**November 9, 2009**

## Tray Washing Feasibility Study for Piney Branch Elementary School

**By Burke Design**

This feasibility study ascertains the possibility of designing a pilot project to replace disposable, single-use styrofoam lunch trays with durable trays and flatware and ware washing capacity at the Piney Branch Elementary School (PBES) in Takoma Park, Maryland. It is based in part on a site visit and survey conducted August 21st, and provides cost, design, installation, and operating information for a ware washer along with the accessories needed for operation. Costs for used and rebuilt ware washers are compared to the costs for a new ware washer. Operating costs include labor, utilities, chemical supplies, replacement trays and flatware. The study presents a project designed to meet the MD Health Department code.

This study covers the following areas:

1. Space availability
2. Power needs, availability and cost
3. Water needs, availability and cost
4. Waste water removal
5. Ware washing machine types and costs and ventilation systems and costs
6. Cost of accessories for necessary operations (such as trays, flatware, racks, carts, and garbage cans with magnetic rims)
7. Operating costs including labor, utilities, chemical supplies, replacement trays and flatware

Attachments include:

Applicable Health Code

Scale Drawings

Site Photographs

## 1. Space Availability

The space for the proposed ware washing machine is in the back area of a presently operating retherm and serve cafeteria style kitchen. At present the area for the ware washing unit is occupied by a two (2) bowl stainless steel sink with a drain board on each side. Next to this unit is a three (3) bowl ware washing sink with drain boards on both sides (this unit is required by the health department). If the unneeded two (2) bowl sink unit were to be removed, the needed space (120”) for the ware washing machine, dirty and clean drain tables would easily be available.

## 2. Power Needs, Availability and Cost

The power needs for a low-temperature ware washer machine are between 11 and 12 amps, 110/120 volts, single phase. Our survey found that an outlet with a single breaker 20 amp circuit is readily available that meets the need for the ware washer unit. This is in panel box # AL5. The outlet is located on the right hand side of the sink proposed to be removed. To come up to code, a disconnect box will have to be added on the wall next to the ware washing unit. The cost for the disconnect box, labor and materials is approximately $300-$400.

For a high-temperature ware washer machine, the power requirements are two (2) 30-amp breakers for 220 volts. This is not at this time available at this location and would be expensive to install (approximately $4,500).

Because this is a Pilot Project Proposal, we recommend purchasing and installing an electricity monitor. (The "Kill A Watt" has a simple model for $25.)

## 3. Water Needs, Availability and Cost

The necessary water hookup is already in place for use with the two bin sink (the one to be removed). It will take 2 hours and cost up to $750 to hook up the water and waste lines to a ware washing machine. Water usage for 2’ x 2’ machines is between 0.74 gals. and 1.7 gals. per cycle.

MCPS estimated $3/day for electricity and water to operate the dishwasher for 1.5 hours. This is two times the estimated 45-minute wash time for the recommended ware washer. Therefore, $1.50/day is the estimate for electricity and water costs. Based on 198 school days per year, the annual cost for electricity and water is approximately $300.

### 4. Waste Water Removal

The survey found that a waste water/grease trap unit is in service under the three bin sink that is to the left of the proposed placement of the ware washing machine. This would require approximately eight feet of PVC tubing (running under the sink/dish table) to connect the ware washing machine and the grease interceptor unit. Also, the grease interceptor unit is of sufficient size to handle all of the waste water flow. The equipment has already been approved and licensed for your food service operation.

### 5. Ware Washing Machine Types and Costs and Ventilation Systems and Costs

For this type of operation and volume needs, a standard commercial 2' x 2' ware washer or dish machine is recommended (two foot by two foot, floor unit with slide up doors for pass through operation). There are two types that fill this need: high-temperature machines and low-temperature machines.

A high-temperature unit is not recommended. High-temperature units are appropriate for high-volume kitchens that have full-service cooking operations with heavily soiled cooking equipment. A high-temperature unit would also be considerably more expensive to purchase (minimum $10,000) and install, and would require a heavy-up on electrical power ($4,500) as well as an exhaust hood and duct work (approximate cost $15,000).

The low-temperature dish machine is less expensive (approximately $3,000), much easier to install, will not require additional power or a vented exhaust hood, and is ideal for the medium duty operation of the PBES kitchen (which largely involves reheating and serving previously prepared lunches from the county's central kitchen).

A new low-temperature machine -- e.g., Hobart LT1-1, is available for $4,500.00 or Jackson, Conserver XL for $3,100.00, while a reconditioned machine would cost approximately $1,500. If purchased at an auction, a reconditioned machine would cost from $450 up to $1,350 (these are the prices we have bought at over the last year). At an auction, clean and dirty side tables are typically included in the price, which can be significant if bought new. The cost of a new clean side table is $450 to $550. A new dirty side table with scrap pan and drain is $750 to $850. In addition, new units have the added cost of shipping. Used units may also be available and possibly acquired at an auction, and may need refurbishing (up to $1,000). Commercial equipment of this type is made to be used reliably for about twenty plus (20+) years. Also needed is a spray arm on the dirty side table for prewash of the trays; this cost is about $200.

The table below summarizes these buying options.

### Summary of Buying Options

| | BUY NEW OPTION | BUY USED RECONDITIONED OPTION | AUCTION OPTION |
|---|---|---|---|
| Ware washer/dish unit | $3,100 - $4,500 [1] | $1,500 [2] | $450 - $1,350 |
| Dish tables | $1,200 - $1,400 | $450 – $850 [3] | $0 - $1,400 [4] |
| Spray arm | $200 | $200 [5] | $0 - $200 [6] |
| Dish racks (six) | $96 [7] | $72 [8] | $24 - $66 |
| Wall shelf (42" long) | $350 [9] | $85 - $115 | $45 - $100 [10] |
| Shipping, pickup, delivery costs | $150 [11] | $250 [12] | $700 [13] |
| **Subtotal Washing Equip.** | **$5,096 - $6,696** | **$2,557 - $2,987** | **$1,219 - $3,816** |
| Electrical work, disconnect box | $300 - $400 | $300 - $400 | $300 - $400 |
| Plumbing work | $450 - $750 | $450 - $750 | $450 - $750 |
| **Total Equip. & Installation** | **$5,846 - $7,846** | **$3,307 - $4,137** | **$1,969 - $4,966** |

[1] Includes shipping.
[2] Reconditioned unit; delivered.
[3] Used; these may or may not be available in the size needed.
[4] Used dish tables. Most dish units include the tables, but they may not be the right sizes.
[5] New spray arm.
[6] May or may not be included in package.
[7] $16 each.
[8] $12 each.
[9] Includes shipping.
[10] 42"–60" long.
[11] Shipping costs.
[12] Pickup of used equipment costs.
[13] Auction services, $300; pickup and delivery, $400.

Please Note: Equipment purchased at auction may need refurbishing (cost $1,000 approx.) and may be variable in size from exact optimal specifics. However, given the flexibility of the space in the PBES kitchen, this is not a negative but in fact would allow us to purchase at greatly reduced cost at Auction since there is a range of ware washers and side tables that would work effectively in the space that is available. Most commercial kitchens are extremely constrained by size, and therefore have limited potential for finding the requisite equipment at Auction.

## 6. Cost of Accessories for Necessary Operations

| | |
|---|---|
| Flat Trays 10' x 14", 360 count | $700 |
| Flatware:  Forks $5/36; spoons $3.50/36; knives $10/36 (720 pieces each) | $370 |
| Flatware Racks (12 racks) | $35 |
| Flatware soaking tub, 3 @ $3.20 each | $10 |
| Dolly for Racks – exist onsite | $0 |
| Flatware Caddy for serving line, 4-compartment, $3.99 x 5 | $20 |
| Magnetic Garbage Can lid | $209 |
| Energy Usage Meter (Kill A Watt) | $25 |
| **Total** | **$1,369** |

Note:  Prices are based on a restaurant/commercial supply house:  http://www.webstaurantstore.com

The cost of six new dish racks for handling washable lunch trays (approx. $96) is included in the previous table.

## 7. Operating Costs

| | | |
|---|---|---|
| Labor | 1.5 (one and a half) hours work for one (1) individual, x $ 13.32/hour = $19.98/day x 198 days of school year | $3,960 |
| Utilities | 45 mins operation of ware washer/day, $1.50/day x 198 days | $300 |
| Chemical supplies & Service contract | It depends on usage, in general:  $70 to $150 per month or $840 to $1,800 per year | $1,200 |
| Replacement trays | 10% (high) | $70 |
| Replacement flatware | 10% (high with use of magnetic lid) | $30 |
| **Total Annual** | | **$5,560** |

One cycle in a low-temperature ware washing machine takes 1.5 minutes. This means that three hundred large trays (10 to 12 per rack) would take about 45 minutes work time at the machine. NOTE:  The smaller trays proposed by PBES would allow doubling up (20-24 per rack) and could significantly reduce the cycles and labor costs from the above estimate.  This does not account for the time to put away the clean trays or the time to rack the dirty trays and pre-spray them.  All total, Burke Design believes that it would not take more than 1.5 (one and a half) hours work for one (1) individual to easily handle the work load.

The Department of Facilities used $13.32/hour as the wage; therefore 1.5 hours/day x $13.32/hour = $19.98/day ($99.90/week) or $3,956 for 198 days of the school year.

The types of soap/chemicals that can be used in low-temperature dish machines have evolved to use less and be environmentally friendly, and there are a number of choices available. More on this can be found at Auto-Chlor.com, or call Scott Mcclees at 571-237-2468 (cell), scottm.autochor@gmail.com.

## SUMMARY AND RECOMMENDATIONS

Burke Design recommends very strongly that a low-temperature ware washing machine would be the best fit for the Piney Branch School Project. The lower cost of the most appropriate dish machine as well as the fact that there is an existing operational kitchen (ample space, power, water and waste removal) in place, makes this choice the best route. In our 25+ years of experience, ware washing machines are made like tanks so that purchasing a used and refurbished machine is a very cost effective way to get the job done.

One recommended model is the Jackson low-temperature dish machine (Jackson, Model No. Conserver XL). New this machine sells for $3,100.00. If you want the top of the line low-temperature machine, then go with the Hobart (Hobart LT1-1), which new is $4,500.00. Note: Jackson Corp. is a subsidiary of Hobart Corp, the top line American made unit and as such the quality follows the line. As noted in the table above (Section 5), costs for a new machine, new spray arms, new racks, and a new wall shelf (including delivery) would range from $5,100 to $6,700. In contrast, these costs for the refurbished or auction options would range from $1,220 to $3,820. We believe PBES could obtain a used machine and these accompanying supplies for $3,000 or less.

On used machines, yes there is some risk, but as an example: In 1998 I bought a used Hobart for $1,000.00 (7 years old), paid another $1,000.00 for Hobart to recondition it and then $1,000.00 for install, total: $3,000.00. Note: with the machine came the dish tables, spray arm, overhead drying shelf and booster heater. This machine has been in full operation since June 1999 at The State Theatre in Falls Church, VA. There have been only a few small problems over the years to date. I know this because I was the designer of the kitchen and bar operations and then the general manager until 2006. This is more the rule then the exception.

Whichever option is chosen, please remember that a company/service will be needed to supply the soap/chemicals, monthly service and repairs, if needed. A good deal of the hookup costs (if not all) may be provided inclusive within the service contract (negotiable area). See above chemicals cost and contact information for the Auto-Chlor company. Light service is included in the chemicals cost from whatever company you choose. Heavy service would come from a local service company (i.e. Hobart will service Hobart or Jackson and is based in Landover, MD).

Below is a summary of the total project costs/budget for the first full year if a reused ware washer and its accompanying needed parts were procured for $3,000.

## Summary Budget

| | |
|---|---|
| Reused ware washer, spray arms, tray racks, wall unit | $3,000 |
| Electrical and plumbing installation work | 1,150 |
| Trays | 700 |
| Flatware, flatware racks, soakiing tubs, caddy | 435 |
| Magnetic Garbage Can Lid | 209 |
| Energy Usage Meter | 25 |
| **Subtotal Equipment, Supplies, and Installation** | **$5,519** |
| Labor | 3,960 |
| Utilities | 300 |
| Chemical supplies & Service contract | 1,200 |
| Replacement trays and flatware | 100 |
| **Subtotal Operating Costs** | **$5,560** |
| **Total Project Budget** | **$11,079** |

We also note that if it is decided that the Pilot project year is not successful, the equipment can be auctioned off and you will be able to recoup a significant part of your initial outlay. In addition, you will also have the double sink to return to County inventory for use in another operation.

Bruce M Burke, Burke Design
1875 Mintwood Place NW, Suite 45,
Washington DC 20009-1952
202-465-0524

Lee Peterson, Professional Electrical Engineer, Maryland License Number 32394

## About Burke Design

Established in 2006, Burke Design was founded to deliver the best quality work for the lowest cost to operators of food service operations, inclusive of designs for kitchens, bars, menus, POS systems and related equipment. Previously, principals Erle and Bruce Burke have been active in the field of food service operations since the mid 1970s; they have owned and operated a number of restaurants including Tucson Cantina in DC and Wheaton, MD. During that time, they worked the trade in all levels from management to hands-on operations, new work and repairs, and determined where to buy the lowest cost equipment without comprising quality. After 25 years in the business, Burke Design was created to handle consulting/designing as well as working in operations. Recent venues that Burke designed and equipped include: The State Theatre, Falls Church, VA; Little Fountain Cafe, Washington, DC; The State Theater, Anderson, Ind.; Piratz Tavern, Silver Spring, MD; and the Rock and Roll Hotel, H St. NW, Washington, DC.

## Addendum:

## Maryland Health Code for Ware Washing Equipment at Food Service Facilities Applicable to PBES Pilot Proposal

The Maryland Department of Health and Mental Hygiene regulates food service facilities according to Maryland State Code, Comar 10.15.03. The specific requirements for cleaning and sanitizing equipment and utensils using a ware washing machine are delineated below.

*Requirement for Cleaning and Sanitizing*: The trays and flatware need to be effectively cleaned and sanitized after each use by either immersion in hot water of 170°F or higher temperature for at least 30 seconds or a chemical sanitizer that is proven to kill pathogens effectively. This feasibility study recommends a low-temperature ware washer that relies on chemical sanitizers to sterilize trays and flatware.

*Requirement for Dish Tables and Drainboards*: Dish tables (or integral drainboards) must be of adequate size for proper handling of soiled utensils before washing and for cleaned utensils following rinsing or sanitizing. They must also be located and constructed so the tables or drainboards do not interfere with the proper use of the ware washing machine.

*Requirement for Installation of Ware Washing Machines*: When spray-type ware washing machines are used, the machines must be installed according to the manufacturer's specifications and the manufacturer's specifications must be listed on a data plate that is permanently affixed to the machine. If the manufacturer's specifications for wash and rinse water temperature do not exist, then the following standards should be met:

- The wash and final rinse water temperature should be at least 120°F for machines using chemical sanitization.
- Wash water must be kept clean and rinse water tanks must be protected by distance, baffles, or other means to minimize the entry of wash water into the rinse water.
- The flow pressure should not be less than 15 or more than 25 pounds per square inch on the water line immediately adjacent to the final rinse control valve.
- Except for a pumped or re-circulated final rinse, a pressure gauge must be provided immediately upstream from the final rinse control valve to check the flow pressure of the final rinse water.
- An easily readable thermometer must be provided to measure water temperature with an accuracy of plus or minus 2°F in each tank of the ware washing machine and as the final rinse water enters the manifold.

*Requirements for Maintaining Ware Washing Machines*: Jets, nozzles, and all other parts of the machine should be maintained free of chemical deposits, debris, and other soil. If used, automatic detergent dispensers are to be maintained and in operating condition. All ware washing machines should be thoroughly cleaned as often as needed throughout the day to prevent recontamination of equipment and utensils and to ensure that the equipment performs the equipment's intended function.

*Requirements for Pre-Rinsing*: A pre-rinse device must be provided for all ware washing machines.

*Requirements for Racks*: Equipment and utensils must be placed in racks, trays, baskets, or on conveyors after flushing, scraping, or soaking so that food contact surfaces are subject to unobstructed application of detergent wash; rinsed thoroughly with clean rinse water to remove particulate matter and detergent residues; and drained.

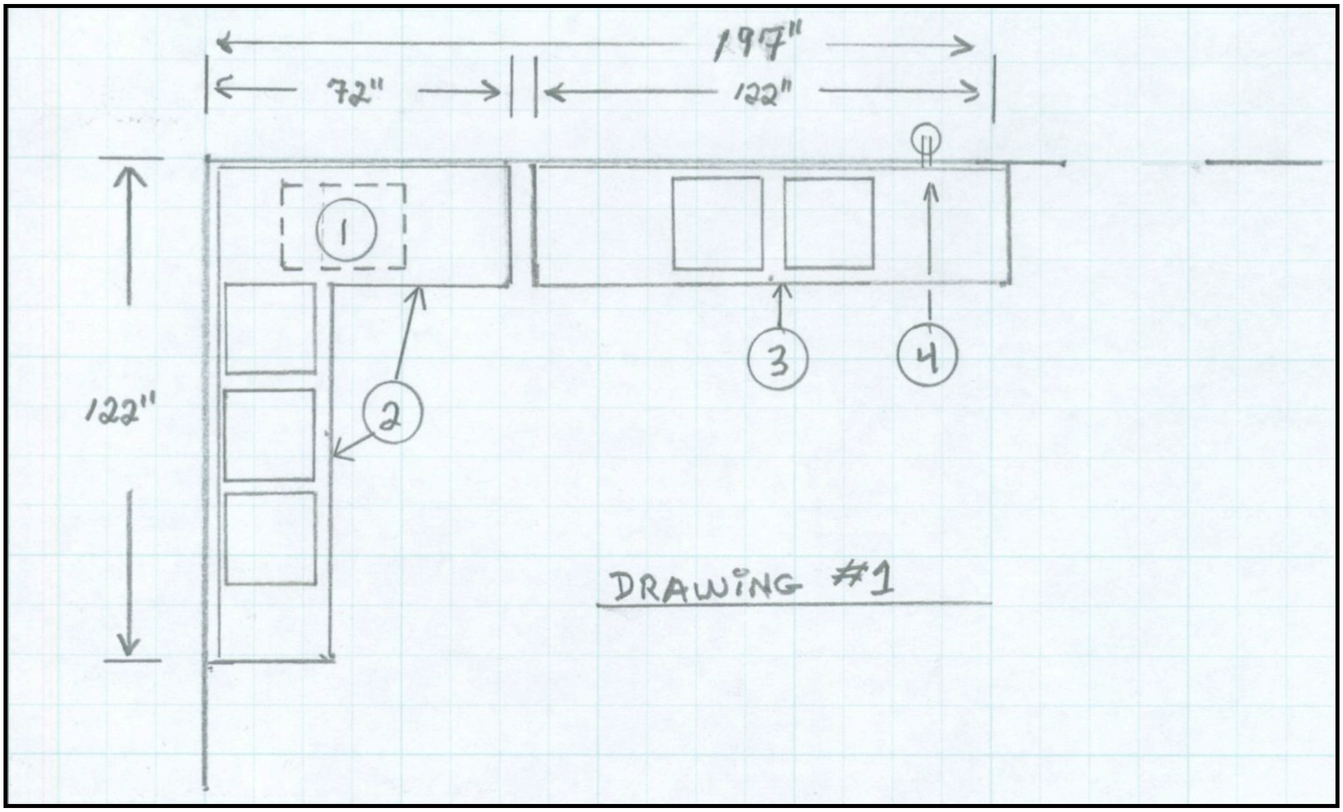
*Requirements for Sanitizing Chemicals*: Ware washing machines using chemicals for sanitization must meet the following requirements:

- Chemicals added for sanitization purposes are automatically dispensed.
- The chemical sanitizer used is listed in 21 CFR §178.1010 and provides the equivalent bactericidal effect of a solution containing at least 50 ppm of chlorine.
- A test kit or other device must be used that accurately measures the concentration of the sanitizing solution.

*Requirements for Storage and Handling of Cleaned Trays and Flatware*: Cleaned spoons, knives, and forks must be handled by the utensil's handles only. The food-contact surfaces of equipment must be protected from splash, dust, and other contamination. Cleaned and sanitized food equipment, portable equipment, and utensils must be stored a minimum of 18 inches above the floor when not fully protected by an enclosure with doors; in a clean, dry location; and in a space that affords protection from splash, dust, and other contamination. Utensils must be air dried before being stored or stored in a self-draining position on hooks or racks constructed of a corrosion resistant material. Stored containers and utensils must be covered or inverted whenever possible. Flatware must be stored in containers designed to present the handle to the student.

*Requirements for Ventilation*: A ventilation hood must be provided for ware washing machines using hot water sanitization but are not required for low-temperature ware washers using chemical sanitization.

*Requirements for Piping Waste Water*: Indirect waste piping must be provided to a ware washing machine, unless the machine is located within 5 feet of a trapped floor drain and the waste piping is connected directly to the inlet side of a floor drain trap vented in conformance with applicable State and local laws, ordinances, and regulations.




**EQUIPMENT SCHEDULE**

DRAWING # 1 (Existing ware washing area)

1. Grease interceptor
2. Three (3) bin stainless steel sink w/side boards
3. Two (2) bin stainless steel sink w/side boards (this sink to be removed)
4. Electrical outlet, single breaker 20 amp circuit

BURKE DESIGN

875 Mintwood Place NW
Suite 45
Washington DC 20009-1952
202-465-0524

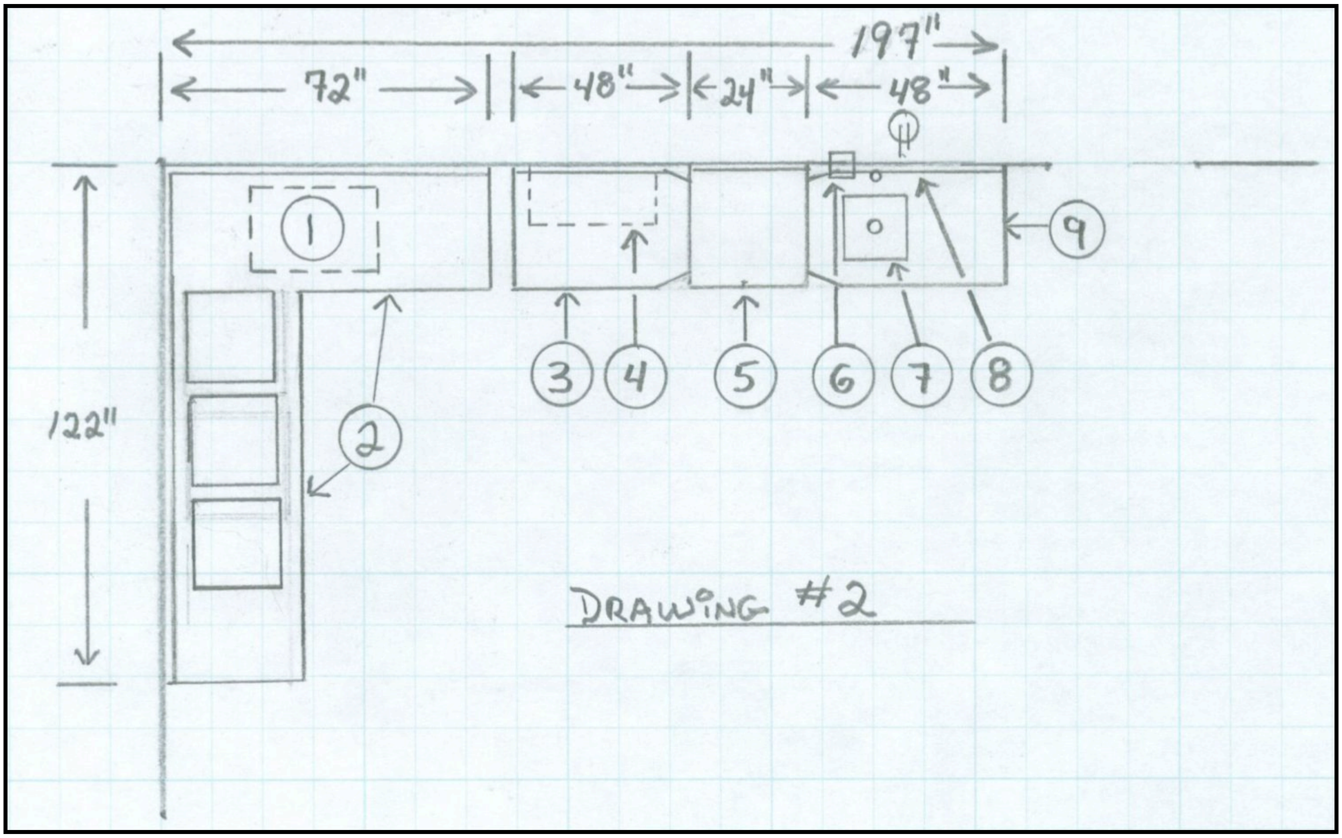
Description: Ware Washing Feasibility

Project Name: Piney Branch Elementary School

Date: 11/09/2009

Drawn By: BMB

Scale: ¼" = 1'




**EQUIPMENT SCHEDULE**

<u>DRAWING # 2 (Upgraded ware washing area)</u>

1. Grease interceptor
2. Three (3) bin stainless steel sink w/side boards
3. 48" clean side stainless steel drain board
4. Over head drying rack, stainless steel 42"
5. Low temp. ware washing machine (24" x 24")
6. Electrical disconnect box
7. Scrap pan w/drain
8. Electrical outlet, single breaker 20 amp circuit
9. 48" dirty side stainless steel drain board, w/pre-rinse spray arm

BURKE DESIGN
875 Mintwood Place NW
Suite 45
Washington DC 20009-1952
202-465-0524

Description: Ware Washing Feasibility

Project Name: Piney Branch Elementary School

Date: 11/09/2009

Drawn By: BMB

Scale: ¼" = 1'

Overall View of the area of the PBES Kitchen that is recommended for placement of a Ware Washer, showing open spacing of existing kitchen.

The Photograph below shows a close up of the Triple Bin Sink; the Open Site Drain below, and the Grease Interceptor ( white box) in the corner. All of these items will remain in service.

The photograph below shows a close up of the Two Bin Sink to be removed for placement of the ware washing machine and tables. Below the sink, the open site drain is visible, and to the right on the wall above the floor tiles is the 20 amp Single Circuit breaker.