

Charles Gill  
Water Utility Manager  
451 Meek Street  
Greenfield, Indiana 46140



Mayor Chuck Fewell  
Board of Works and Public Safety  
10 South State St.  
Greenfield, IN 46140

Re: South Plant Maintenance Phase 1

November 10, 2020

Mayor and Board Members,

The main roof of the plant has been failing over the last two years despite the best efforts of the staff to patch the membrane roof and has reached the end of its service life. The structural inspection of the South Plant conducted by Donohue and Associates, INC and supports the replacement of the main roof and the installation of a gutter system for the aeration deck to allow water to be channelized away from the roof and walls of the building properly. I have included the pages from the report that support the need of this corrective maintenance work. The scope of the roof replacement would include the evaluation to remove, or refit the existing skylights to maintenance access hatches in the filter room to prevent algae growth on the filter cell walls.

I have shared with the board the upcoming need to replace the filter media just as we did with the North Plant in 2019. The Water Utility personnel will shut down the plant and then remove the old media and then have contractors enter the filter cells to inspect, and evaluate structural components. Repairs will be made, and then the contractors will install and condition the new media in each filter.

In order to economize activities in this phase, the roof replacement would occur with junction with the filter media rehabilitation. I would request that the Board approve the Water Department to seek bids for the roof and filter media replacement and rehabilitation. We hope there will be a cost savings to bid these repairs as a single maintenance project. The RFQ's received will be evaluated by a committee comprised of the City Engineer, Water Utility Manager, and Water Assistant Manager. I would hope to bring a recommendation back to the board for approval of the successful firm by the end of January 2021.

I welcome any questions the Board may have on this recommendation.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Charles Gill", is written over a horizontal line.

Charles Gill  
Manager  
Water Utility

cc: Jason Koch, City Engineer  
Dan Worl, Business Service Manager  
Lori Elmore, Clerk-Treasurer  
Jane Webb, Utility Customer Manager

## 2. CONDITION ASSESSMENT

The following sections record the condition of the structure at the time of assessment along with potential root causes of deterioration.

### 2.1 MAIN ROOF

According to plant staff, the existing roof is approximately 15 years old and the warranty has expired. The roof is composed of a rubber membrane applied over a flat underlayment. The specific composition of the underlayment was not determined. By its inherent nature, a flat roof requires adequate water to build up on the surface before finally flowing to the roof drains. In the case of the main roof, localized ponding is occurring throughout the majority of the roof space. In certain locations, roof drains are set at a slightly higher elevation than the surrounding roof, further worsening the ponding problem. Figures 2-1 and 2-2 provide representative examples of observed roof ponding and the roof drain elevation concern, respectively.



**Figure 2-1** Representative ponding in the South East corner of the roof.



**Figure 2-2** Ponding around an improperly installed roof drain.

Five existing skylights over the filter room were also noted. These are in poor shape and lack the fall protection system required by building and safety codes. They further have been identified as a source of UV light infiltration into the filter room, encouraging algae growth in the filter cells. The roof access ladder was also noted as failing to meet modern code requirements. The existing HVAC unit in the north east corner of the building was in operation during the time of the assessment. Donohue noted, and brought to the Owner's attention, that the condensate drain trap on the east side of the unit previously froze and cracked. Condensate water was freely draining onto the roof as apposed to the roof drain as originally intended.



**Figure 2-3** Overall view of the upper roof including localized ponding and skylights.

## 2.2 INTERMEDIATE ROOF

This space houses the aeration unit off the northwest corner of the building. The concrete deck shows only minor signs of cracking and deterioration which are anticipated for a structure of this age. Observations were made of previous brick repointing work which appears to have been done with a cement and fine sand mix. The mortar is very hard, likely harder than the original mortar, and was falling out in select locations. Further observation of the failed mortar revealed that the previous replacement depth did not always meet standard repointing recommendations.



**Figure 2-4** Failed repointed mortar joint adjacent to the intermediate roof deck.

Condensate draining from the aeration unit falls onto the roof deck and runs off the north and west edges. From there it runs down the face of the building and leaks onto the covered stairway on the north face of the building, resulting in further deterioration.

## 2.3 FILTER ROOM

The filter room is comprised of cast-in-place concrete walls, single wythe masonry walls, and topped with 24 inch wide by 12 inch deep precast concrete planks. All interior surfaces have been coated. Windows in the south wall of the room, along with the five skylights, allow ample natural light into the space. This further fuels algae growth within the filter cells. The space is not currently ventilated, but maintains a cool overall temperature due to the exposed water surfaces.

Excessive cracking of the single wythe masonry wall comprising the west wall of the room was noted. The majority of the cracking is horizontal in nature, indicating planar movement of the wall. Diagonal or step cracking is more indicative of vertical movement, typically associated with settlement. Signs of distress were further noted at the roof-wall intersection and between adjacent roof panels, most notably along the west side of the room. Movement of the roof panels along the western edge of the