

**I. Updated Capital Projects Plan**

**2017-18 Eastford Board of Education Capital Priority #1: Gymnasium Roof Replacement**

When the Board of Education received the Hallam report (excerpts contained at the end of this plan) and discussed which project to pursue first it was decided that replacing a failing gymnasium roof and preparing it for solar panels should be the highest priority and addressed immediately. It is possible that with the current energy incentives, installing a photovoltaic (PV) system on the gym roof could achieve the original goals of the project and more. The electricity produced by the PV system could offset the entire project and reap energy and financial savings well into the future. It is also possible that the town could save more in energy dollars than the cost of the project.

The roof had been slated for replacement in 2020. Based on the recommendation of the consultant, and the possibility of this becoming a revenue neutral project, the Board of Education decided to replace it sooner. When it is replaced, it will be replaced with a current code compliant roof.

See attached detailed description of this project.

Replacement of Gym Roof and adding Insulation	\$129,000
Hiring an Engineer to Design the proper roof and reinforcements to support the load of a PV system	\$ 16,000
Total	\$145,000

**2018-2019—Converting Steam to Hot water and adding redundancy**

One of the frequent questions is whether it is reasonable to continue heating with steam. Since the newest wing of the building, the 1991 wing, is heated with hot water and does not utilize steam, many wonder whether steam traps could be removed from the 1949 and 1963 wings and the infrastructure could be modified to heat the building by circulating hot water instead of steam. This project will reduce overall heating costs, and provide better control of spaces in the older building section. The estimated cost for this project is **\$145,000**.

**2020-2021—1963 Wing: Insulation of Corridor**

This project should be completed to reduce the energy consumption of the building. The noticeable effect to staff and students won't be as present as the steam to hot water conversion, so while it is important to maintain a proper envelope, some low cost/no cost work can address this a bit until the project is slated for construction. The estimated cost for this project is **\$45,000-60,000**.

**2021-2022—1991 Wing: Pitched Roof Replacement**

The original shingled (pitched) roof on the 1991 building will have to be replaced. Additionally, small portions of the 1949 building's roof that were not replaced in 2006 should be replaced in 2021. This should cost about **\$54,612** using the roofer's 2015 prices for a "new architectural shingle" and adding 6% per year. The current insulation should be evaluated and compared to a standard of at least R-40 and perhaps R-60 when bidding specifications are prepared. This estimate prices is from the roofer and does not include the insulation.

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Hallam Report and Capital Projects Plan (Revised June 2017)  
2017-2031**

**2021-2023—Upgrade the Gym HVAC system and controls**

The Gym HVAC system is being operated inefficiently and can be corrected under the no/low cost measures. Future upgrades would provide additional energy savings and improved comfort. The equipment is in sound enough condition that the replacement is not an immediate concern. The estimated cost for this project is **\$150,000**.

**2022-2023—1963 Wing Roof Replacement**

The roof on the 1963 wing was last replaced in 1997. It should last 25 years and should be replaced by **2022**. It is projected to **cost \$84,663** using the 2015 prices and adjustments. The current insulation should be evaluated and compared to a standard of at least R-40 and perhaps R-60 when bidding specifications are prepared. This estimate prices is from the roofer and does not include the insulation.

**2021-2023—Addressing Rain water infiltration at foundation of Gym**

This work is necessary to maintain the foundation of the building and provide longevity to the exterior brick façade. Proper flashing and weep holes will allow for moisture to escape the space between the interior concrete masonry unit (CMU) wall and exterior brick. Currently, moisture builds up in this location and is causing degradation of the block wall and steel structure. The damage is prevalent along the entire perimeter, but is slow progressing. The estimated cost for this project is **\$103,000**.

**By 2031—1949 Wing Roof Replacement**

The roof on the 1949 building was last replaced in 2006. Since new drains and downspouts were added in the summer of 2014, this roof should last until **2031**.

**II. Hallam Report**

**HVAC and Boiler Control System Upgrades and Energy Efficiency Study**

In the fall of 2016, the Eastford Board of Education and the Board of Selectmen sought proposals and then signed a contract with Hallam ICS for an HVAC and Boiler Control System Upgrades and Energy Efficiency Study. **The Hallam Report was completed in April 2017 and this capital projects plan has been updated to reflect the recommendations in the report.** Following is an excerpt from the report. The entire report can be found on the school's website.

Prioritized Capital Improvement list: **Eastford Elementary School.**

Prepared by Jamison Spalding, Hallam-ICS

Ranking of Priorities is based on the School's Criteria:

- **Get the best value from the building**
- **Minimize energy expenditures**
- **Continually improve the facility through planned replacement of systems**
- **Meet aggressive energy cost reduction goals**

Each Project was given a score of 0-3 based on the value of the project, the effect on energy reduction and the improvement to the overall facility.

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Project	Building Value	Energy Reduction	Urgency	Improved facility	Score	Rank
Gym HVAC	2	1	1	2	6	4
Boiler Conversion	3	2	2	3	10	1**
Gym Roof	2	1	3	3	9	2**
Water Issues in Gym	1	0	2	2	5	5
Lighting	3	3	1	3	10	1*
Corridor insulation	1	3	2	2	8	3

\*Lighting is ranked #1 but is included in alternative funding sources.

**\*\*Priorities 1 and 2 are debatable—they might be transposed based on whether the architectural or mechanical engineering viewpoint prevails.**

**Capital Improvement Projects According to Hallam Report:**

**Priority #1 Converting Steam to Hot water and adding redundancy - \$145,000**

This capital project is priority number one, to reduce overall heating costs, and provide better control of spaces in the older building section. Resources dedicated to this project will have a meaningful effect on staff and students and improve the operational conditions of the school noticeably.

**Priority #2 Replacement of Gym Roof and adding Insulation – \$129,000**

This project is slated for 2020 on the capital improvement schedule. Waiting another 2 and a half year’s means that the existing system may fail again and the school should be prepared for additional temporary repairs. The potential danger to the structure at this time is water damage from leaks, which has occurred previously and was addressed.

**Priority #3 Insulation of the Corridor in 1964 wing - \$45,000-60,000**

This project should be completed to reduce the energy consumption of the building. The noticeable effect to staff and students won’t be as present as the steam to hot water conversion, so while it is important to maintain a proper envelope, some low cost/no cost work can address this a bit until the project is slated for construction.

**Priority #4 Upgrade the Gym HVAC system and controls. - \$150,000**

The Gym HVAC system is being operated inefficiently and can be corrected under the no/low cost measures. Future upgrades would provide additional energy savings and improved comfort. The equipment is in sound enough condition that the replacement is not an immediate concern.

**Priority #5 Addressing Rain water infiltration at foundation of Gym -\$103,000**

This work is necessary to maintain the foundation of the building and provide longevity to the exterior brick façade. Proper flashing and weep holes will allow for moisture to escape the space between the interior concrete masonry unit (CMU) wall and exterior brick. Currently moisture builds up in this location and is causing degradation of the block wall and steel structure. The damage is prevalent along the entire perimeter, but is slow progressing. Eastford has time to address this issue.

**Eastford Elementary School  
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Gym Roof Replacement**

**Eastford Elementary School—Major Goals of the Energy Efficiency Study commissioned by the Board of Education and the Board of Selectman:**

- Get the best value from the building;
- Minimize the energy expenditures;
- Plan on what needs to be replaced and a timeline that will continually improve the facility; and
- Meet aggressive energy cost reduction goals.

After a bidding process, the Energy Efficiency Study was conducted by Jamie Spalding, a mechanical engineer from Hallam-ICS, an engineering company with an office in Middletown, CT. After assessing the building himself and combining his findings with those of an architect and a structural engineer, Mr. Spalding ranked the projects that would reduce energy consumption and improve the quality of the building. The top two projects based on the above criteria were converting the boilers and replacing the gymnasium roof. Both projects were considered urgent and worthwhile for improving the overall facility. When the Board of Education received the report and discussed which project to pursue first it was decided that replacing a failing gymnasium roof and preparing it for solar panels should be the highest priority and addressed immediately. It is possible that with the current energy incentives, installing a photovoltaic (PV) system on the gym roof could achieve the original goals of the project and more. The electricity produced by the PV system could offset the entire project and reap energy and financial savings well into the future. It is also possible that the town could save more in energy dollars than the cost of the project.

**1. RATIONALE:**

The average life expectancy of a built-up roofing system is between 15 and 18 years. The built-up roof on the Eastford Elementary School gymnasium was installed in 1992 and is 25 years old; it has met and exceeded its life expectancy. There are numerous areas of leaking as evidenced by staining and moisture damage. An architect from TLB Architecture, hired by Hallam-ICS, conducted an analysis of the gymnasium roof and his conclusion states that, "Temporary repairs are not recommended since multiple attempts have been undertaken and are currently failing." The architect further commented that "The temporary repairs, cold-applied, asphaltic-based mastic flashing, are now displaying cracking and bubbling, alligatoring and open lacerations in the field of the mastic repair areas. These failures will continue to deteriorate over time and will create areas for further potential water infiltration into the roofing system and the interior gymnasium space below." Extensive damage could be caused if the roof is not replaced.

**2. LONG -RANGE PLAN**

The findings of the report indicate that the existing gymnasium roof structure is sound for the current snow loads, but has no spare capacity for solar panels, added insulation, or rooftop equipment. A new roof, of the adhered membrane type with tapered foam insulation would eliminate standing water, and remove 5 pounds per square foot (PSF) of dead load on the joists, making the roof suitable for some solar panel loading on the roof.

According to Daniel Morrissey PE (Morrissey Engineering):

"If the gymnasium roof is re-roofed without the use of ballast, the load on the existing joists will be decreased and will allow for solar panels with a weight of up to five pounds per square foot to be installed on the roof. If the selected solar panels exceed five pounds per square foot in weight, the

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capacity of the bar joists will be exceeded. To address this, the existing steel bar joists could be reinforced with steel rods, nested in the corner of the top and bottom chord angles. This reinforcing would be designed by an engineer and welded according to the design. To avoid bar joist reinforcing, solar panels over 5 PSF could be installed over a reduced roof footprint. Leaving the area above the midspan of the trusses free of solar panels would be most effective.”

**3. THE PROJECT**

A new roof, of the adhered membrane type with tapered foam insulation would eliminate standing water, and remove 5 pounds per square foot (PSF) of dead load on the joists, making roof suitable for solar panel loading on the roof. The project proposes the following components of this flat roof replacement project:

- Remove the existing roofing system down to the metal roof.
- Inspect and repair the areas of the metal deck that might be deteriorated because of ongoing water infiltration issues.
- Once the metal deck was observed to be in satisfactory condition, the new insulated EPDM roofing system inclusive at a minimum of 4” polyiso insulation for an R-Value of R-40 would be installed.
- The new system will have integrated flashings and drains with walk pads as required.
- Replace deck with a single ply, 0.060 mil EPDM roofing.
- Insulation would be tapered to drains.
- All roof flashing and drainage components should be removed and replaced with new in accordance with current practices and in conformance with the roofing manufacturer’s recommendations.
- The exterior facade needs flashing and weep venting repairs to be made to remove moisture and stop damage being caused by water infiltration. This work is highly prioritized, as a solid building envelope is paramount to maintaining a facility for longevity.
- Replacement of all roof drains will be included in the scope as well as installing scuppers and other secondary drains as required by code.
- Secondary drains for this flat roof may be required with interior piping to the exterior wall, or provisions of overflow spout is to be placed.
- A fixed ladder with a roof hatch or a protected ladder off the back of the building is recommended for installation for safe roof access.
- The existing gymnasium roof is detailed on the contract documents from the 1991 construction as a built up roof with stone ballast. This roof has been repaired in the past and maintained.
- The current school includes grades preschool to eight and the gymnasium serves as the gym, auditorium, cafeteria, music room, and small kitchen.

**4. Estimated Costs**

Replacement of Gym Roof and adding Insulation	\$129,000
Hiring an Engineer to Design the proper roof and reinforcements to support the load of a PV system	\$ 16,000
Total	\$145,000