



**AGENDA  
CITY OF HARRISONVILLE  
BOARD OF ALDERMEN  
WORK SESSION  
CITY HALL  
JANUARY 18, 2016  
6:00 PM**

**I. Call to Order & Pledge of Allegiance**

**II. Present**

**A. Attendees**

**III. Discussion Items**

**A. Engineering Contract for Design of the WTP**

**B. DIGESTER REPAIR ALTERNATIVES**

**Posted on City Hall Bulletin Board this 14<sup>th</sup> day of January 2016**

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**Kim Hubbard, City Clerk**

**The Board of Aldermen Work Session is open to the public but is not a meeting of the public**



City of  
**Harrisonville**  
est. 1836

STAFF REPORT

**TO:** Board of Aldermen  
**FROM:** Eric Patterson, Asst. Director  
**DATE:** January 5, 2016  
**SUBJECT:** Engineering Contract for Design of the WTP

**Type of Item:** *Presentation*

**Background:** On August 18, 2014 the city entered into a contract with Burns & McDonnell for an amount “not to exceed” \$1.475 million. The filter replacement design was estimated at \$177,000 and started first. The Water Treatment Plant Rehabilitation design, bidding and construction services were estimated at \$1.298 million. Projects of this type and complexity need minor fine tuning along the way. Geotechnical information is different than anticipated, existing water treatment plant required more modifications than anticipated or mechanical piping/electrical issues. Changes in one area can impact changes in other areas.

On May 15, 2015 City Administrator issued the notice to proceed to Burns & McDonnell for the Water Treatment Plant Process design. A core group including staff from Burns and McDonnell, city staff and Aldermen Dickerson and Coburn met monthly to review progress, review unforeseen issues, discuss alternatives and provide direction to the engineer. These meetings have resulted in changes to areas that already had some of the engineering started or completed, resulting in expanding the initial Engineer’s Scope.

Examples include:

- 1.) Adding to the filter building exterior to complement the appearance of the new building.
- 2.) Replacing the roof on the existing filter building.
- 3.) Adding natural lighting to the two main buildings. (will cut down on electrical usage)
- 4.) Relocated the new building (Ozone-Electrical-Chemical) to be eligible for SRF funding,
- 5.) Adding drilled piers to the new building because of poor soil.
- 6.) See the attached spreadsheet for a full list.

**Conclusion:** The engineers have done approximately 805 hours of additional work totaling \$140,875. This is in addition to the estimated design cost of \$893,000. It is still below the authorized contract for \$1.298 million. However, the construction services would be reduced to \$215,000.

**Options:**

- 1.) Wait until construction starts to determine if the city will utilize a 3<sup>rd</sup> party inspector and

use Burns and McDonnell for specialty issues or use Burns & McDonnell for all inspection services.

- 2.) Proceed with an amendment to the Burns and McDonnell contract in the amount of \$140,875 in February or March.

**Recommendations:** Staff is recommending option ONE. This leaves the City more options to consider at construction time.

**A. Discussion Item (ID # 2087)**

Engineering Contract for Design of the WTP

Attachments:

List of Additional WTP Engineering Work 121715 (PDF)

Harrisonville WTP Process Improvements  
Additional Engineering Work/Construction Budget Impacts

12/17/2015

Items under Design not Specifically Listed in Original Construction Funding/CFP

| No.  | Item                                                                                                            | Hours | Eng Fee | Comments                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------|-------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Add Filter Building Fascia                                                                                      | 16    |         | Improve aesthetics - requested by City                                                                                                                                             |
| 2    | Replace all lab cabinets/counters/sinks/plumbing                                                                | 16    |         | Requested by City staff; good idea based on current condition                                                                                                                      |
| 3    | Filter Bldg Roof Replacement and Roof Drain Changes                                                             | 16    |         | Requested by City staff to solve drainage issue and new roof needed in near future                                                                                                 |
| 4    | Replace South Side Glass Curtain Wall                                                                           | 4     |         | Improve aesthetics - requested by City                                                                                                                                             |
| 5    | Replace 2nd floor Single and Double door                                                                        | 4     |         | Improve aesthetics - requested by City                                                                                                                                             |
| 6    | Add Solatubes in Filter Building                                                                                | 8     |         | Provide natural light - requested by City                                                                                                                                          |
| 7    | Replace and move lockers and add wardrobe in the basement                                                       | 4     |         | Improve functionality - requested by City                                                                                                                                          |
| 8    | New LED luminaires and circuits in the office area/filter area                                                  | 16    |         | Update to current with other improvements                                                                                                                                          |
| 9    | Epoxy Floor in Filter Bldg                                                                                      | 4     |         | General improvement                                                                                                                                                                |
| 10   | Furniture (was direct City purchase)                                                                            |       |         | Steelcase quote \$23.5K + GC/I/B/etc.                                                                                                                                              |
| 10.1 | Repowering Furniture (power/network)                                                                            | 8     |         |                                                                                                                                                                                    |
| 11   | Loading Dock/Steps/Access Ramp                                                                                  | 40    |         | Required due to relocation of building to parking lot for SRF compliance                                                                                                           |
| 12   | Site Civil Extras associated with the Loading Dock:                                                             |       |         |                                                                                                                                                                                    |
| 12.1 | Concrete Pavement with Base                                                                                     | 16    |         | Restore vs. City code - discuss with City                                                                                                                                          |
| 12.2 | Earthwork Allowance                                                                                             | 8     |         | Required due to relocation of building to parking lot for SRF compliance                                                                                                           |
| 13   | Additional Site Work for southern entrance due to Ozone Bldg location in parking lot for SRF                    | 16    |         | Required due to relocation of building to parking lot for SRF compliance                                                                                                           |
| 13   | Electrical Underground Design for second entrance gate                                                          | 8     |         | Power and control for new gate, new cables, control diagrams.                                                                                                                      |
| 14   | Additional Site Work and ADA ramp due to Ozone Bldg in parking lot for SRF                                      | 8     |         | Required due to relocation of building to parking lot for SRF compliance                                                                                                           |
| 15   | Thiosulfate Feed                                                                                                | 4     |         | Added to enhance safety                                                                                                                                                            |
| 15.1 | Electrical Impacts                                                                                              | 6     |         | Power, conduit, controls, etc.                                                                                                                                                     |
| 16   | Above grade Chemical Feed Lines / Pipe Rack                                                                     | 98    |         | Roxtec, Thermon, Rack - CPVC (orig)                                                                                                                                                |
| 16.1 | Electrical impacts                                                                                              | 16    |         | Power, controls, system operation description, network screen.                                                                                                                     |
| 17   | Ozone System Modifications (VSA in lieu of PSA (long-term operations savings), degas unit, additional monitors) | 10    |         | VSA present value payback; added degas and injection skid monitoring for additional safety; re-evaluating LOX option; Use of a smaller VSA (DOCS200 could reduce to cost to \$150K |
| 17.1 | LOX Pad (elec)                                                                                                  | 8     |         | Lights, conduits, power, controls                                                                                                                                                  |
| 17.2 | SS piping for LOX and Future Contactor                                                                          | 8     |         |                                                                                                                                                                                    |
| 17.3 | LOX Pad (structural)                                                                                            | 4     |         | Drilled shafts included elsewhere                                                                                                                                                  |
| 18   | Add small 480V panel in the existing Chem Bldg to maintain power to existing transformers                       | 4     |         | Originally, planned to run line and reuse panel but a new panel is needed                                                                                                          |
| 19   | Drilled Shafts/Poor Subgrade                                                                                    | 105   |         | Economical option based on geotech report; Additional Geotech and structural design phase hours.                                                                                   |
| 20   | Integrate City Network with SCADA for internet access.                                                          | 28    |         | Required for internet access to plant for remote monitoring of plant                                                                                                               |
| 21   | New diesel generator                                                                                            | 36    |         | Sized for expected future load, duct bank routing, redo transfer scheme, conduit, cables, specification                                                                            |
| 22   | New 225A rated 480v panel in Filter Bldg - estimated 2-3 circuits re-installed.                                 | 4     |         | Existing panel not sufficient size for new networking, office, lighting, A/C, air scour blower                                                                                     |
| 23   | New 45 kVA transformer - wall mounted                                                                           | 0     |         | need space freed up for new 480v panel                                                                                                                                             |
| 24   | New 120V panelboard in Filter Bldg - assumes installation will not require existing circuits to be repulled.    | 4     |         | Existing panel not sufficient size for new networking, office, lighting, A/C                                                                                                       |
| 25   | Relocation of Ozone Building:                                                                                   |       |         | Move from greenfield to parking lot for SRF - multiple obstructions for utilities                                                                                                  |
| 25.1 | Process                                                                                                         | 110   |         |                                                                                                                                                                                    |
| 25.2 | Electrical                                                                                                      | 48    |         |                                                                                                                                                                                    |
| 26   | Drilled Shafts - Construction Phase                                                                             | 40    |         | Required based on Geotech Report                                                                                                                                                   |
| 27   | Management/Coordination                                                                                         | 60    |         | 10 percent                                                                                                                                                                         |
| 28   | Add network jack for future VoIP telephone to existing chem building                                            | 4     |         |                                                                                                                                                                                    |
| 29   | Add television to break area with capability to look at process, city network PC, or watch DVD                  | 8     |         | Includes shelf, devices to duplicate signals between multiple screens, network jacks, cable/conduit routing, etc.                                                                  |
| 30   | Future Contactor Basin Elec Design                                                                              | 6     |         | Conduit and manhole for future contact basin                                                                                                                                       |
| 31   | Replace 1 utility light pole with plant light pole at far west end of site                                      | 2     |         | Needed because utility poles will no longer stretch out to equipment storage area.                                                                                                 |
|      |                                                                                                                 |       |         |                                                                                                                                                                                    |
|      | Subtotal                                                                                                        | 805   | 140,875 |                                                                                                                                                                                    |
|      |                                                                                                                 |       |         |                                                                                                                                                                                    |
|      | CFP Budget (without 25% Contingency):                                                                           |       |         |                                                                                                                                                                                    |
|      | Additional lab cabinets, main floor glass walls , and new front door                                            |       |         | New cost is \$58.5K installed                                                                                                                                                      |
|      | Site Improvements - 1 gate, site grading, rock pavement, site drainage, site lighting and security              |       |         |                                                                                                                                                                                    |
|      |                                                                                                                 |       |         |                                                                                                                                                                                    |
|      | Additional Costs Subtotal 1                                                                                     |       |         |                                                                                                                                                                                    |
|      |                                                                                                                 |       |         |                                                                                                                                                                                    |

Larger HS Pumps for Peak Hour and Emergency Demands (eliminates need for the tank)

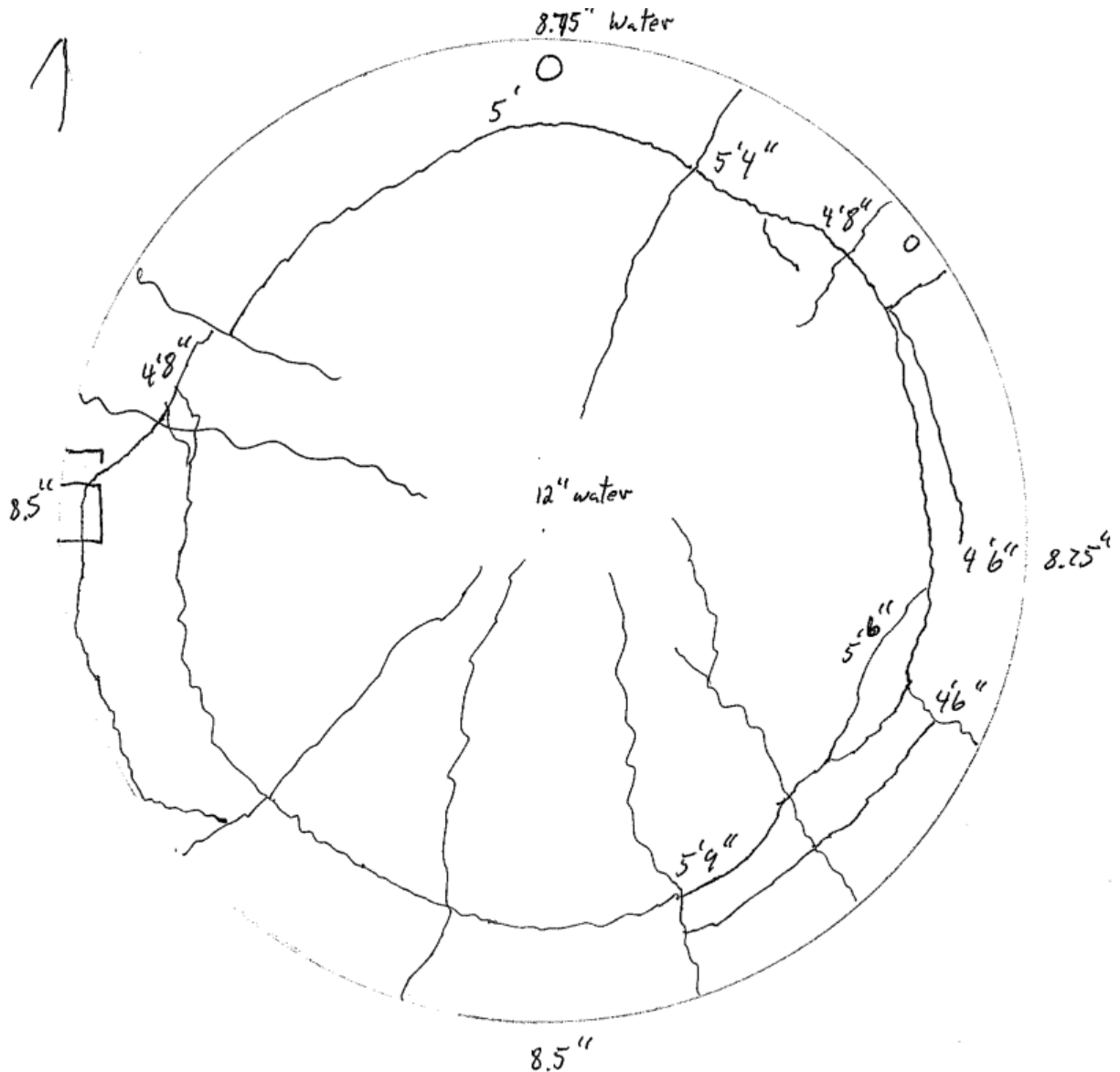
Attachment: List of Additional WTP Engineering Work 121715 (2087 : Engineering Contract for Design of the WTP)



**TO: Board of Aldermen**  
**FROM: Jerry Gibbs, Director**  
**DATE: January 13, 2016**  
**SUBJECT: DIGESTER REPAIR ALTERNATIVES**

**Type of Item:** *Report*

Jeff Barnard, Burns and McDonnell and Michael Hafling, CAS Constructors LLC presented to city staff members from the WWTP and city administration three possible options to consider to repair the damaged floor in the digester. The cause of the damage was hydraulic loading under the floor. Unfortunately the resulting cracking extend beyond the footing inside the tank to at least the tank walls. (Figure 1 below) Before any repair to the tank they will need to determine the extent of the damage.



The first alternative describes a new 1.5'-2' concrete slab to be poured over the existing, cracked floor, and tied in with steel reinforcement to the existing sidewalls. Approximately 25 Tideflex backflow prevention valves (referred to as '6" PRV' in Figure 12) will be installed at regular intervals around the perimeter of the basin to allow groundwater from outside the basin to enter the basin when groundwater levels are higher than the valve elevation. Granular fill will be filled in from under the slab up to a point up the sidewall above the 6" PRV so that groundwater can flow easily to the PRVs. A preliminary sketch of this scenario is presented in Figure 12. In this case, as in Alternative A, a four-inch piezometer will be installed inside the basin that extends below the original basin floor. It is also recommended in this alternative for piezometers to be installed adjacent to the wall of any submerged basin on site. **This option was quickly dismissed.** The hydraulic water pressure issue would not be resolved. The floor would be subject to the same conditions contributing to the damage of the current floor. This option has the greatest unknown risk.

Alternative 2 completely removing the interior cracked concrete basin floor and partial excavation of the layers below the floor to allow for placement of 12 inches of granular material on a layer of geotextile filter fabric. A new concrete floor will then be poured in place of the former floor as shown in Figures 10 and 11. PRVs in the floor slab will be installed at regular intervals to allow relief of differential water pressure from under the tank during dewatering (refer to Figure 10). In order to maintain perimeter wall stability and a working surface, pre-shaped sections will be constructed one at a time, as shown in Figure 10.

The new floor will be doweled into the existing basin wall footing, as displayed in Figure 11. The existing footing is 1'-2" thick, and the concrete floor will maintain the same thickness for the first three feet extending inward from the wall toward the tank center (six feet total at this width, including footing exterior to and under the basin wall). Then, the slab thickness transitions to eight inches for the interior of the basin floor slab. Construction will need to occur in stages to limit the amount of potential settlement of the existing perimeter wall as well as the immediately adjacent newly constructed slab. Significant risk exists for weakly supported or differentially supported sections at intersections of new slab; settling potential depends upon the depth of material that is to be removed and replaced with new material to provide a properly supported slab. The estimated cost would be in the \$800,000 range. This option has medium to high risk.

The floor removal would require the additional excavation of 3' to 4' of material. Saturated soils would make it extremely difficult to establish a working surface. Saturated soils under the floor & footings, sloughing would be a concern. The integrity of the basin wall could/would be impacted. The contractor was directed to determine the stability of the soils under the floor.

The 3<sup>rd</sup> alternative would be to construct a new basin. The approximate cost is \$1.5 M. This alternative is high cost low risk.

The group discussion identified a possible 4<sup>th</sup> alternative to explore. A mechanical solution that has a lower capital cost and higher operating cost. The risk would be low. Burns and McDonnell and WWTP personnel will review if a centrifuge or material drying unit could be a viable alternative.

A meeting will be scheduled in a couple of weeks to review the findings.

## **B. Discussion Item (ID # 2104)**

### **DIGESTER REPAIR ALTERNATIVES**