

Posted 11.26.2019 at 3:30pm by JAD

**SELECT BOARD**

**AGENDA**

**Tuesday, December 3, 2019**

**7:00pm**

**Town Hall Meeting Room  
13 Ayer Road, Harvard, MA 01451**

**Alice von Loesecke (Chair), Stu Sklar, Lucy Wallace, Kara McGuire Minar, Rich Maiore**

- 1) *Call Meeting to Order – Alice von Loesecke*
- 2) *Tax Classification Hearing (7:00)*
- 3) *Permanent Building Committee appointment – Guy Hermann (7:10)*
- 4) *Follow up to Environmental Assessment Form – Ellen Leicher & Brian Smith (7:15)*
- 5) *Update from the War Monument Restoration Committee (7:30)*
- 6) *Approve minutes from 11/5 (7:40)*
- 7) *Public Communication (7:45)*
- 8) *Finalize Complete Streets plan (8:00)*
- 9) *Town Administrator report – miscellaneous issues & discussion items: (8:30)*
- 10) *Action/Discussion Items: (8:45)*
  - a) *Act on final pay request to Rinaldi Inc. for completion of the old library accessibility project*
  - b) *Review and determine course of action for old library per investigative report*
  - c) *Appointment of Select Board Rep. to the Open Space Committee*
  - d) *Review of Select Board goals*
- 11) *Select Board Reports*
- 12) *Executive Session:* The Board will enter into executive session, as authorized by Chapter 30A, Section 21.3 to discuss strategy with respect to collective bargaining or litigation if an open meeting may have a detrimental effect on the bargaining or litigating position of the public body and the chair so declares. The Board will reconvene into open session only to adjourn.

**NEXT SCHEDULED MEETING**

**Town Hall Meeting Room**

**December 17, 2019**

**7:00pm**



## Town of Harvard

13 Ayer Road

Phone: (978) 456-4100

### Volunteer Form

*Good Government Starts with You*

**Date Submitted:** January 9, 2019

**Name:** Guy Hermann

**Home Address:** 32 Madigan Lane  
Harvard, MA 01451

**Mailing Address:** 32 Madigan Lane  
Harvard, MA 01451

**Phone Number(s):** (860)-857-7363 - Cell

**Email Address:** guy.hermann@mac.com

**Current Occupation/Employer:** Cultural Facilities consultant, Harvard

**Have you previously been a member of a Board, Committee or Commission (either in the Town of Harvard or elsewhere)?** Yes

*If yes, please list the Board name and your approximate dates of service:*

Board Member, Building Committee chair, and treasurer, ISAAC charter school, New Land, CT

Board member and President, Museum Computer Network

various others

**Are you a registered voter?** Yes

**Do you, your spouse, or your employer have any current or potential business relationship with the Town of Harvard that could create a conflict of interest?** No

*If YES, please describe the possible conflict:*

**Narrative:** I have a strong background in facility planning for cultural and other projects and led two multi-million dollar building projects for the ISAAC school, from concept through completion.

**Board(s) / Committee(s):** \_\_\_PERMANENT BUILDING COMMITTEE

**Recommendation to the Harvard Select Board – November 19, 2019**  
Environmental Assessment

Meetings held with Town Committees and/or Representatives:

- Pond, Land Stewardship Subcommittee
- ConsCon
- Board of Health
- Planning, Zoning, MVP
- Town Administration
- Park & Rec
- School Committee
- CPIC
- HEAC
- CPC

General Feedback:

- Almost 100% positive support for the addition of the tool as a way to encourage the consideration of the environment in what the Town does
- Need to abide by federal/state regulations, but mostly this pertains to environmental committees who have pretty strict regulations regarding the environment (e.g. ConsCom, CPC, BoH)
- The form should not be a burden to complete. Edits were made to it and most agreed it was doable
- Issue of how/where to post and how the public would know this is happening and where they can learn more

Recommendations:

- CPIC was very supportive and already agreed to make it part of their capital request process. Questions were shortened/combined to be part of their follow-up with applicants this year. They will have responses to review this year but not yet include them in their project rating. In January we will talk about how well the questions worked based on the answers received. The application can be modified to include these questions (or modified questions) in the next round of capital requests for FY 2022. Inclusion in CPIC covers a significant number of expenditures that would come from any committee/board.
- Form has been revised based on feedback from meetings but may be revised further and can be used in other circumstances outside of CPIC (see below)
- Post all completed forms on the Town website. Put it in the Documents and Forms section on the website with a new tab heading, Environmental Assessment

- Trigger for use is voluntary to start. CPIC will cover the big items. Smaller expenditures and policy is up to the particular committee. If a resident or another committee or Board requests a committee to use the form for a particular decision, the committee should be receptive and accommodate the resident or committee.
- Consideration for using the form or some part of it as part of the budget process – it may be used as an explanation of why budgeted items may be going up or down (e.g. use of greener materials, reuse, refurbish savings, etc.)
- Communication to Residents is key:
  - If approved for use – communication from Select Board to committees about its use and posting on website
  - Website changes and announcements
  - Article in the Press – Consider This and other articles
  - Advertise as public notice when utilized by a committee/board
  - Info on Nextdoor with link to Town website

Attachments:  
Revised Form  
CPIC questions

December 3, 2019

Town of Harvard

Environmental Assessment Form

(NOTE: Projects/Acquisitions that are reviewed by CPIC are exempted)

Committee/Board/Department: \_\_\_\_\_

Project/ Decision/Acquisition Name: \_\_\_\_\_

Date: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone/Email Contact Information: \_\_\_\_\_

Background: The Town and its residents are seeking consideration of the environment, energy efficiency and renewable content, the re-use/re-cycling of materials, and the enhancement of resiliency in our Town projects, planning and major decisions. Please complete this form before a public meeting and a decision to take action and submit it to Julie Doucet ([jdoucet@harvard.ma.us](mailto:jdoucet@harvard.ma.us)) for posting on the Town Website under Documents and Forms.

This information will inform other boards, Town government and the public and facilitate their feedback on choices that your Board/Committee/Department takes into consideration. It will ensure opportunities for environmental protection, re-use, energy conservation and resiliency are considered in decision-making. It will also provide a measure of transparency into what was included in the decision-making.

What does this not apply to?

- Projects/Acquisitions that are submitted to CPIC as this has been incorporated into their process
- Regulatory hearings that are governed by MA law and Town Bylaws (e.g., zoning hearings, Conservation Commission hearings, etc.)

1. Please describe any potential environmental impacts or considerations associated with the Project, Acquisition or Decision. What choices were made about seeking ways to reduce environmental impacts (e.g. alternative designs, locations, sharing resources etc.)

December 3, 2019

2. What is the expected life of the acquisition or duration of the project? What are the options for the de-commission, disposal, re-use, resale or recycling during and at the end of that life span?

3. Please describe any energy efficiency or green energy options that may be considered associated with the Project or Decision. What impact does it have on the town's energy consumption and energy budget?

4. Please describe any resiliency and/or hazard-mitigation opportunities that may be considered that help fulfill a Town climate-related resiliency plan.

5. Please share any other relevant information.

## CPIC Questions

Please describe any potential environmental impacts or considerations associated with the capital acquisition.

- What choices were made about seeking ways to reduce environmental impacts (e.g. type of materials, sharing resources with other entities, alternative acquisition options)?
- What is the expected life of the acquisition? What are the options for the de-commission, disposal, re-use, resale or recycling during and at the end of that life span?
- Please describe any energy efficiency or green energy options that were considered as part of the proposed acquisition?



**Select Board  
Minutes  
Tuesday, November 5, 2019 at 7:00pm  
Town Hall Meeting Room, Harvard, MA**

The meeting was called to order at 7:00pm by Chair Alice von Loesecke in the Town Hall Meeting Room. Select Board members Kara Minar, Rich Maiore, Lucy Wallace and Stu Sklar were in attendance as well as Town Administrator Tim Bragan, Assistant Town Administrator Marie Sobalvarro and Executive Assistant Julie Doucet.

**Other Post-Employment Benefits (OPEB)**

Assistant Town Administrator Marie Sobalvarro summarized the recent Government Accounting Standards Board (GASB 74 & 75) actuarial valuation of the retiree health care benefits. This included explanation of past liability comparisons and drivers that change liability. She provided a breakdown by department and explained the discount rate referred to in the report is the rate at which future benefit payments are ‘brought back’ to the present when calculating liabilities; a lower discount rate results in a higher liability. Sobalvarro indicated the good news/bad news is Harvard has a low municipal bond yield rate which is beneficial for funding Town projects it is statutorily used to cover the years in which benefit payments are not covered by the assets. Harvard’s declining discount rate is a blended rate of the long-term rate of return through 2035 and then the municipal bond yield rate through 2052. The next valuation will be a complete valuation, tailored to our employees’ Date of Hire (DOH), Date of Birth (DOB), wage, department, health plan election/eligibility, retirement system, and our retirees’ DOB, health plan election, and retirement system, as of June 30, 2020.

**Minutes**

On a Wallace/Maiore motion, the board voted unanimously to approve minutes of 10/8 & 10/22, as presented.

**Entertainment License Request – First Night Event**

On a Wallace/Minar motion, the board voted unanimously to approve entertainment license for the Friends of the CoA and Lions Club event for 6pm December 31, 2019 to January 1, 2020 at 12:30pm.

**Open Space Committee charge**

Stu Sklar and Rich Maiore worked together to finalize the charge. They decided to increase the membership from seven to nine and removed the five year action plan. A few minor spelling corrections were made.

On a Wallace/Minar motion, the board voted unanimously to adopt Town of Harvard Open Space Committee charge as presented and amended.

**Public Communication**

Connie Larrabee, 15 Under Pin Hill Rd, addressed parking issues that came up during recent discussions about the proposed Hildreth House Phase II project. She said the current parking area is sufficient and options on how to accommodate additional attendees at CoA events should include ideas such as carpooling and shuttles instead of adding more paved areas.

Ron Ostberg, 41 Warren Ave, distributed a handout on behalf of residents asking the Select Board to intervene in the Complete Streets process to ensure the final product is safe and consistent with the character of the common. The handout offered notes on design, process and remedy.

Billy Salter, 3 Elm Street, suggested the Select Board institute a citizen engagement process to develop a final plan. He obtained a copy of the contract with the state for the Complete Streets grant funding and believes the performance end date allows for flexibility in when the project is started allowing more time to modify the plan.



Nate Finch, 165 Codman Hill Road, has spoken with resident Ron Ostberg, General Store owner Scott Hayward and DPW Director Tim Kilhart. He understands there are different visions however as a father with young children he supports sidewalks in the town center, improvements to the parking lot at the General Store and all efforts to make the town center walkable and safer for all residents. He is sensitive to businesses in the center and does not want this project to adversely affect them. Admittedly he does not have all the answers but is hopeful there is a reasonable solution.

Paul Willard, Still River Road, is aware many questions have arisen about the Complete Streets proposal and process. He would rather wait than do it wrong. Willard acknowledges the town center is important and asks the Select Board to consider reexamining the proposed plan.

Sharon McCarthy, 90 East Bare Hill Road, does not agree with previous speakers that a sidewalk down Still River Road will make the parking lot safer near the General Store or the church. She suggested the sidewalk be installed along the Park & Rec land between the two buildings to improve safety instead of people traversing the parking lot.

Mike Kilian, 25 Candleberry Lane, walked the proposed design and thinks it is terrible. He does not recommend shorter crosswalks and asked for more detail on sidewalk along Ayer Road. He asked how a redesign can be requested prior to execution of contract with the state. Kilian suggested a possible mockup of the plan which would allow residents to understand the proposal better.

Tim Clark, 114 Bolton Road, has participated in many town center committees over the years. He said the proposed plan meets many principals set forth by the Planning Board and general wishes of the town with respect to pedestrians and vehicles however his big beef is with the overall connectivity of walkways. He understands the project financing limits the scope therefore the town is not able to include all the areas in need of improvement. Clark also understands how frustrating it can be when you have worked hard on something and then at the last minute people start to pay attention. He remains hopeful for an outcome that is simple and a good solution.

Trevor Smedley, 25 Depot Road – Harvard, understands the town has agreed to the Complete Streets program. He asks the Select Board to be sensitive to the community feedback and consider all stakeholders.

Carl Sciple, 23 Fairbank Street, said he would rather do nothing than do something wrong. He thinks residents in the neighborhood were not engaged to extent they should have been.

John Martin, 5 Fairbank Street, has lived in the town center for 32 years. He heard the claim from Town Counsel that this project does not require Historical Commission approval. He disagrees and believes a certificate of appropriateness is required.

George Triantaris, 2 Littleton Road, serves as secretary on the Historical Commission. He said the commission discussed this project in length but do not have jurisdiction on placement or design.

Don Green, 90 Oak Hill Road, hopes the Select Board is listening carefully to the concerns being expressed by residents.

### **Town Administrator Report**

Bragan reported on the following items:

- Asked the Select Board to sign easement granted to National Grid at the Special Town Meeting
- The commission on disability approved at the Special Town Meeting will require action at the next meeting

- He distributed a copy of an update Roadway Condition database provided by the DPW Director along with his five year pavement preservation program.
- He reported Gale Associates has determined the old library roof drainage system has significant problems. A recommendation for repairs will be forthcoming.
- The Cannabis Control Commission has requested signature from the town. This indicates they will be provisionally approving the request from Coil Brothers Inc.
- Harvard did not received the Mass Works grant for Slough Road
- The DPW Director informed Bragan the test on well #5 came back absent for coliform and had a plate count of 3. Another test will be done this week.
- He provided results from the Community Aggregation
- He announced Town Hall will be closed the Friday after Thanksgiving and employees will use their PTO time.
- He announced annual license renewals will be coming up for action at the second meeting in December.
- The Moderator is seeking two alternate members on the Finance Committee.

### **Quarterly budget report**

Bragan provided the budget report through the first of October. All department budgets are consistent with expectations at this point in the budget year. He does expect the water department budget to run over due to the issues with water quality requiring additional testing.

### **Hildreth House Phase II**

Von Loesecke reported after the last Select Board meeting the project proposal was examined more closely. Meetings with Permanent Building Committee (PBC) members and the Phase II subcommittee resulted in three main areas of concern; existing building code compliance, no heated connection between buildings and onsite parking. The architect has been asked to provide a cost estimate for them to investigate code compliance of the Hildreth House. Sobalvarro made a point of clarification that the Hildreth House currently is up to code for what it is being used for today. This was satisfied during the first phase of renovations. Sobalvarro asked for corroboration on precisely what the Select Board is requesting from the architects. She noted the current budget for this task has been expended. Von Loesecke said in order to make informed decisions they are seeking a cost estimate from the architects for code requirements that will be triggered for an addition to the Hildreth House or if a heated connection was built. Lucy Wallace appreciates the reasoning and necessity for the current design however a desired outcome would be to at least have the buildings connected. Everyone agreed a communication breakdown occurred between the sub-committee, PBC and the Select Board. A reporting structure will be implemented for future projects to avoid this type of situation from occurring in the future. Maiore was curious if the Council on Aging (CoA) and subcommittee are happy with the current design why are we requesting additional information. Von Loesecke reiterated the importance of understanding the cost implications for the Hildreth House phase II project if additional code compliance is necessary. Subcommittee member Connie Larrabee came forward to express her concern this direction deals the project an impossible hand. She recalls the struggles getting phase I passed. Larrabee is skeptical residents will vote favorably for phase II without full support from the town boards on the plan being proposed. Von Loesecke assured Larrabee the Capital Planning & Investment Committee (CPIC) will be vetting the plan as proposed and the additional information being requested will not delay the process. Subcommittee Chair Guy Oliva also articulated his concerns. He suggested if additional work is triggered those costs could be consider with a separate article. The Select Board members fully expect the town to show support for phase II by passing the article at the Annual Town Meeting.

### **Select Board Reports**

Sklar reported the War Monument Restoration Committee continues their work and will provide an update to the Select Board.

Sklar was pleased with the vote at the Special Town Meeting to extend the Transfer Station hours.

Sklar expects a report on usage from the DPW Director at the second meeting in December.

Von Loesecke reported the CPIC has begun work on their initial questions. She expects the Finance Director to have an updated debt schedule soon.

Von Loesecke reported currently the HES building project is on schedule and budget.

The meeting was adjourned at 8:50pm.

#### Documents referenced:

OPEB Overview from MS - dated 11.5.2019

GASB Report – dated 10.15.2019

First Night/Ent w/carry in application – dated 10.22.2019

Open Space Committee charge – dated 11.4.2019

Public Communication – Ron Ostberg handout – dated 11.5.2019

Quarterly Reports – dated 10.16.2019

To Whom It May Concern:

The following is an estimated timeline based on the Select Board approving the Complete Streets Sidewalk project at their meeting on Tuesday Dec. 3, 2019.

Final the design plan and review by early January 2020

Put out to bid on central register by mid January 2020

Open Bids on or about March 1, 2020

Award bid to lowest qualified bidder by mid March 2020

Construction to begin on or after April 1, 2020 depending on weather

Project completion by June 30, 2020 grant deadline

Thanks,

Timothy B. Kilhart  
Harvard DPW Director

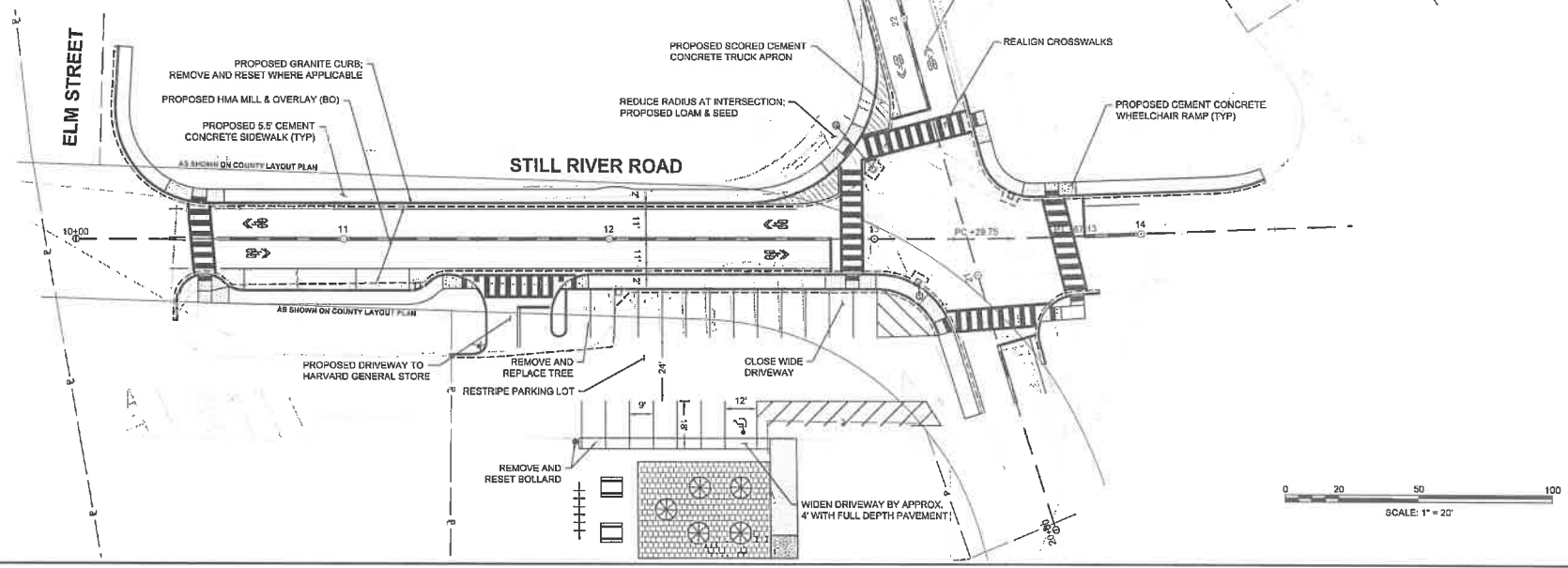
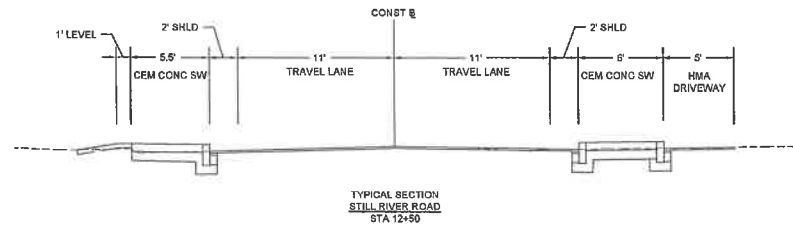


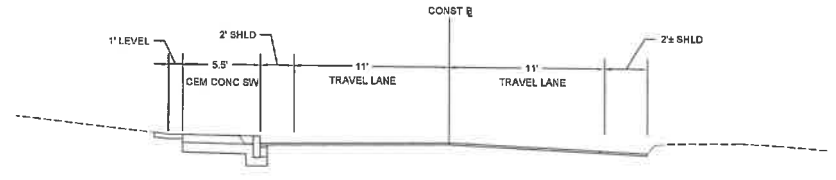
CONTINUED ON SHEET NO. 2

HARVARD  
TOWN CENTER COMPLETE STREETS

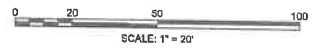
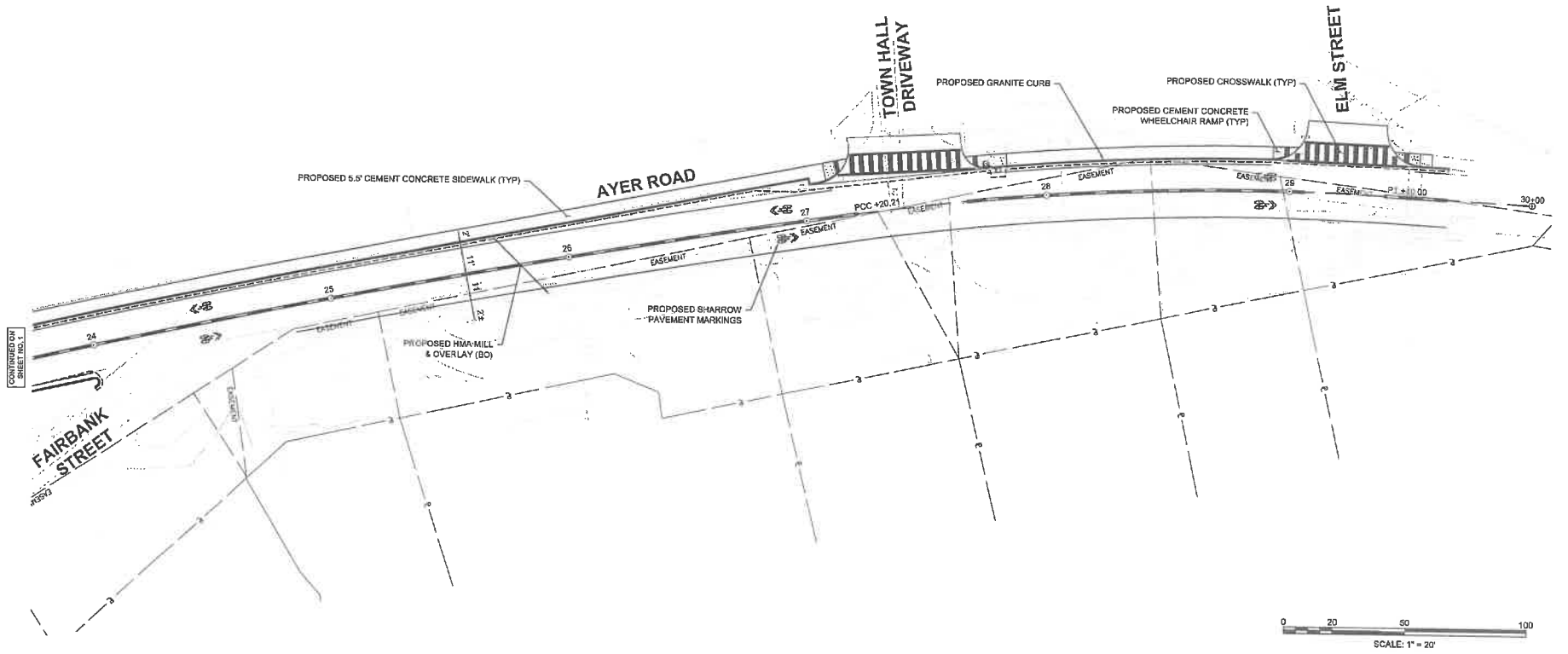
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MA	-	1	2
PROJECT FILE NO.			

PRELIMINARY DESIGN - 1 OF 2

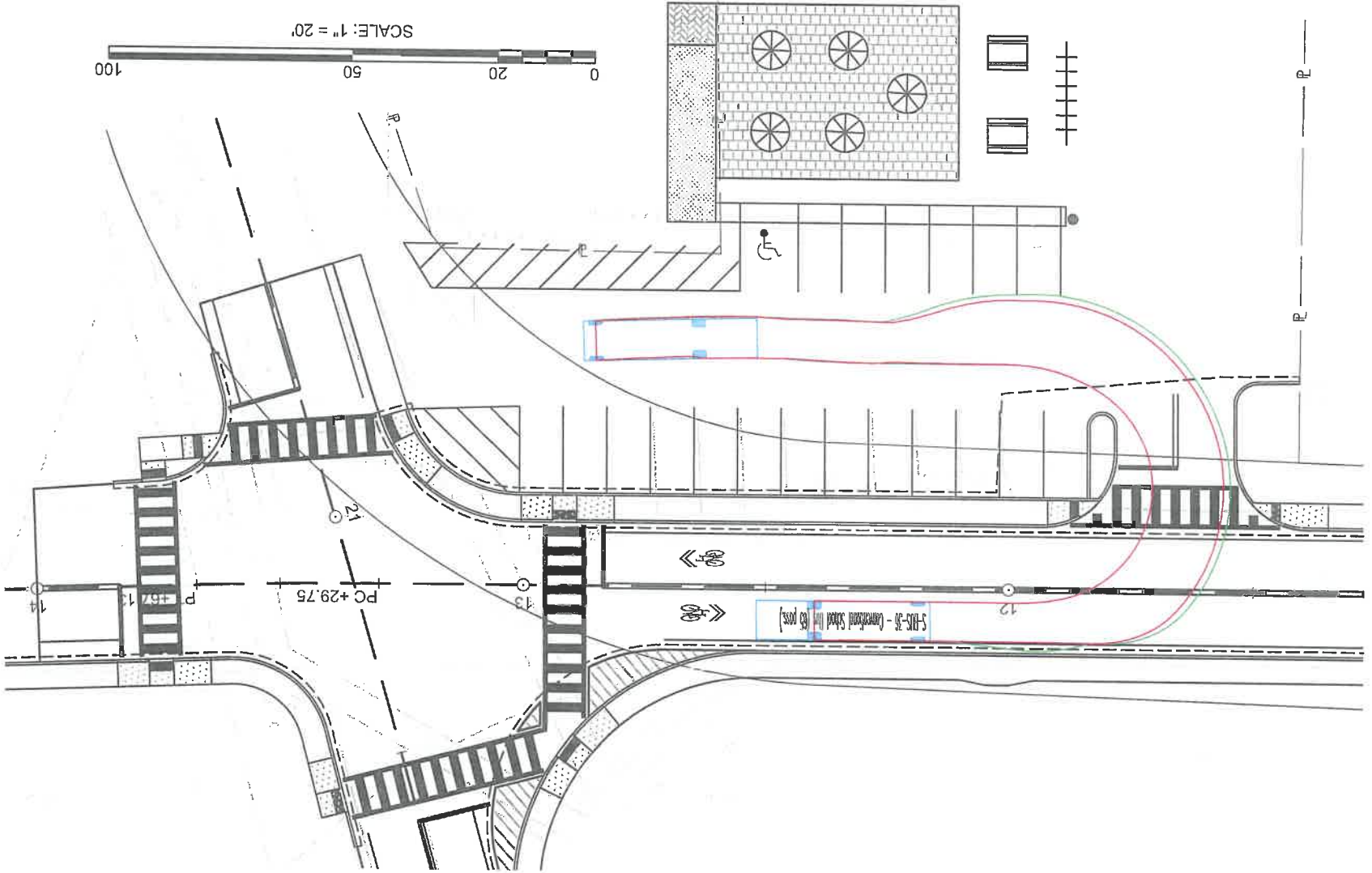




TYPICAL SECTION  
AYER ROAD  
STA 26+00



CONTINUED ON SHEET 101.1



# APPLICATION AND CERTIFICATE FOR PAYMENT AIA DOCUMENT G703 (Instructions on reverse side) PAGE 1 OF 2

<b>TO (OWNER):</b> Town of Harvard 13 Ayer Road Harvard, Ma 01451	<b>PROJECT:</b> Old Town Library - Accessibility Upgrades 7 Fairbanks St., Harvard, Ma 01451	<b>APPLICATION NO:</b> 9 (FINAL)  <b>PERIOD TO:</b> 9/11/2019	<b>Distribution to:</b> <input type="checkbox"/> Owner <input type="checkbox"/> Architect <input type="checkbox"/> Contractor
<b>FROM (CONTRACTOR):</b> Rinaldi, Inc. PO Box 178 Sheldonville, Ma 02070	<b>VIA (ARCHITECT):</b> Abacus Architects + Planners 119 Braintree Street, Suite 318 Allston, Ma 02134	<b>ARCHITECT'S PROJECT NO.:</b> 17-0766	
<b>CONTRACT FOR:</b> Old Town Library - Accessibility Upgrades		<b>CONTRACT DATE:</b> 11/26/2018	

## CONTRACTOR'S APPLICATION FOR PAYMENT

CHANGE ORDER SUMMARY		ADDITIONS	DEDUCTIONS
Change Orders approved in previous months by Owner		\$0	\$0
<b>TOTAL</b>			
Approved this Month			
Number	Date Approved		
6			-14500
<b>TOTALS</b>			(\$14,500)
<b>Net Change by Change Orders</b>			<b>\$11,782.26</b>

The undersigned Contractor certifies that, to the best of the Contractor's knowledge, information and belief, the Work covered by this Application has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown here is now due.

**CONTRACTOR:**

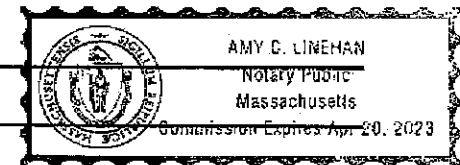
By: Orazio Rinaldi, PE for Rinaldi, Inc.  
 Date: *[Signature]* 11/18/2019

Application is made for Payment, as shown below, in connection with the Contract. Continuation sheet, AIA Document G703, is attached.

- |    |  |              |
|----|--|--------------|
| 1. | ORIGINAL CONTRACT SUM  | \$547,552.00 |
| 2. | Net change by Change Orders  | \$11,782.26  |
| 3. | CONTRACT SUM TO DATE (Line 1 +/- 2)                                    | \$559,334.26 |
| 4. | TOTAL COMPLETED & STORED TO DATE<br>(Column G on G703)                 | \$559,334.26 |
| 5. | RETAINAGE:   |              |
| a. | 5 % of completed Work<br>(Column D + E on G703)                        | \$0.00       |
| b. | 5 % of Stored Material<br>(Column F on G703)                           | \$0.00       |
|    | Total Retainage (Line 5a + 5b or<br>Total in Column I of G703)         | \$0.00       |
| 6. | TOTAL EARNED LESS RETAINAGE<br>(Line 4 less Line 5 Total)              | \$559,334.26 |
| 7. | LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) | \$532,191.42 |
| 8. | CURRENT PAYMENT DUE  | \$27,142.84  |
| 9. | BALANCE TO FINISH, PLUS RETAINAGE<br>(Line 3 less Line 6)              | \$0.00       |

State of Massachusetts County of: Norfolk  
 Subscribed and sworn to before me this 18 day of November, 2019

Notary Public: *[Signature]*  
 My Commission expires: 4/20/23



## ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief, the Work has progressed as indicated, quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$27,142.84

(Attach explanation if amount certified differs from the amount applied for.)

By: *[Signature]* Date: 11/18/19

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights to the Owner or Contractor under this Contract.



## **FY20 Select Board Goals**

### **Policies/Procedures**

- The board will set fewer goals than in years past and assess progress at their December 3<sup>rd</sup> meeting.
- All fees set by the Select Board will be reviewed this year.
- All documents included in the Select Board packets will be posted on the website with the agenda. Dropbox will be used to share agenda and packet information with the Select Board. This will start in September.

### **Master Plan**

- Assess where the Select Board is on set goals; discuss at upcoming meeting (KM & RM)
- Monitor other boards/committees on progress toward their Master Plan goals in cooperation with the Planning Board. (KM & RM)

### **Building Commissioner/Facilities Manager**

- Position has been advertised with initial review of applications beginning on June 19<sup>th</sup>. (TB & MS)

### **Volunteers**

- Outreach Plan (LW)

### **Capital projects**

- Adjustments to the plan will be necessary to appropriately accommodate projects such as the Fire Station and DPW Facility. (AvL)
- Funding of playing fields potentially. (SS)
- Fire Station study necessary now to determine clear path forward in the future.
- Hildreth House Phase II (LW)

### **Fiscal needs of Taxpayers**

- Ongoing; focus on long term investments & liabilities (KM)
- Consideration of Recreation Director position
- Upcoming union contracts (School – AvL DPW/Police – SS)
- Include advertising to offset cost of printing and mailing of the Finance Committee booklet

### **Hildreth Elementary School project (AvL)**

- Financing less expensive than forecast; communication will continue throughout.

### **Bromfield House (AvL & SS)**

- With offices being moved to the new school a decision will be necessary for the future of the Bromfield House structure/property

### **Ayer Road (RM & KM)**

- Develop overall goal for the area
- Solve infrastructure issues water/sewer

**SLATE ROOF AND MASONRY WALL EVALUATION  
AT THE OLD LIBRARY  
Town of Harvard  
Harvard, Massachusetts  
Gale JN 835760**

**BACKGROUND INFORMATION**

In accordance with our agreement, Gale Associates, Inc. (Gale) has performed a visual evaluation of the existing conditions at the Old Library (Library). The intent of the evaluation is to review the as-built condition of the roof and masonry wall assemblies and the associated sheet metal components, gutters and downspouts. This report includes Gale’s findings of the in-place components and will be augmented with recommendations for options for repair or replacement. Supporting information is provided within the appendix of the report, which includes, but is not limited to, preliminary cost estimates, field sketches, and reduced size drawings.

The Old Library was constructed circa 1886 and has an approximately 3,500 square feet building footprint. Multiple repair, renovation, and addition projects were reportedly performed at the Library in 1902, 1983, and 2018.

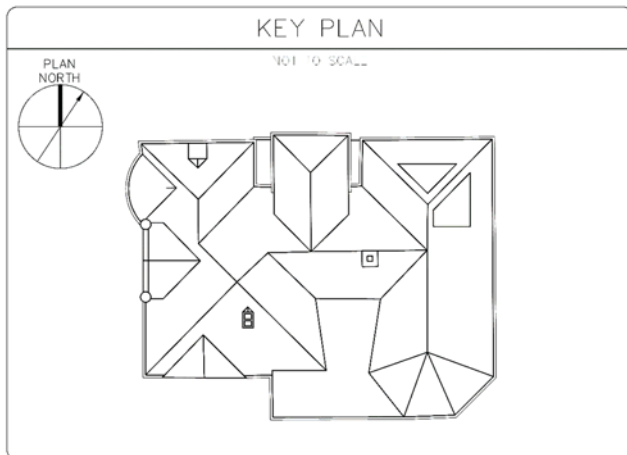


Figure 1: Key Plan of the Old Library

**REVIEW OF EXISTING DOCUMENTS**

To assist Gale in performing the evaluation of the Old Library, representatives from the Town of Harvard (Harvard) provided Gale with the following drawings:

1. Plans for a Public Library at Harvard Mass. by William Channing Whitney presumed to be the

original building drawings from 1886. The set of drawings includes floor plans, elevations, framing plans, wall sections, and details.

2. Harvard Public Library Alterations and Renovations by Architects Design Group II Inc. dated July 21, 1982. The set of drawings includes floor plans, building elevations, wall sections, window, door, and interior finish details, electrical plans, fire alarm plans, and heating plans.
3. Old Town Library – Accessibility Upgrades by ABACUS Architects + Planners, dated July 19, 2018. The set of drawings includes site plans, demolition plans, floor plans, elevations, details, and electrical and fire alarm plans.

**INTERIOR LEAK AUDIT**

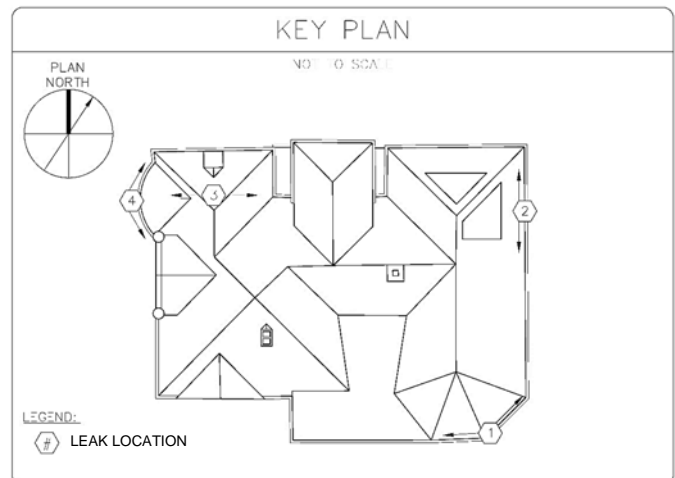


Figure 2: Key Plan of leak locations at the Old Library

Multiple locations of water infiltration were reported to Gale by Harvard personnel. It appears that Harvard maintenance staff have performed remedial repairs to address active leak locations including, but not limited to, cleaning gutters above leak locations, removing and replacing interior wall sheathing, and repainting. Evidence observed at reported leak locations includes water staining and peeling/blistering paint. Refer to the leak location descriptions below for specific information related to each leak, and refer to Figure 2 for the approximate location of the reported leaks:

- Leak location #1 was observed at the southeast corner of the building in the basement and first floor walls. This leak appears to start at the roof level. The leak is indicated by heavy staining on the walls in that area, which is hidden by the curtains. Harvard reported that the wall sheathing at this location had been previously replaced and repainted in an effort to remediate the effects of the leak.



Photo 1: View of heavy water staining on the first floor walls at Leak Location #1.



Photo 2: View of peeling paint, cracked plaster, and water staining on the basement floor walls at Leak Location #1.

- Leak location #2 was reported to occur along the east side of the building on the first floor. Harvard indicated that this area had been recently repainted to cover staining above the crown molding.



Photo 3: View of Leak Location #2.

- Leak location #3 was observed in the reading room on the first floor in the northwest corner of the building. Harvard reported that the leak in this area comes from an east-west line through the center of the ceiling. Harvard indicated that the ceiling had been recently repainted to cover staining. Based on the location in the first floor, there is a potential that moisture is entering through the roof or masonry near the gutter of the turret roof above and traveling along the ceiling, though it is unclear at this time.



Photo 4: View of rotted wood at the end of the roof framing valley beam Leak Location #4.

- Leak Location #4 was observed as rotted wood components and water staining on the roof sheathing boards near the eave in the attic space below the turret roof area.



Photo 5: View of water staining on the underside of the roof sheathing at Leak Location #4.

**DESTRUCTIVE TESTING**

On October 29, 2019, Gale representatives observed destructive roof and masonry test cuts performed at two (2) locations at the Old Library. The test cuts were performed by AMI Boston Masonry/Restoration Inc. (AMI) to confirm the existing configuration and condition of the slate roof, copper gutter, and associated masonry.

The two (2) test cuts were conducted on the west and south elevations of the building at the locations indicated in Figure 3. Samples for hazardous materials testing were collected at each of these test cuts.

Please be reminded that these test cuts represent the typical construction details but are not all inclusive of the construction configurations. Some additional evaluation may be required at a later date to further develop roof replacement and masonry repair designs.

The following conditions summarize our findings:

- 1. Test cut 1 revealed a wood roof deck, two (2) layers of felt paper, and slate shingles held in place with nails and set in roofing mastic at the eave. The roof materials appeared aged, with several deteriorated slates. The copper gutter has a flange that extends approximately four inches (4”) onto the roof deck between the two layers of felt paper and appeared to be secured with galvanized steel roofing nails. The test cut revealed that the copper gutter rests directly on top of the outer wythe of the mass masonry walls. It was discovered that the fourth course of masonry below the gutter contains header bricks that extend into the second wythe of masonry. The mortar in the second wythe of masonry was found to be typically soft and deteriorated in areas. Isolated cracked bricks were also observed in the second wythe of masonry.

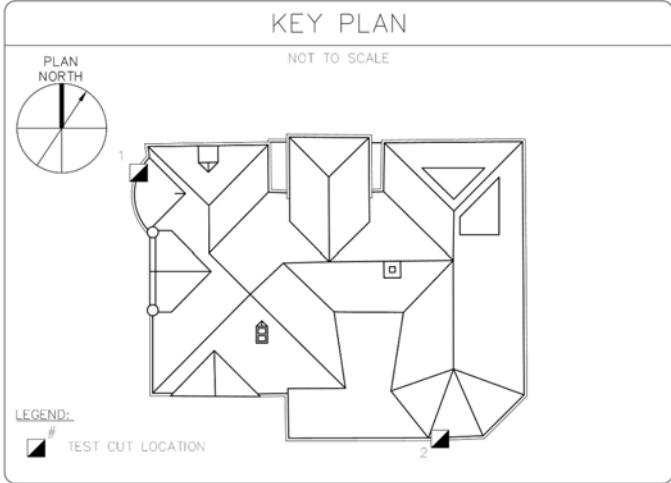


Figure 3: Key Plan of test cut locations at the Old Library.



Photo 6: View of test cut 1 at the roof with a wood roof deck.



Photo 7: View of test cut 1 at the masonry directly below the gutter. Note the cracked brick and deteriorated mortar in the second wythe of brick.

2. Test cut 2 revealed similar materials and conditions to test cut 1. The primary differences in test cut 2 were a terracotta roof deck in place of the wood roof deck and a lack of roofing mastic. Galvanized steel roofing nails are utilized to secure the slate to the terracotta roof deck. Gale observed punctures in the gutter at this test cut location and at adjacent gutter sections. This test cut also revealed a header brick in the second wythe of masonry tying into the third wythe. Header bricks were not observed in the outer wythe of masonry outside of the fourth course of brick down from the gutter. The brick and mortar observed in the inner wythes of masonry at this test cut are deteriorated, similar to test cut 1.



Photo 8: The slate, underlayment, and copper gutter are nailed directly into the terra cotta roof deck.



Photo 9: View of punctures in the gutter at test cut 2.



Photo 10: View of cracked brick and deteriorated mortar in the second wythe of masonry.

**HAZARDOUS MATERIALS**

At this time, Harvard has elected to forego the recommended services of an industrial hygienist, which may be required at a later time during the project to meet the requirements of the Massachusetts Department of Environmental Protection. However, in conjunction with the destructive test cuts, Gale sampled suspect materials to send for asbestos testing.

Gale sampled suspect roofing materials, including felt underlayments, slate roofing cement, and miscellaneous flashing sealant to determine if hazardous materials are present that could be impacted by the roof renovations and associated work.

## Asbestos

Tests determined that slate roof cement sampled at Test Cut 1 at the original portion of the building was found to contain asbestos containing materials. The slate cement was observed below the slate near the gutter.

## EXISTING CONDITIONS

On Monday, September 30, 2019 and Wednesday, October 2, 2019, representatives from Gale visited the Old Library to perform an evaluation of the existing roof assembly, sheet metal accessories, masonry, drainage systems and associated components including, but not limited to, gutters, downspouts, and flashings. The following observations are based on Gale's field evaluations:

### Roofs

1. Slate shingles are installed on the majority of the steep-sloped roof areas throughout the Old Library.



Photo 11: Overview of the slate roof areas at the Old Library.

2. A white, fluid-applied roof system is installed on the low-sloped roof area on the south side of the building. The adjacent sections of gutter were reportedly repaired as part of previous renovations.



Photo 12: View of the white fluid-applied low-sloped roof area.

3. At the northeast corner of the Old Library, a small sloped roof area with an approximately 2:12 roof slope is installed over a building entrance. This roof area is covered with a standing seam copper roof. The underside of this roof area is plywood sheathing that appears to be deteriorating.



Photo 13: View of the standing seam metal roof area.



Photo 14: View of the plywood on the soffit of the standing seam metal roof area.

4. At the northwest corner of the Old Library, a small low-sloped roof area is installed over a building entrance. This roof area appears to be covered with a flat-lock copper roof. The

plywood on the soffit of this roof area also appears to be deteriorated.



Photo 15: View of the flat lock copper roof area.

5. Throughout the slate roof areas, large numbers of broken shingles were observed.



Photo 16: View of typical broken shingles.

6. Gale observed isolated loose slates throughout the Old Library roof.



Photo 17: View of a loose slate.

7. Missing slates were observed in sporadic locations on the roof.



Photo 18: View of a missing shingle.

8. Gale observed multiple locations throughout the roof where slate fastening holes are visible.



Photo 19: View of exposed slate fastener holes. Note also the loose slates (dark arrows).

9. At the front entrance of the Old Library, the second story masonry appears to be leaning slightly towards the roof.



Photo 20: View of the masonry above the front entrance.

### Sheet Metal Components

1. The gutters at the Old Library are typically installed above the cornices on the brick masonry shelves at the top of the wall. Downspouts are integrated into the top courses of brick at some locations, and at others the downspouts rest against the face of the wall.



Photo 21: View of a downspout integrated into the top courses of masonry at a wall.



Photo 22: View of a downspout resting against the face of a wall.

2. Sheet metal flashing is installed at valleys throughout the slate shingle roof area. Gale observed multiple valleys on the roof where the sheet metal flashing has lost its patina and appears deteriorated.



Photo 23: View of deteriorated sheet metal valley flashing.

3. Stepped sheet metal reglet flashing is installed at the perimeters of the chimneys. At the two chimneys that do not rest along a ridge of the roof, sheet metal crickets are installed along the upper edge to shed water around the chimneys. Deteriorated sheet metal flashing was observed at two (2) of the building's chimneys.



Photo 24: View of deteriorated sheet metal flashing at a chimney.

4. Sheet metal caps are installed at ridges and hips throughout the slate roof area. Loose and deformed ridge caps were observed at one (1) location on the Old Library roof.



Photo 25: View of deformed and displaced ridge cap and rake trim.

5. Decorative metal rake trim is installed at gable end locations throughout the slate roof area. Gale observed one (1) deformed section of edge metal at a rake.
6. Gale observed deformed gutters in isolated locations along roof edges.





Photo 26: View of a deformed gutter.

7. The majority of the roof downspouts appear to be obstructed by debris. Drain strainers were not visible.



Photo 27: View of two obstructed downspouts.

8. Ferrous nails were observed in the copper sheet metal components and appear rusted.



Photo 28: Sheet metal fasteners appear rusted in some locations.

9. The brick masonry chimneys above the roof line are in fair to good condition. The stepped reglet flashing which provide the transition from the roof to the masonry

chimneys are sealant dependent, and the sealants appear to require replacement.



Photo 29: The sealant along the sheet metal flashing is failed, and the brick masonry appears stained at this chimney.

Masonry/Walls

1. Brick masonry walls throughout the Old Library appear to be in fair condition. Gale observed displaced brick in sporadic locations throughout the decorative brick masonry cornice. In one location, loose brick masonry units appeared in danger of falling. Gale removed the loose brick from a ladder while on site.



Photo 30: View of the displaced brick in danger of falling.

2. Gale observed large areas of deteriorated mortar and efflorescence staining throughout the building, with the worst deterioration typically occurring directly under gutters and behind the downspouts.



Photo 31: View of the deteriorated mortar and white colored efflorescence staining.

3. Isolated cracked and spalled bricks were observed throughout the Old Library.

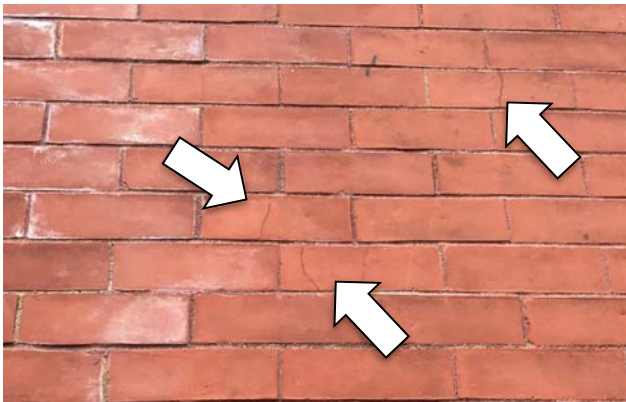


Photo 32: View of cracked brick masonry units.

### Drainage

1. Roof downspouts appear to drain into underground leader lines.

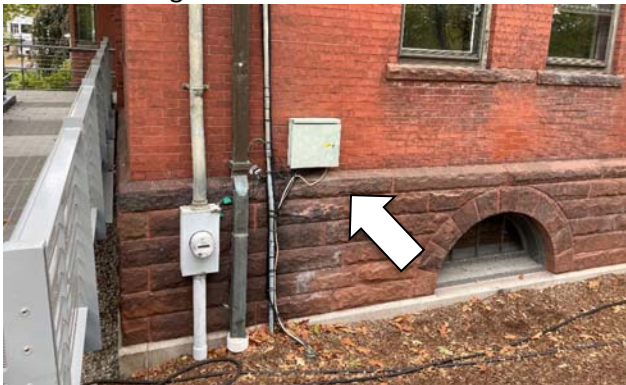


Photo 33: View of downspout connection to a sub-grade drainage leader line.

2. Sub-grade drain leaders were observed close to the surface on the east elevation of the

Old Library, which can result in freezing and backing of water.

3. Gale observed a catch basin on Old Littleton Road with a leader line that appears to point in the direction of the Old Library. The invert elevation is approximately 4'-0" below the top surface of the catch basin grate, which correlates to the sub-grade drainage leaders being placed close to the ground surface.

### Additional Observations

4. Gale observed various locations throughout the Old Library where glazing is cracked or missing.



Photo 34: View of cracked glazing and loose brick masonry units on the brownstone sill.



Photo 35: View of missing glazing.

5. Gale observed a window with a rusted hole in the frame on the interior side of the building.



Photo 36: View of window with a rusted hole in the frame.

6. Windows throughout the Old Library appear to have peeling paint on their frames on the interior and exterior, with the exception of the new windows on the south side of the building.



Photo 37: View of a window with peeling paint.

7. The skylights are constructed of what appears to be a steel framed assembly with obscure glazing. The steel frame and vertical batten strips securing the glass appear superficially rusted. Sheet metal flashings are used flash the skylight curb into the slate roof system.



Photo 38: Overview of one of the skylight assemblies.

## **GENERAL DESIGN CONSIDERATIONS**

This section relates to design considerations specifically associated with the proposed repairs at the Old Library and associated components that may be affected by the proposed installations.

### **Building Code Assessment (General)**

New construction as well as repair and alteration of existing buildings in Massachusetts is regulated by 780 CMR, Massachusetts State Building Code (MSBC), and 521 CMR, The Architectural Access Board (AAB). This code review is based upon the following:

- The proposed renovations being constructed in 2020 under the 9<sup>th</sup> Edition of the MSBC, which is based upon the 2015 *International Building Code (IBC)* and the Massachusetts Amendments

Applicable portions of these pertinent codes are as follows:

780 CMR Massachusetts State Building Code

Under the 9th edition of the MSBC Chapter 34 Existing Building and Structures refers to the International Existing Building Code 2015 (IEBC) as modified by the Massachusetts Amendments. This section of the code applies when there are repairs, alterations, additions or a change in use to existing buildings and generally refers to other sections of 780 CMR for specific requirements. Alterations to existing buildings, including the removal and replacement of building elements with a continuation of the same use group (as is the case for the proposed repairs at the Old Library), are governed by Chapter 7, Alterations – Level 1.

IEBC Chapter 7 – Alterations Level 1

*Building Elements and Materials*

Section 702: Building Elements and Materials – Generally, existing buildings must be modified in a manner that does not decrease safety. Existing items may remain, but all new materials to be used shall be compliant with code for new construction.

*Fire Protection*

Section 703: Fire Protection – This section of the code defines requirements for fire resistant materials. Generally, for an existing building, the building layout and fire resistance may be presumed to have met the codes in effect at the time of construction per the IEBC. New work must conform to the building code for new construction, but upgrade of the existing building components to remain is not required. If during construction, existing fire resistant materials to remain are damaged or removed, they must be replaced to meet the requirements for new construction. The IBC, Chapter 15, Section 1505 – Fire Classification requirements were also reviewed.

*Egress and Accessibility*

Section 704: Means of Egress – Any alterations shall be done in a manner that maintains the level of protection of the means of egress. It is Gale’s understanding that accessibility concerns were addressed during a prior renovation project, which included the construction of a new ramp to the main entrance of the building. No additional upgrades are anticipated at this time.

*Structural Review*

Section 707 of the IEBC establishes requirements for the structural analysis of an existing building’s roof framing during renovation projects. As the roof framing at the Old Library was largely inaccessible for review, limited structural analysis was performed.

707.2 Addition or replacement of roofing or replacement of equipment – This section of the code outlines requirements for vertical loading on structural elements from roof recovers and replacements. The code states that if the proposed roof system increases the force in the supporting structural element by more than 5%, those structural elements shall be strengthened, supplemented, replaced, or altered to carry the increased load if the elements are found to have insufficient capacity. As the proposed renovations for the roof systems as the Old Library include replacing the existing materials with new materials of similar properties, it is not anticipated that the new load on the roof will exceed 5%.

In addition to Section 707 of the IEBC, Chapter 15 and Chapter 16 of the IBC provide structural requirements which were reviewed as part of this project.

Chapter 15 (IBC): Roof Assemblies and Rooftop Structures – This section relates to wind resistance requirements for roof assemblies.

Section 1504.1 Wind resistance of roofs – Wind uplift requirements for low-slope roof areas should be performed in conformance with both the MSBC, which references the American Society of Civil Engineers (ASCE) design standard ASCE 7-10, and the Factory Mutual (FM) Global Method, as noted within Data Sheet 1-28, “Wind Design.” Increased attachment methods are typically provided at the perimeter and corners of each roof area replaced to withstand the increased uplift pressures for these specific areas. Refer to the Chapter 16 commentary for further structural requirements regarding wind uplift.

Chapter 16 (IBC): Structural Design – This section states the requirements for structural loads on the roof and wall systems. A limited structural analysis has been performed, including calculation of wind uplift and snow loads of the roof areas, and is described below.

*Section 1608 Snow Loads* – Gale reviewed the snow loading for steep sloped and low sloped roof areas, including an calculating of drifting and sliding snow loads as it pertains to impact on lower roof areas and the design of a snow rail system and the attachment to the structure. Based on Gale’s code review, the following loads were calculated:

- Steep slope roof snow load: 19.1 pounds per square foot with additional loading at snow drift locations adjacent to the low slope roof areas.
- Low slope roof snow load: 34.7 pounds per square foot with additional loading at snow drift and sliding snow locations.

The existing architectural roof framing drawings do not indicate the sizes of the roof framing members, and the majority of the framing is obscured by the interior finishes. As such, a full as-built condition survey was not performed, and Gale was unable to perform a structural analysis based on snow loading. Should the Harvard wish to proceed with the review of the snow load conditions, Gale will be required to perform additional test cuts and field measure ups to gain the necessary information to perform a snow load analysis on the current roof system. Gale will be pleased to perform these services for an additional fee with the owner’s approval. Should this code review not be performed, it is Gale’s recommendation that the amount of accumulated snow fall on the roof be monitored, and potential shoveling be considered should the snow become saturated with water and exceed 18-inches in height. All snow removal is recommended to be performed by a licensed snow removal contractor.

*Wind Uplift* – Gale reviewed the wind uplift requirements of a typical low-slope roof area in accordance with the proposed 9<sup>th</sup> edition of the MSBC which references American Society of Civil Engineers (ASCE) Minimum Design Loads for Building and Other Structures 7-10. Based on Gale’s calculations, the design wind uplift pressure is calculated to be 38.1 pounds per square foot in the field of the roof. Increased attachment methods will be provided at the perimeter and corners of each roof area replaced to withstand the increased uplift pressures for these specific areas. Refer to the calculation sheets in the appendix of this report for additional information.

### *Additional Considerations*

In addition to Gale's review of the IEBC, several other code requirements were reviewed as they pertain to the building envelope. The following code requirements are referenced in the IBC and the draft Massachusetts Amendments.

Chapter 15 (IBC): Roof Assemblies and Rooftop Structures – This section relates to drainage requirements for roof assemblies.

Section 1503.4 Roof Drainage – A review of the existing drainage capacity was performed for the facility. The roof areas drain into gutters which typically discharge to a sub-grade drainage system through downspouts. Gale reviewed the capacity of the existing roof drainage system for compliance with the current Massachusetts State Building Code. Based on our calculations, the gutter and downspout have sufficient capacity to drain the roof areas. As such, Gale recommends the installation of additional downspouts to reduce the amount of standing water within the gutter, and extend their service life. However, the new downspouts will need to either drain to grade or into a new drywell to allow water to infiltrate into the nearby soils. Based on Gale's visual observations from grade, it appears that the existing sub-grade drainage system may be clogged with debris, and due to the sub-grade leader piping's proximity to the surface, the leader's will be prone to freezing and blockages. Therefore, we recommend that the existing system is cleaned, and we do not recommend discharging additional downspouts into that system. Refer to the calculation sheets in the appendix of this report for additional information.

## **DISCUSSIONS AND RECOMMENDATIONS**

### Roofs

Gale's evaluation of the steep-sloped slate roof (Roof Area A) at the Old Library revealed that a significant number of the existing slate shingles are broken, loose, or missing. *Preservation Brief 29: The Repair, replacement, and Maintenance of Historic slate Roofs*, published by the National Park Service of the Department of the Interior, indicates that once 20% or more of a roof's slate require replacement, it is typically more cost effective to replace the entire roof than to perform individual repairs. It appears that more than 20% of the Old Library's slates are in need of replacement, and so it is Gale's opinion that the entirety of the slate roof should be removed and replaced. Gale recommends installing a new slate roof with slates of similar size and configuration to the existing roof in order to preserve the historic aesthetic of the Old Library. The full slate roof replacement would incorporate removal and replacement of the sheet metal components at locations including, but not limited to, the gutters, ridges, hips, rake edges, wall claddings, and chimney flashings; refer to the sheet metal section below for additional descriptions of those components. In addition to the roofing and sheet metal, a new snow guard system is recommended throughout the roof, particularly above active walkways and lower roof areas. Installation of a new snow rail system will require further review, but remove and replacement of the roof sheathing near the eave edges of the roof are anticipated to provide solid blocking to secure the snow rail system. Gale recommends that snow tabs are installed in conjunction with the snow rails to assist in breaking up large sections of snow and ice.

If only repairs are being considered at this time to address the apparent gutter leaks, the amount of renovations to be performed will be reduced from that above. At a minimum, roof repairs should include removal and replacement of the lower four feet of slate in order to remove and replace the gutter and downspouts, and install a high temperature modified bitumen membrane, or ice and water shield, along the

eave of the roof, and behind the gutter and new sheet metal components. Because of the extent of cracked, broken, loose, and missing slates, the replacement of additional individual units of slate is also recommended to be performed on a unit price basis under this repair option. Refer to the sheet metal components section below for additional descriptions of the recommended gutter renovations.

During the test cuts, Gale noted that the slate installed at the addition are secured to the existing terra cotta roof deck with standard galvanized roofing nails. Because standard roofing nails are meant to be secured into wood substrates, they have the potential to become loose over time when subjected to snow and wind loads. For these roof areas, Gale recommends that furring is installed over the terra cotta using the appropriate masonry fasteners, to allow the installation of new slate with copper or stainless steel roofing nails.

Gale observed a section of the steep-sloped slate shingle roof (Roof Area A) that appears bowed. This area is noted on the roof area plan. As part of the roof replacement, the roof sheathing boards will need to be removed and replaced so that the rafters in this area can be replaced, or sistered with new rafters, to correct the bow in the roof prior to installing a new sheathing. This area is not anticipated to be addressed under the repair option, though it could be included if requested.

It is Gale's understanding that the white, low-sloped roof system on the south side of the Old Library (Roof Area B) was installed within the past five years. The roof appears to be in fair condition, and no leaks were reported that appear to be related to this roof system. In addition, no noticeable defects were observed during Gale's drone survey. However, coated roofs typically have a service life of approximately ten years. As such, it is Gale's opinion that though this roof could remain, Harvard should consider removing and replacing this roof area in conjunction with the slate to provide a more durable roof system while access to the roof areas available during a slate roof renovation project. If Harvard wants to proceed with repairs only at this time, this roof membrane would need to be cut back to allow a new gutter to be installed, and then stripped in with similar roofing materials. Removal of all or portions of the white coated roof will result in additional slate replacement where the two roof systems meet and are disturbed.

The small sloped roof in the northeast corner of the building (Roof Area C) appears to have been added to the Old Library after the 1983 construction for the elevator shaft. The standing seam copper roof appears to be in fair condition, but it appears that the roof to wall flashings consist of a sealant dependent surface-mounted copper reglet flashing, and the sealant is failed. Exposed nails were also observed to be rusting around the copper components, which indicated that ferrous nails were used during the installation. The use of steel nails, even galvanized steel nails is not recommended for copper components, because they are susceptible to galvanic corrosion. The roof area also lacks a gutter, allowing water to run off in front of a building entryway. Gale recommends that the roof is removed and replaced with a new flat-lock copper, or SBS modified bitumen roof membrane, with appropriate cut-in reglet flashings and a new gutter and downspout. Standing seam roofs are typically recommended only for roof slopes of 4:12 (inches rise: inches run) or greater to shed water and reduce the potential for moisture entering the roof system through the standing seams via capillary action. Because the plywood on the underside of this roof area appears to be deteriorating, it is also recommended that this plywood be replaced and clad with soffit panels. Because the roof to wall flashing sealant is failed, it is anticipated that deteriorated wood sheathing and potential framing elements may be damaged, and should be replaced if they are uncovered during roof replacement work.

The small low-sloped roof in the northwest corner of the building (Roof Area D) appears to have been constructed around the same time as the small steep-sloped roof in the northeast corner. The flat-lock copper roof appears to be in fair to poor condition, and likely requires replacement. The current configuration of the roof appears to lack sufficient slope to promote drainage, and the existing window is located in close proximity

to the roof, which has the potential to accumulate snow against the window. Harvard should consider reconstructing the roof framing to provide 8 inch minimum flashing heights at the window, and to provide minimum slope to the roof edge. Similar to the other small roof area, roof to wall flashings have gaps between the roofing and masonry walls, are sealant dependent, and appear to be susceptible to moisture infiltration. New stepped, saw-cut reglet flashings are recommended to be installed during the roof replacement. This roof area has an existing gutter with a downspout connection that should also be replaced with the roof, as the gutter appears to be deformed, and the downspout appears to be beyond its useful lifespan. Gale observed deteriorated plywood on the underside of this roof area and anticipates that other deteriorated roof components may be discovered during the roof replacement work.

Based on Gale's limited visual observations of the roof framing components, the condition of the connections of the wood rafters and hip and valley beams to the masonry walls varies. In the attic space below the rounded turret roof, Gale observed rotted wood components and water staining. The roof framing appears to be primarily connected to the walls with nails embedded in the masonry. As such, Gale recommends reinforcing these connections by provide additional clips and connectors, such as hurricane ties from the rafters to the masonry wall. Though further review will be required during the design phase, budgetary figures are included for the installation of hurricane ties and new connectors. Additionally, portions of the roof appear deflected, though these areas are located behind hard ceilings, were not visible from the interior. For budgetary purposes, structural augmentation to the roof rafters is included within the option for full roof replacement. Because the deflected section of roof or existing rafter and beam ends are not anticipated to be accessed during the gutter replacement option (which does not include full roof replacement), these wood framing renovations are not included in the cost estimates for that option. Refer to the Summary of Recommendations section below for additional descriptions of the recommended scope of work.

### Sheet Metal Components

Representatives from Harvard were not able to confirm if any of the Library's sheet metal components have ever been replaced during the various repairs and renovations, which could mean that the copper components of the building are approximately 133 years old. It is not unheard-of for copper to maintain its integrity for up to 100 years, as the green-colored patina that forms on copper as it oxidizes creates a protective, durable layer. However, during Gale's evaluation, it was observed that areas of the gutters and downspouts are turning a dark grey-brown color, which indicates that the copper's patina has worn off and the metal components should be replaced.

From the interior leak audit, it appears that the majority of the reported leaks at the Old Library are related to the copper gutters. Gale observed standing water throughout the majority of the gutters, which are installed directly above the exterior walls, where the leaks were reported. During the test cuts, Gale observed pitting holes in the gutters, which are anticipated to exist at other locations, and are anticipated to continue to form over time. Although gutters can be repaired in place by lining the gutter with waterproofing membrane, this type of repair is sealant dependent, and typically only offers a short term solution of less than five years. Also, it is our understanding that gutter lining repairs have already been performed in some locations, which can make new gutter lining repairs difficult if there is significant sealant residue already within the gutter. As such, Gale does not recommend gutter lining repairs for this building, and the gutters and downspouts are recommended to be replaced. As noted previously in this report, additional downspouts are recommended to reduce the amount of standing water within the gutters. Refer to the drainage section below for additional discussions on the downspouts and sub-grade drainage system.



In addition to the gutters, copper components are installed at valleys, ridges, hips and chimneys throughout the Old Library, and some of these elements, especially the hip flashings, appear loose and displaced in some locations. Because all of these components are all in varying conditions, they will need to be removed and replaced in conjunction with the slate roof to allow for the roof underlayments to extend across the detail locations (valleys, hips, etc.). Furthermore, if the copper components are original to the building, they will be nearing the end of their useful life, if they are not already deteriorated. Replacing the copper roof components at the same time as the slate roof would reduce potential damage to the new roof system if the copper components are replaced at a later date. Harvard should be aware that the ridge and hip cap flashings appear to be custom pressed pieces, though they could be replaced with similar pressed units to maintain the existing aesthetics. In addition, replacing the Old Library's copper components, including the gutters and downspouts, at the same time with the same materials will give the building a unified aesthetic. The copper should age in a similar fashion throughout the building if it is from the same manufacturer. In this region, it will typically take up to twenty years for copper to fully oxidize, during which time the copper will slowly progress from its shiny orange color through stages of brown to the eventual green patina. Coatings are available that can accelerate copper patina formation if it is desired that the copper immediately match the existing in color, though Gale does not recommend the use of these products.

### Drainage

Gale's evaluation revealed that the Old Library's downspouts drain into underground leaders that collect in a catch basin located on Old Littleton Road. The leader from the Old Library is approximately four feet below the surface of the finished road in the catch basin, which could explain why underground drain leaders were visible above the ground surface on the east elevation of the building, presumably to maintain gravity flow in the system. The catch basin is approximately 75 feet away from the Old Library, so it is likely that the underground drain leaders need to be close to the ground surface to create the necessary slope to the catch basin. It recommended that underground drain leaders are buried a minimum of 12 inches below the ground surface, as they are more prone to freezing when they do not have sufficient soil cover to be warmed by the earth. If possible, Gale recommends lowering the underground leader lines or raising the grade where leader lines are visible. In addition, it is Gale's opinion that the underground drain leader lines should be cleaned during the roof replacement project to remove any existing debris that may be present in the system.

Gale's downspout capacity calculations indicated that the current number of downspouts at the Old Library are adequately sized to meet SMACNA recommendations. That being said, the spacing between the downspouts ranges from 5 feet to 35 feet. Industry standards typically recommend that downspouts are 20 feet apart as a maximum to reduce the amount of standing water in flat gutters. Gale also observed that clogged downspouts at numerous locations, and in some areas, the debris accumulation appears to be causing the downspouts to bulge and open up at their seams. The blockage of the downspouts also seems to be causing excess water to accumulate on the brick masonry walls below the downspout locations, which appear to be resulting in accelerated deterioration of the masonry behind and around the downspouts. As such, it is Gale's opinion that additional downspouts should be added to the Old Library, particularly at the south and east elevations. Additional evaluation is required to determine if these downspouts could connect to the existing underground leader system, if they would require leaching basins independent from the existing system, or could be discharged to grade. Based on Gale's visual observations, connection of new downspouts to the existing sub-grade drain system is not recommended with modifying the sub-grade leaders to bury them further below ground, and confirm the capacity of the existing system.

## Masonry/Walls

The brick masonry at the Old Library appears to be in fair condition overall, with the most severe areas of deterioration typically occurring directly under the gutters and behind the downspouts. These observations that the mortar deterioration under gutters is likely related to water infiltration behind the gutter, through punctures in the gutters, or into open seams between sections of gutter. Gale has noted various recommended masonry repairs on the elevations in the appendix. These repairs include, but are not limited to rebuilding sections of brick, repointing large areas, and replacing isolated cracked and spalled bricks. Though the above roof line chimneys appear in fair to good condition, Gale recommends that spot repointing is performed, sheet metal chimney caps are installed to reduce the amount of moisture which can infiltrate the brick, and the roof to wall flashings and associated sealant are removed and replaced during a roof replacement. If only gutter repairs are considered, then additional access would need to be provided to access the chimneys. Gale's cost estimate includes the chimney repairs in the full roof replacement option only.

Gale observed that the second-story masonry above the Old Library's front entrance, specifically above the "Public Library," decorative stone inlay, appears to be leaning slightly towards the building at the ridge. The original architectural drawings show tie joists extending from the wall, which should be providing lateral restraint. Gale accessed the attic space below the rounded turret roof area, and though the tie joists were not visible, Gale observed suspect connections of the adjacent valley beams to the existing masonry wall. Additional structural analysis is recommended in this area to determine why the masonry may be deflecting and what additional repairs may be required.

Though Gale and Harvard's contract only included evaluation of the masonry at the chimneys above the roof levels and areas directly below the gutters, Gale performed a cursory visual evaluation of the masonry walls throughout the building. Gale observed various masonry defects including, but not limited to, deteriorated mortar, displaced masonry, cracked/spalled brick masonry units, abandoned anchors, and isolated cracked brownstone and concrete elements. These defects are included on the elevations. The test cuts near the gutter also revealed that the mortar within the inner wythes of masonry is deteriorated, and was observed to be in a dust like condition, which typically suggests that moisture intrusion has removed the binder from the mortar leaving the aggregate remaining. Though the test cuts were performed in areas of suspect moisture intrusion, it is anticipated that similar conditions exist at other areas of the wall.

Gale also performed Rilem tube tests to assess the moisture absorption within the masonry wall assemblies. Rilem tube tests aid in identifying a wall's resistance to wind-driven rain by measuring the time elapsed for a set amount of water to be absorbed. Gale performed six Rilem tube tests, three at the original portion of the building, and three at the addition, which included at a brick masonry unit, at a bed joint, and at a head joint for each era of construction. Industry standards indicate that areas having an absorption rate of 5 mL in 5 minutes or less may potentially be susceptible to moisture infiltration during wind-driven rain events. Wall assemblies with absorption rates of 5 mL of water in 15 minutes or greater typically do not allow excessive moisture into the wall assembly. The following summarizes the results of Gale's Rilem tests:

1. Original Construction
  - a. Brick Masonry Unit: 5 mL absorbed in 5 minutes and 39 seconds
  - b. Bed Mortar Joint: 5 mL absorbed in 10 minutes 30 seconds
  - c. Head Mortar Joint: 5 mL absorbed in 3 minutes 18 seconds
2. Addition
  - a. Brick Masonry Unit: No moisture absorption was observed after 15 minutes
  - b. Bed Mortar Joint: 5 mL absorbed in greater than 15 minutes

- c. Head Mortar Joint: 5 mL absorbed in 8 minutes 35 seconds

Based on Gale's visual observation, test cuts, and Rilem tube tests, It is Gale's opinion that the masonry walls are unstable in some areas, particularly near the gutter, and susceptible to moisture infiltration. As such, Gale recommends that masonry repairs are performed in conjunction with the roof and gutter renovations in order to reduce mobilization costs for Harvard and reduce the potential of moisture infiltration in other locations throughout the Old Library. At a minimum, because of the deterioration of the masonry near the gutter, the brick masonry cornice will require partial rebuilding and wide scale repointing as part of gutter or roof renovations.

#### Other Observations

Although a full evaluation of the existing skylight assembly was not included, Gale was able to get close-up access during the test cut evaluation. It appears that the skylights feature obscure glazing within steel frames, with steel batten bars to hold the glass in place. The paint on the steel frames and battens is peeling, and the exposed steel appears superficially rusted. During replacement of the slate roof, the skylight frames could be prepared, primed, and painted. Replacement aluminum framed skylight units could be considered, although additional evaluations would be required. For the purposes of this evaluation, the costs associated with preparing, priming, and painting the skylight frame with a corrosion resistant coating have been included at this time for Harvard's consideration.

During Gale's visual evaluation of the Old Library, multiple window defects were observed. Gale noticed several windows with broken glazing, a window with missing glazing, windows with rusted holes in their frames on the interior side, and peeling paint at the window frame on both the exterior and interior. Some of the glazings appear to have an embedded pattern, and may be custom units. These defects were common throughout the building and significant enough that Gale recommends that Harvard consider performing a more detail window evaluation to assess potential window restoration or replacement options. At this time, a window renovation scope is not well defined, and budgetary figures are not included.

#### **SUMMARY OF RECOMMENDATIONS AND COST ESTIMATES**

The two options for repairs or full roof replacement are described below, and include estimated budgets. Each option includes the costs associated with demolition, abatement, staging, dumpsters, equipment, temporary overhead and interior protection, and general conditions for construction, though these values vary for each option. Refer to the attached cost estimate summary sheet for additional cost breakdowns.

#### **Option 1: Gutter Removal and Replacement and Associated Work** **\$569,470**

1. Remove and replace portions of the slate shingle roof system, coated membrane roof, and copper roofing to as required to replace the gutter and install ice and water shield along the eaves.
2. Remove and replace the gutter. Install gutter splash guards at areas of high volume water shedding, such as the roof valleys.
3. Replace downspouts, add additional downspouts, and perform drainage renovations including, but not limited to, cleaning of the existing sub-grade drainage system. Provide drain strainers within the gutters at all downspout locations.
4. Remove and replace sheet metal components, such as the hip caps and roof to wall reglet flashings, where impacted by the slate removal and gutter renovations.
5. Rebuild and repoint the brick masonry cornice directly below the gutter.

6. Perform additional slate replacement on a unit price basis.
7. Replace deteriorated wood roof deck on a unit price basis.

***Option 2: Roof Replacement and Associated Work***

***\$1,047,200***

1. Remove and replace the slate shingle roof system, coated membrane roof, and copper roofing 100%, including all underlayments.
2. Remove and replace the gutter. Install gutter splash guards at areas of high volume water shedding, such as the roof valleys.
3. Replace downspouts, add additional downspouts, and perform drainage renovations including, but not limited to, cleaning of the existing sub-grade drainage system. Provide drain strainers within the gutters at all downspout locations.
4. Remove and replace the existing sheet metal components to match the existing aesthetics and to shed water. These components include, but are not limited to, ridge/hip caps, valley flashings, gable trim, vent pipe flashing, chimney crickets, step flashings and stepped reglet flashings, skylight flashing, and blind nailers.
5. Remove and replace the slate and sheet metal wall claddings that extend above the roof line.
6. Remove and replace the existing snow rails, and add additional snow rails. Augment the snow rails with the installation of new copper snow tabs to break up large section of snow that collects on the roof.
7. Perform all recommended masonry renovations, including repairs to the brick masonry cornice at the gutter, chimney repairs, and additional brick masonry, natural stone, concrete, and sealant repairs around the exterior elevations to reduce the potential for moisture infiltration. Repairs typically include rebuilding of displaced masonry, repointing deteriorated mortar joints, sealant replacement, and façade cleaning. Perform additional repairs on a unit price basis.
8. Prepare, prime, and paint the existing skylights' frames.
9. Perform miscellaneous rough carpentry and roof framing repairs, including, but not limited to, installation of wood furring at the terra cotta roof deck areas, replacement of wood plank roof deck to install hurricane ties and connectors, structural augmentation of the existing roof rafters where they appear deflected, installation of wood blocking for connection of new snow rails, rebuild the canopy framing, and structural augmentation for the displaced masonry wall above the entrance.

The budget estimates presented in this report and in the appendix have been broken down for the recommendations listed above. These estimates, which are based on current construction costs, should be considered preliminary and should not be used for sensitive budgeting. All estimating was performed using historical and market trends to establish unit pricing. These estimates have been generated by various sources and may not reflect the actual conditions at the time of construction. These budget estimates also do not include soft costs associated with the Owner's project management, Owners site supervision, designer fees, or site renovations associated with the site logistics. The line items within the estimate include a 10% contingency, as a defined scope has not been determined, as well as to account for potential unforeseen conditions that may be encountered.

## **Open Space & Recreation (LW)**

- Based on the request from the Conservation Commission with support from other entities the Select Board will draft a charge and specific membership for review of open space with a broader view, Specific timeframe to complete initial assessment (2 yrs). (SS)

## **Hildreth House/Housing**

- Discussed separation of Hildreth House phase II project from any potential senior housing at that site. (LW)
- Possible recommendation from Housing @ Hildreth House in July. (LW)
- Discussed need for cluster multi-unit housing for younger families and downsizers; zoning changes. (AvL & RM)

## **Playing Fields**

- Playing fields may need to be added; need assessment and plan for moving forward (SS)
- Private fundraising
- 2 year field committee, Select Board to define membership & charge

## **Operating Issues**

### **Transfer Station**

- Consider extending hours of operation; open until 4pm on Saturdays and possible open at 6:30am Wednesdays; consult with DPW Director. *Agenda item*
- Install no loitering/drop off only signs for metals area. *Agenda item*

### **Technology Expansion (TB & MS)**

- Viewpoint permitting program will be expanded to include the Land Use Offices and either the DPW or Fire Departments.
- Electronic timecards
- Seamless documents; fillable forms may be expanded depending on department needs and implementation process.

### **Communication Plan (RM)**

- Implement a use policy for Next Door Harvard
- Improve communication between boards/committees and town operations/staff
- Increase use of news/announcements