STATEMENT OF PURPOSE & BACKGROUND

- **Scope:**
  - Selection and installation of complete domestic gas fired hot water heating system.
- **Statement of goals:**
  - Provide a high quality water heating system with:
    - Adequate heating rate
    - Sufficient stored volume
    - Appropriate level of energy efficiency
    - A safe, code-compliant installation
    - An innocuous, easily serviceable installation
- **Revision history of section:**
  - 10/11/2011 (date of adoption)
  - 01/29/2020
  - 10/28/2022

SELECTION AND APPLICATION CRITERIA

<table>
<thead>
<tr>
<th>Application</th>
<th>Selection</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Intermittent, moderate water use,</td>
<td>High efficiency, condensing; conventional glass lined vertical steel tank;</td>
<td>&gt; 80%</td>
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<tr>
<td>average size school</td>
<td>100 gallon storage; 200,000 Btu/hour heat input; bottom burner; cathodic</td>
<td>efficiency</td>
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<td>protection; electronic ignition; non-continuous pilot; automatic flue</td>
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<td></td>
<td>damper; design per ANSI Z-21.10.3</td>
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<tr>
<td>Continuous, higher flow rate,</td>
<td>High efficiency; condensing; conventional glass lined vertical steel tank;</td>
<td>&gt; 90%</td>
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<td>larger school</td>
<td>storage volume &amp; heat input per site requirements; top or side burner;</td>
<td>efficiency</td>
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<td></td>
<td>cathodic protection; digitally controlled combustion system; direct vented;</td>
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<td></td>
<td>design per ANSI Z-21.10.3</td>
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OUTLINE SPECIFICATION

- **Part 1 General**
  - Design criteria:
    - Justification for added cost for a high-efficiency heater: A 5-year payback justifies. 10-year payback less certain. Payback calc.: Typical 1000person school; use rate 2 gallons of 120º F hot water heated from 55ºF per day per person; 185 school days per year; fuel cost 1 cent per 1000 Btu; difference in heater thermal efficiency (including standby loss) 98% vs. 80%. Operating cost difference: $459/year [= (1/.8-1/.98)*(0.75 gallon/day person)*(120ºF-55ºF)*(1000person)*(185day/year)*(.01 gallon)/(8.33 lb/gallon)*(1Btu/lb 9ºF)*($0.01/1000Btu)]. For extra cost of $3000 the payback would be $3000 / ($459/year) = 6.5 years.
• Venting considerations: High efficiency heaters can be direct vented through a sidewall, which can be beneficial where venting an ordinary heater through a roof would be difficult. Sometimes sidewall venting is not an advantage. Vent ports can diminish the visual appeal of a facade. In winter, combustion product condensate can accumulate and freeze near a port and the mist is often perceived as unpleasant. The ports of some units are noisy. High efficiency heaters cannot be vented with readily available metallic duct.

• Part 2 Products
  o Acceptable Manufacturer(s):
    ▪ Bradford White
      • Typical model number: Bradford White “Energy Saver” series EF-60T-199E-3N for typical elementary school
      • For typical kitchen use: Bradford White EF-100T-250E-3N. The maximum size for a kitchen or general high school in this series is model number 120T-300E-3N.
      • For greater capacity, use Bradford White “Brute” model and storage tank when necessary or required.
    ▪ Laars
      • U.H.E. Ultra High Efficiency
      • Equivalent manufacturers approved, in writing, in advance, by the Architect/Engineer and Owner, may be substituted in accordance with the provisions of the Contract.

• Part 3 Execution
  o Per Consultant and per manufacturer specification.
  o Avoid placement in corrosive atmospheres, e.g. pool tunnels.
  o Careful consideration required for placement of sidewall vent ports for high efficiency heaters.
  o Serviceability: Locate heater to allow easy access.

End of Section