing circadian physiology than a high pressure sodium light
47 based on melatonin suppression.³¹ Recent large surveys found that brighter residential nighttime
48 lighting is associated with reduced sleep time, dissatisfaction with sleep quality, nighttime
49 awakenings, excessive sleepiness, impaired daytime functioning, and obesity.^{29,32} Thus, white LED
50 street lighting patterns also could contribute to the risk of chronic disease in the populations of
51 cities in which they have been installed. Measurements at street level from white LED street lamps

- 1 are needed to more accurately assess the potential circadian impact of evening/nighttime exposure
- 2 to these lights.

1 ENVIRONMENTAL EFFECTS OF LED LIGHTING

2

3 The detrimental effects of inefficient lighting are not limited to humans; 60% of animals are
4 nocturnal and are potentially adversely affected by exposure to nighttime electrical lighting. Many
5 birds navigate by the moon and star reflections at night; excessive nighttime lighting can lead to
6 reflections on glass high rise towers and other objects, leading to confusion, collisions and death.³³
7 Many insects need a dark environment to procreate, the most obvious example being lightning bugs
8 that cannot “see” each other when light pollution is pronounced. Other environmentally beneficial
9 insects are attracted to blue-rich lighting, circling under them until they are exhausted and die.^{34,35}
10 Unshielded lighting on beach areas has led to a massive drop in turtle populations as hatchlings are
11 disoriented by electrical light and sky glow, preventing them from reaching the water safely.³⁵⁻³⁷
12 Excessive outdoor lighting diverts the hatchlings inland to their demise. Even bridge lighting that is
13 “too blue” has been shown to inhibit upstream migration of certain fish species such as salmon
14 returning to spawn. One such overly lit bridge in Washington State now is shut off during salmon
15 spawning season.

16

17 Recognizing the detrimental effects of light pollution on nocturnal species, U.S. national parks
18 have adopted best lighting practices and now require minimal and shielded lighting. Light pollution
19 along the borders of national parks leads to detrimental effects on the local bio-environment. For
20 example, the glow of Miami, FL extends throughout the Everglades National Park. Proper
21 shielding and proper color temperature of the lighting installations can greatly minimize these types
22 of harmful effects on our environment.

23

24 CONCLUSION

25

26 Current AMA Policy supports efforts to reduce light pollution. Specific to street lighting, Policy H-
27 135.932 supports the implementation of technologies to reduce glare from roadway lighting. Thus,
28 the Council recommends that communities considering conversion to energy efficient LED street
29 lighting use lower CCT lights that will minimize potential health and environmental effects. The
30 Council previously reviewed the adverse health effects of nighttime lighting, and concluded that
31 pervasive use of nighttime lighting disrupts various biological processes, creating potentially
32 harmful health effects related to disability glare and sleep disturbance.²⁵

33

34 RECOMMENDATIONS

35

36 The Council on Science and Public Health recommends that the following statements be adopted,
37 and the remainder of the report filed.

38

- 39 1. That our American Medical Association (AMA) support the proper conversion to
40 community-based Light Emitting Diode (LED) lighting, which reduces energy
41 consumption and decreases the use of fossil fuels. (New HOD Policy)
- 42
- 43 2. That our AMA encourage minimizing and controlling blue-rich environmental lighting by
44 using the lowest emission of blue light possible to reduce glare. (New HOD Policy)
- 45
- 46 3. That our AMA encourage the use of 3000K or lower lighting for outdoor installations such
47 as roadways. All LED lighting should be properly shielded to minimize glare and
48 detrimental human and environmental effects, and consideration should be given to utilize
49 the ability of LED lighting to be dimmed for off-peak time periods. (New HOD Policy)

Fiscal Note: Less than \$500

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DECEMBER 2014

GE LIGHTING LIGHTING AND SLEEP



INTRODUCTION

The National Institute of Health defines “circadian rhythms” as “physical, mental and behavioral changes that follow a roughly 24-hour cycle, responding primarily to light and darkness in an organism’s environment.”¹ Although, in the strictest sense, circadian rhythms refer to cyclical changes in hormones, body temperature, and other biological processes over the course of a 24 hour period, the term commonly is used to refer to the body’s natural sleep-wake cycle. Indeed, a disruption of a person’s circadian rhythms typically results in a disruption of the individual’s sleep-wake cycle.

The Department of Health and Human Services has reported that “sleep deficiency and circadian disruption resulting from lifestyle factors are increasingly common societal problems that increase disease risk through complex pathways.”² An estimated 50–70 million adults in the United States suffer from chronic sleep or wakefulness issues, and the percentage of adults who report averaging less than seven hours of sleep per night has increased by about one third since the 1980s.³ According to the National Institute of Health, sleep disorders have been linked to a growing list of long-term health problems, including a greater risk of heart disease, stroke, diabetes, obesity, and other diseases.”⁴

Lifestyle factors and stress levels certainly influence sleeping patterns, but more and more attention is being paid to the impact of light on sleep cycles. The invention of electric light in the nineteenth century and, more recently, the explosive rise of “screen time” associated with smart phones and tablets, places us in a world where we can have as much light as we want whenever we want it. Light, and human activity, is no longer tied to the rising and setting sun. But our biology is still linked to that astronomical cycle.

Recent scientific studies provide empirical and epidemiological evidence of positive and negative effects of lighting on sleep patterns. Light has the potential to strengthen our natural internal clocks but, more frequently, acts to disrupt it. Lighting solutions that more closely simulate the daily rhythms we receive from natural light may help improve our ability to enjoy sound sleep and awaken efficiently.

- 1 National Institute of Health, *Circadian Rhythms Fact Sheet*, http://www.nigms.nih.gov/Education/Pages/Factsheet_CircadianRhythms.aspx.
- 2 National Institute of Health (2011) National Institutes of Health Sleep Disorders Research Plan Publication No. 11-7820, U.S. Department of Health and Human Services, NIH
- 3 National Institutes of Health (2011, November 9) National Institutes of Health. Retrieved June 2, 2014, from Updated NIH Sleep Disorders Research Plan seeks to promote and protect sleep health, <http://www.nih.gov/news/health/nov2011/nhlbi-09.htm>



EXECUTIVE SUMMARY

At the AMA House of Delegates 2012 Annual Meeting, the American Medical Association (AMA), the largest physician organization in the U.S., voted to adopt policy that recognizes “that exposure to excessive light at night, including extended use of various electronic media, can disrupt sleep or exacerbate sleep disorders, especially in children and adolescents.”⁵

At the center of this discussion is the impact of electric lighting, as well as the impact of modern electronics such as computer screens, phones, and tablets. These lighting and communication devices produce high levels of blue light, and this bluish light tends to suppress the body’s production of melatonin — the “sleep hormone.” Melatonin levels follow a daily rhythm, tending to drop sharply in the morning as we wake and then rising again in the evening, leading to end of the day drowsiness that fosters sleep.⁶

The link between light and melatonin production is well accepted in the scientific community. Many people would benefit from a more regular daily rhythm of light that mimics the intensity and spectrum that humans had received from natural lighting in the past. As discussed in more detail below, recent developments support this conclusion:

1. Studies going back several decades have established the link between melatonin and circadian/sleep rhythms. Recent scientific and medical studies are providing empirical and epidemiological evidence of the potential positive and negative effects of lighting on sleep.
2. Better scientific understanding of human circadian physiology has increasingly revealed the quantity, quality, and timing of light that is best for maintaining natural sleep-awake cycles.
3. Advancements in lighting technology now allow for precise spectral tailoring with LED technology.

⁴ Updated NIH Sleep Disorders Research Plan Seeks to Promote and Protect Sleep Health.” U.S National Library of Medicine. U.S. National Library of Medicine, 9 Nov. 2011. Web. 2 June 2014. <<http://www.nih.gov/news/health/nov2011/nhlbi-09.htm>>.

⁵ Council on Science and Public Health (A-12), American Medical Association, 2012.

⁶ Brown, G. M. “Light, Melatonin and the Sleep-wake Cycle.” J Psychiatry Neurosci 19.5 (1994): 345-53. Print.



THE ROLE OF SLEEP ON WELLNESS

There is ample evidence supporting the benefits of regular and adequate sleep. Getting between 7 and 9 hours of sleep per night is the recommended daily amount. Sleep deprivation can increase stress, increase the chance of chronic disease (specifically cardiovascular disease), and reduce brain function—including inattention, hallucinations and blurred vision.⁷ Chronic sleep loss can result in a handful of health issues, including weakened memory, slowed metabolism, increased irritability and moodiness, hypertension, a weakened immune system.^{8,9} It has also been linked to obesity, diabetes, depression, bipolar disorder, and seasonal affective disorder.¹⁰ Employing strategies and tactics to regulate sleep, and foster a regular sleep-wake cycle, should be a priority.

CIRCADIAN RHYTHM AND MELATONIN

Increased use of light-emitting technological devices in recent decades further challenges our ability to maintain a regular sleep-wake cycle. Several studies have demonstrated, with conclusive statistical strength, that nighttime light exposure can suppress the production of melatonin, which is secreted by the pineal gland.¹¹ This suppression, in turn, hinders our ability to fall to sleep, and wake, on a regular schedule.

Several studies have demonstrated, with conclusive statistical strength, that nighttime light exposure can suppress the production of melatonin

The effect is particularly strong with bluish light, which has been researched heavily. In a telling study by Dr. George Brainard, eight subjects were exposed to different wavelengths of light. Researchers collected blood samples both before and after light exposures to measure melatonin levels. The results demonstrate that bluish light is particularly effective in suppressing melatonin.¹² Other, subsequent studies support these findings.¹³

⁷ MMWR Morb Mortal Wkly Rep. 2011 Mar 4;60(8):233–8., <http://www.cdc.gov/mmwr/pdf/wk/mm6008.pdf>

⁸ Meerlo, P., Sgoifo, A., Suchecki, D., 2008. Restricted and disrupted sleep: effects on autonomic function, neuroendocrine stress, systems and stress responsivity. *Sleep Med. Rev.* 12, 197-210, <http://cbn.eldoc.ub.rug.nl/FILES/root/2008/SleepMedRevMeerlo/2008SleepMedRevMeerlo.pdf>

⁹ Weinhouse GL, Schwab RJ. Sleep in the critically ill patient. *Sleep* 2006;29(5):707–16., <http://www.journalsleep.org/Articles/290519.pdf>

¹⁰ National Institute of Health, *Circadian Rhythms Fact Sheet*, http://www.nigms.nih.gov/Education/Pages/Factsheet_CircadianRhythms.aspx.

¹¹ Thapan, Kavita, Josephine Arendt, and Debra J. Skene. "An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans." *The Journal of Physiology* 535 (2001): 261-67. Print.

Brainard, G. C., J. P. Hanifin, J. M. Greeson, B. Byrne, G. Glickman, E. Gerner, and M. D. Rollag. "Action Spectrum for Melatonin Regulation in Humans: Evidence for a Novel Circadian Photoreceptor." *J Neurosci.* 21.16 (2001): 6405-12. Print.



In a natural state, melatonin production by the pineal gland drops significantly in the morning, remains low during the day, and then rises considerably in the evening.¹⁴ This daily hormonal cycle is strongly influenced by light. Certain photoreceptor cells in the human eye, melanopsin retinal ganglion cells, are especially sensitive to blue light with short wavelengths of approximately 460 nanometers.¹⁵ When exposed to high doses of bluish light — whether generated by the sun, electric light, or smart devices — these cells send a message to brain to “shut down” the production of melatonin, and the brain retransmits this message to the pineal gland.¹⁶ In this way light, especially bluish light, reduces the body’s production of melatonin.

Melatonin suppression in the evening hinders sleep and disrupts the sleep cycle

This suppressive effect is naturally caused by sunlight during the day. It can also result from artificial light sources in the evening. This is important, because melatonin suppression in the evening (a relatively new phenomenon in human history brought about by electric light) hinders sleep and disrupts the sleep cycle.

Melatonin production may be suppressed by a variety of light sources but, as discussed above, the more bluish light produced by newer energy-efficient light bulbs, and electronics such as computer screens, smart phones, and tablets, is compounding the problem. Dr. Brainard explained that a large LED screen, for example, “could be giving you an alert stimulus at a time that will frustrate your body’s ability to go to sleep later.” And even when you turn it off, he says, “it doesn’t mean that instantly the alerting effects go away. There’s an underlying biology that’s stimulated.”¹⁷

¹² Thapan, Kavita, Josephine Arendt, and Debra J. Skene. “An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans.” *The Journal of Physiology* 535 (2001): 261-67. Print.

Brainard, G. C., J. P. Hanifin, J. M. Greeson, B. Byrne, G. Glickman, E. Gerner, and M. D. Rollag. “Action Spectrum for Melatonin Regulation in Humans: Evidence for a Novel Circadian Photoreceptor.” *J Neurosci.* 21.16 (2001): 6405-12. Print.

¹³ Ibid

¹⁴ Brown, G. M. “Light, Melatonin and the Sleep-wake Cycle.” *J Psychiatry Neurosci* 19.5 (1994): 345-53. Print.

¹⁵ Thapan, Kavita, Josephine Arendt, and Debra J. Skene. “An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans.” *The Journal of Physiology* 535 (2001): 261-67. Print.

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¹⁶ Macchi M, Bruce J (2004). “Human pineal physiology and functional significance of melatonin”. *Front Neuroendocrinol* 25 (3-4): 177-95. doi: 10.1016/j.yfrne.2004.08.001. PMID 15589268.

¹⁷ http://www.nytimes.com/2011/07/05/health/05light.html?pagewanted=all&_r=0



While the bluish light from new light sources has the strongest effect on melatonin levels, even bright standard room lighting has a noticeable impact.¹⁸ Conversely, light with longer wavelengths above 550 to 560 nanometers (more towards the orange or red end of the spectrum) has a much lower suppressive effect.¹⁹ Exposure to such light in the evening and at night, in lieu of bluish or regular lighting, has a less disruptive effect on the sleep-wake cycle.²⁰

The effects of melatonin suppression can be long lasting, just as jet lag may persist several days after a trip.²¹ Accordingly, maintaining a consistent schedule of the right kind of light exposure helps your body maintain a consistent sleep-wake schedule.

USING LIGHTING TO OUR ADVANTAGE

While certain types of lighting may negatively affect our sleeping schedules, there are ways to create lighting that can help our bodies maintain their natural rhythms. For example, research shows that illumination of less than 30 lux for 30 minutes should not significantly suppress melatonin production.²² In addition, using a light source that is skewed towards the orange and red end of the spectrum (in place of a more whitish or bluish light) will also reduce melatonin suppression that would otherwise be caused by a bluish, or even a traditional white, light source.²³ Engineering LED bulbs in this way can provide individuals with the illumination (quality and quantity of light) they need in the evenings and at night, but without significantly suppressing melatonin. This can help them maintain their natural sleep cycles.

18 Figueiro et al. found that even low levels (30 to 300 lux at the eye) of incandescent light in the home, for ½ hour have a significant effect (8 to 35% reduction) on melatonin level in humans (Mariana G Figueiro, Mark S Rea, John D Bullough, *J Carcinog* 2006, 5:20).

McIntyre et al. found that maximum suppression of melatonin following 1 hr of light at midnight was 71%, 67%, 44%, 38%, and 16% with intensities of 3000, 1000, 500, 350, and 200 lux, respectively (McIntyre IM, *J Pineal Res.* 1989, 6(2):149-56).

Gooley, et al. found that compared with dim light (< 3 lux), exposure to room light (< 200 lux) before bedtime suppressed melatonin, resulting in a later melatonin onset in 99.0% of individuals and shortening melatonin duration by about 90 min. Also, exposure to room light during the usual hours of sleep suppressed melatonin by greater than 50% in most (85%) trials (Joshua J Gooley et al., *J Clin Endocrinol Metab.* Mar 2011; 96(3): E463–E472).

19 Thapan, Kavita, Josephine Arendt, and Debra J. Skene. "An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans." *The Journal of Physiology* 535 (2001): 261-67. Print.

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20 Ibid

21 National Institute of Health, Circadian Rhythms Fact Sheet, http://www.nigms.nih.gov/Education/Pages/Factsheet_CircadianRhythms.aspx.

22 Thapan, Kavita, Josephine Arendt, and Debra J. Skene. "An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans." *The Journal of Physiology* 535 (2001): 261-67. Print.

Brainard, G. C., J. P. Hanifin, J. M. Greeson, B. Byrne, G. Glickman, E. Gerner, and M. D. Rollag. "Action Spectrum for Melatonin Regulation in Humans: Evidence for a Novel Circadian Photoreceptor." *J Neurosci.* 21.16 (2001): 6405-12. Print.

23 Ibid



While bright, bluish light in the evening works to disrupt our circadian rhythm, such light in the early day actually assists our body to maintain its natural rhythms.²⁴ The light works to suppress melatonin at the same time the pineal gland is ramping down melatonin production in the morning. Engineering an LED light source in this way for use in the morning also can help an individual maintain a natural sleep cycle.

There are ways to create lighting that can help our bodies maintain their natural rhythms

In addition to color (bluish versus orange/reddish) and intensity (brightness), distance from the light source to a person is an important practical factor, since how much light actually reaches the eyes is critical. Having higher light levels reach the eyes in the morning, coupled with lower levels reaching the eyes in the evening, generally is better to support our body's natural melatonin production and maintain sleep-wake cycles.

Finally, pairing the use of a relatively high volume of bright, bluish light in the morning with the use of non-bluish light in the evening would seem to be most effective at helping an individual maintain the natural sleep-wake cycle. Light bulbs or fixtures designed to provide this "recipe" of lighting — in place of traditional light sources — can benefit an individual seeking to get, achieve and maintain, a more consistent, natural sleep cycle.

CONCLUSION

Thanks to advances in technology, we are living in a "new age of illumination." While these advancements come with many benefits, we should also be aware of unintended effects they can cause to our natural rhythms around day and night, such as their ability to interfere with wakefulness and sleep. New innovations in the field of lighting, and solutions that help mimic natural light patterns, will be important, since they may help to the body back into, and maintain, its natural circadian rhythm.

²⁴ Thapan, Kavita, Josephine Arendt, and Debra J. Skene. "An Action Spectrum for Melatonin Suppression: Evidence for a Novel Non-rod, Non-cone Photoreceptor System in Humans." *The Journal of Physiology* 535 (2001): 261-67. Print.

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Agenda Item: BOS Goals / Liaisons

- I Put *Actual* Item for Discussion on BOS Agenda

- II Advertise the Actual Goal
 - Documents, Arguments
 - Invite Public Input

- III Questionable "To-Dos" in 2015 "Goals"
 - "Support" Pathways
 - Enact LIP Regulations (Developers love this idea, gives up town's leverage without corresponding benefit)
 - "Support" Full Time Police Department

- IV Goals Should Be Overarching (High Ground) and Specific, e.g:
 - Tax Increase <2%
 - Decide: 1.5% Land Area or 10% Units for 40B Obligation
 - Increase Participation in TM

NON-BINDING BALLOT QUESTION

BOW HUNTING ON TOWN-OWNED LANDS

Question 3: Shall the Town of Carlisle request the Selectmen to place an article on the next Town Meeting warrant to regulate bow hunting on Town-owned lands as an approach to deer management?

YES ___ NO ___

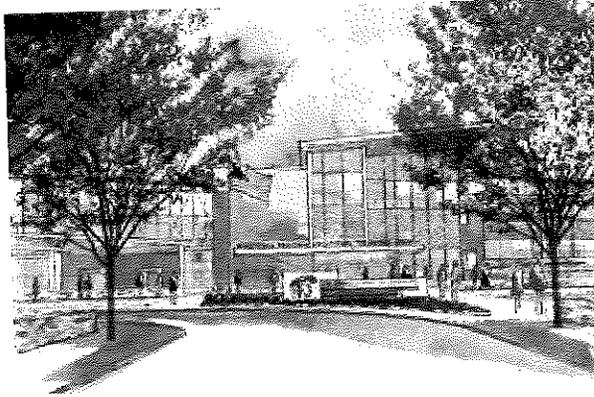
M.G.L. ch.53, Section 18B ... (b) The governing body of a city, town or district which accepts this section in the manner provided in section 4 of chapter 4 shall print information relating to each question that shall appear on the city, town or district ballot. The information shall include: (1) the full text of each question; (2) a fair and concise summary of each question, including a 1 sentence statement describing the effect of a yes or no vote, which shall be prepared by the city solicitor, town counsel or counsel for the city, town or district; and (3) **arguments for and against each question** as provided in subsections (d) and (e). Not later than 7 days before an election at which the question shall be submitted to the voters in a city, town or district, *the information in this subsection shall be sent to each household* wherein a person whose name appears on the current voting list for the city, town or district resides.

... (d) Not later than 7 days after the determination that a question shall appear on the ballot, the city solicitor or town or district counsel, as applicable, *shall seek written arguments from the principal proponents and opponents of the question*. For the purposes of this section, the principal proponents and opponents of a question shall be those persons determined by the solicitor or counsel to be best able to present the arguments for and against the question. The solicitor or counsel shall provide not less than 7 days' written notice to the opponents and proponents of the date on which the written arguments shall be received. Proponents and opponents shall submit their arguments, which shall be not more than 150 words, to the solicitor or counsel, together with a copy thereof to the city or town clerk or, in a district, to the clerk of each city and town within the district. The arguments and summary shall be submitted by the solicitor or counsel to the governing body at least 20 days before the election for distribution to voters in accordance with subsection (b). A copy of the arguments and summary shall also be submitted by the solicitor or counsel to the city, town or district clerk.

(e) *In determining the principal proponents and opponents of a ballot question, the solicitor or counsel shall contact each ballot question committee, if any, as defined in section 1 of chapter 55. The principal proponents or opponents of a ballot question may include officers of a ballot question committee or officers of a city, town or district office or committee including, but not limited to, a finance committee or a school committee. In addition, the principal proponents or opponents may include the first 10 signers or a majority of the first 10 signers of a petition initiating the placement of such question on the ballot. The solicitor or counsel shall determine, based on a review of arguments received, the person or group best able to present arguments for and against a question. If no argument is received by the solicitor or counsel within the time specified by the solicitor or counsel, the solicitor or counsel shall prepare an argument and submit the argument to the governing body and to the city or town clerk or, in a district, to the clerk of each city and town within the district within the time specified in subsection (d).*

M.G.L. ch. 53, Section 18A ... A **nonbinding** public opinion advisory question may be placed on the ballot for a regular municipal election in any city or town no later than the thirty-fifth day preceding such election:... by vote of the board of selectmen of a town ...

AVOID THE PROBLEM OF A BIG, TOO EXPENSIVE PROJECT – 2x the cost of what may have been necessary



Main Entry Sketch, KBA

2015

Welcome to the Minuteman School Building Committee website!

1. Regularly Scheduled Meetings / Ample Notice
2. Informative Agendas
 - a. Hearings with Public Input Welcomed
 - b. Relevant Documents Available in Advance
3. Comprehensive and Timely Minutes
4. Larger Issues Advertised with Good Notice