McKeesport Water Softening Plant

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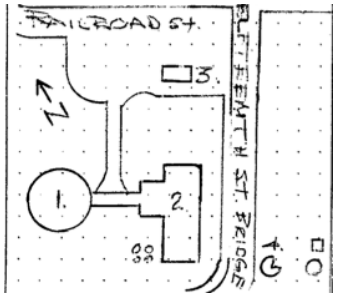
Physical Description, Statement of Significance, & Meta Narrative

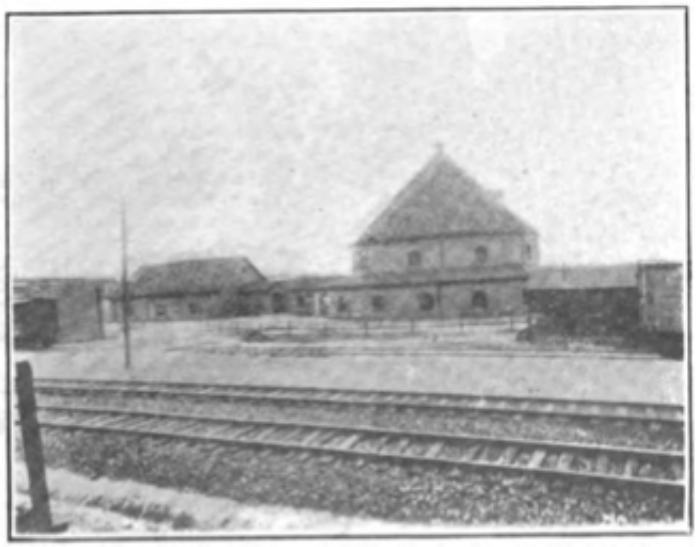
McKeesport Water Softening Building Physical Description

The McKeesport Water Softening Building is situated in an urban area along the East bank of the Youghiogheny River 1.25 miles from confluence of the Monongahela River. The property is bisected by the 15th Street Bridge connecting McKeesport to the Boroughs of Port Vue and Liberty. It is bordered by the Youghiogheny Bike Trail, a converted railroad right-of-way, to the northeast with Rt. 148 (Walnut St.) running parallel and just beyond this. A chain-link fence around the perimeter of the property delineates the boarder between the property and its neighbors, both up and down stream. Also located on the property is the Chemical Warehouse and Power Station, the only other building remaining from the 1908 plant. This small two-story structure is located to the East of the Softening Plant next to the Fifteenth Street Bridge as seen in figure 3 on the map.[1]



[1] (Lu Donnelly 1981)

The structure is a 1908 water softening plant of a Romanesque design, circular in shape, compromised of a poured concrete substructure and three floors made of brick above ground. [2] The floors have diameters of 95, 65, and 65 feet respectively with water tanks, built below grade, and arranged concentrically extending beyond the outer walls creating an overall footprint of 190 feet. This can clearly be seen in the wear patterns of grass visible in areal photographs of the site.[3] The above ground structure is equipped with Roman arched windows that are located on the bottom two floors along the entire circumference of the building. These were partially bricked over at some point before 1981 to accommodate metal-framed casement replacement windows on the second floor and glass block on the first. All windows include ashlar spring stones and sills.[4] These replacements are also showing wear and a number of each are broken. The main entrance also features a Roman arched design that now houses an aluminum overhead door.



General View of Plant from B. & O. Right-of-way

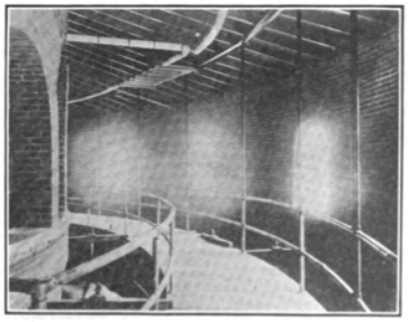
While the current condition of the interior is not discernable without access, the original floor plan and a 1981 report share some of the possible internal details. The sub

[2] (Lu Donnelly 1981)
[3] (Potter, The Design, Construction and Operation Filtration Plant at Mckeesport, Pa. 1909)
[4] (Lu Donnelly 1981)

level of the structure is composed of a circular basin 190 feet in diameter with walls 24 feet high and 15 inches thick. A trough 3 feet deep by 4 feet wide is suspended from this. Hydraulic Engineer Alexander Potter believed this to be the largest basin of this type ever constructed. The foundation is constructed from reinforced concrete with an approximate 3:5 mixture. Aggregate for the concrete came from Allegheny River with Gravel at ¼ to but not exceeding 2 ½ inches. The mixture was reinforced with ¾ inch rods on vertical and horizontal. Full height forms were used with concrete deposited from the top of forms. Amongst the structural elements constructed from concrete are groined and plain arches, retaining walls, tanks, cantilever constructions, columns, beams, and floor slabs.[5] In both the foundation and the superstructure mild steel was used to both compensate for the vibrations of machinery and because of the ease with which it could be bent to create the unique structure.

[5] (Potter, The Design, Construction and Operation of the New Watersoftening and Filtration Plant at Mckeesport, Pa. 1909)

The external walls of the of the building are constructed of brick, buff in color chosen for economics and aesthetics being both easily accessible in the region and practical to use in the construction of a round building.[6] The above ground structure consists of three floors fitted with Roman arched windows and ashlar spring stones and sills.[7] All windows have been partially bricked over to contain replacements, metal-framed casement on the second floor and glass block on the first. The first floor with a diameter of 95 feet includes the Chemical Control Apparatus and a centrally located operating section.[8] This level also included a clear-well anthrofill water filtration system allowing the building to double as a filtration plant or do a combination of filtration and softening in its four segmented tanks.[9]



View of Lean-to Over Baffles Showing Controlling Gates and Walk

The second floor with a diameter of 65 feet includes laboratories, lavatories, offices, workroom, and chemical solution tanks many of which contained workstations custom built into the rounded exterior walls. The third floor also with a diameter of 65 feet contained the stirring and agitation mechanism along with the motors and connecting shafts (a system powered by water

THE MAIN CHEMICAL LABORATORY, WHERE THE PROCESS OF SOFTENING AND PURIFICATION IS CLOSELY WATCHED AND CONTROLLED

[6] (Potter, The Design, Construction and Operation of the New Watersoftening and Filtration Plant at Mckeesport, Pa. 1909)
[7](Lu Donnelly 1981)
[8] (Potter, The Design, Construction and Operation of the New Water Softening and Filtration Plant at Mckeesport, Pa. 1909)
[9] (Lu Donnelly 1981)

released from the cities reservoir). A final feature of the interior was a water-powered elevator, also powered the reservoir, for moving supplies between floors. [10]

The cone shaped roof has a steel frame with timber elements and has had various coverings over the years. Porter's original design included graduated tiles, but these were eventually replaced by asbestos shingles and in more recent updates by at least two lawyers of asphalt shingles that are currently visible on the structure. The structure is capped with a simple sheet metal cone. This feature replaced a more ornate pinnacle device partially visible in early photographs.

[10] (Lu Donnelly 1981)

Integrity

The last twenty years has seen the demolition of two of the four original buildings of the of the 1908 Water Treatment Plant and changes have been made to the Water Softening Building. The building retains integrity of location as it remains in the location of construction. Likewise the integrity of setting is also intact. Although secondary resources have been removed, no new structures have been added within the space they occupied. The two new features that have been added to the site have not adversely impacted the setting as the new Fifteenth Street Bridge maintains the same footprint as its predecessor. The new filtration plant is located on the opposite side of the bridge in an area that was not previously used.

The integrity of design and materials are compromised in a number of ways. First, it is unclear whether the original machinery or even the floor plan remains within the Water Softening Building. A number of unique features including hydraulic powered machinery and an elevator were intact as of 1981 but may have been destroyed or removed along with the demolition of the secondary structures on the property. [11] Aesthetic structural changes to building include the alteration of window design and

[11] (Lu Donnelly 1981)

partial closing of their Roman arch design to accommodate this. The original wood framed windows were removed at some point prior to 1981 and replaced with metal-framed casement windows on the second floor and glass block on the first. The roofing material has been changed from the original tile to modern asphalt shingles. Additionally, the device at the pinnacle of the building seen in many early photos was removed and replaced with a sheet metal cone. The most drastic change made to the building and the one that does the most damage to its integrity of design is the removal of four pedimented dormer windows from the third floor. As a structure that gains much of its significance from design it is difficult to loose such a feature. [12]

The loss of secondary buildings including the Filtration Building is unfortunate but does not take away from the significance of the Treatment Building .The 166 foot long building was located to the south of the softening plant between it and the 15th Street Bridge and the two were connected by an arcade.[13] Although this structure was part of the design it had few distinguishing characteristics. As the architect Alex Potter phrased it "The filtration plant is of conventional mechanical gravity type and method of construction and operation well know. The water softening plant on the contrary is almost unique in municipal practice…."

The plant displays an innovative design finding creative ways to improve on previous plants by embracing new construction techniques while creating aesthetically pleasing structure. The utilization of poured concrete allowed for the creation of concentric circular tanks. This design created an economic use of land, allowed for ease

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[12] (Potter, The Design, Construction and Operation of the New Watersoftening and Filtration Plant at Mckeesport, Pa. 1909)
[13] (Lu Donnelly 1981)

of operation, and was better was suited to reduce water agitation during the treatment process. Because these factors are so closely tied to the structure the building has maintained integrity of workmanship.

The integrity of feeling can be seen in the architectural design of the building Unlike many modern industrial structures that tend to be utilitarian the artistic embellishments that Potter included are testament to a time when a factory could be an object of civic pride. The change in window design and the removal of the third floor dormers adversely impacts this but the general design remains.

The Water Softening Plant retains an association with the elements that makes it a property of significance. Although secondary structures have been removed and elements have been altered the fact that the building gets so much of its importance from it shape and the innovations that are associated it is able to maintain integrity.

Historical Resource Statement of Significance

To understand the significance of the McKeesport Water Filtration and Softening Plant it is important to understand the conflicting needs of the McKeesport community in the 19th and early 20th century. The development of heavy industry stimulated the growth of the city but at the same time held the potential to ruin it. The McKeesport Water Softening Plant is an excellent example of Criterion A of the National Register because the building is closely tied to both the industrial and environmental development of the city reconciling the two factors that that threatened to stop its development.

The building is so closely associated with the development of the city that its period of significance will trace the rise and fall of both. The period will begin with the 1908 construction of the building as a top of the line facility in a booming city and conclude with the Giardiasis outbreak of 1983, caused by the now decrepit building, the financially burdened city could not afford to improve it.

The Softening building along with the rest of the water plant was constructed in 1907-08 replacing the cities first attempt at public water: an 1881 power plant and pump house. While this facility provided water to residents the product was unfiltered

and many opted to continue using wells on their own property. With industry on the rise in the river valley the plant was short lived.[14]

By the turn of the century McKeesport was one of the most important industrial centers in the region. This growth did not come without consequences especially the Youghiogheny River, the source of the city's drinking water. As early as 1839 coal mines (starting with the Miller near the mouth of the river) had been in operation and as their minerals deposits were exhausted operations moved up river abandoning old sites. Drainage from the mines flowed down the hillsides and into the river mixing with runoff from various industrial sites including the coke ovens of the Connellsville and local business like National Tube Works and the Tin Plate Mill.[15] The runoff, especially that of the mines lowered the natural alkalinity of the river; these conditions were worsened by the seasons and periods of drought. [16]

By the turn of the century the city's water supply was so damaged that wells were drilled along the riverbank and their waters used to dilute the municipal supply. This did not work, as the well water was high in minerals and just as unsuitable for consumption. The city faced particular bad conditions in the year before construction (1906) with measurements indicating the water-contained 106-ppm of acidity based off of reaction to methyl-orange. The water had become so bad that the municipal pipes were being damaged by it. The city was experiencing as much as 50% loss and Hydraulic Engineer Alexander Potter calculated public/private-plumbing bills in the city to be as much as

[14] (Public Water Supply of the McKeesport District n.d.)
[15] (Walter S. Abbot 1894)
[16] (E. C. Trax 1920)

$1,5000,000.[17] In 1906, the U.S Geographic Survey reported the water supply to be some of the worst in the country. As USGS Water Supply Paper 161 stated " few municipalities have been supplied with waters as unfit for domestic and industrial uses as that supplied to McKeesport for some years prior to the construction of the water softening plant". The unfiltered nature of the city's water and the insistence of many residents on using private wells led to high levels of water born illness. In the two years before the opening of the plant (1906 and 1907) the city reported 842 cases of Typhoid Fever with as many as 188 resulting in death.

McKeesport had a booming industrial sector and growing population both of which were in danger of becoming stagnant if the water problem was not solved. The National Tube Works responded building a private 5,000,000 gallon softening plant as part of $15,000,000 in improvements.[18] But without a supply of its own the growth of the city was in doubt. In 1907 the city under the leadership of Mayor George Lysle contracted Alexander Potter with the assistance of Leo Hudson and water softening expert John Bower Jr. to design and construct the water filtration/ softening plant. [19]The plant exceeded expectations providing clean safe water that while heavily treated was more than palatable. [20]

Beyond producing an exceptional water supply for the city water plant, especially the water softening building, was aesthetically pleasing with a Romanesque design that

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[17] (Potter, The Design, Construction and Operation of the New Watersoftening and Filtration Plant at Mckeesport, Pa. 1909)
[18] (Potter, The Design, Construction and Operation of the New Watersoftening and Filtration Plant at Mckeesport, Pa. 1909)
[19] (Walter S. Abbot 1894)
[20] (E. C. Trax 1920)

far exceeded its utilitarian use of the structure.The building was so popular that it became the subject of city postcards and the backdrop for its swimming pool (touted as one of the largest of its kind in the world). Architectural embellishment of industrial building was not uncommon at this time making a strong case for Criterion C. This can be furthered by innovative nature of the building with its innovative tank and mechanism designs.

In the years that followed McKeesport continued to grow and prosper as the National Tube Works became the largest of its kind in the world and the cities population grew to 51,502 by the 1950 census.[21] The plant remained in operation until its deteriorated state led to 329 cases of Giardiasis in December of 1983. The plant was closed and the city was forced by court order to sell the property to Municipal Water Authority.[22] In the years that followed the Authority built and operated a new plant on the property up river from the original and demolished two of the three secondary structures found on the site structures leaving only the Chemical Warehouse/Power Station and the distinctive Water Treatment Building.

The Treatment Building remains a structure of both architectural and engineering significance at the local level with close ties to the history and development of the city of McKeesport making it an excellent candidate for criterion A of the National Register. Though architect Alexander Potter, the most notable individual of the project, created a unique structure only a weak argument can be made for criterion B as the building was neither the first to treat water in this fashion nor the first to introduce

[21] (Walter S. Abbot 1894)
[22] (Williams 1984)

high-level architecture into industrial sites. The same can be said for criterion D, for while interesting industrial work was done on the site there is little to be learned from the excavation of the site that cannot but taken from the engineering journals of the day. The Water Treatment building does however present opportunities to explore criterion C. The Building shows both artistic and practical ingenuity.

NRHP Boundary Delineation. McKeesport Water Treatment Plant Water Softening Building

Location

Description Location

The McKeesport Water Softening Building is situated in an urban area along the East bank of the Youghiogheny River 1.25 miles from confluence of the Monongahela River where the 15th Street Bridge connects McKeesport to Port Vue, Pa.

NRHP Boundary

The boundary for this historic resource can be delineated from the Allegheny County Tax Parcel it is contained in. This tax boundary is derived from a series of features both natural and man-made that surround, or at various times have surrounded the property. The historic structure and the two remaining ancillary buildings are located in Allegheny County Tax Parcel 38 2-K-175. This parcel is bisected by the 15th St. Bridge with the main portion of the property including the Water Softening Plant and the Chemical Storage Building on the larger down-river portion and the Active Intake System building located in the smaller up-stream section.

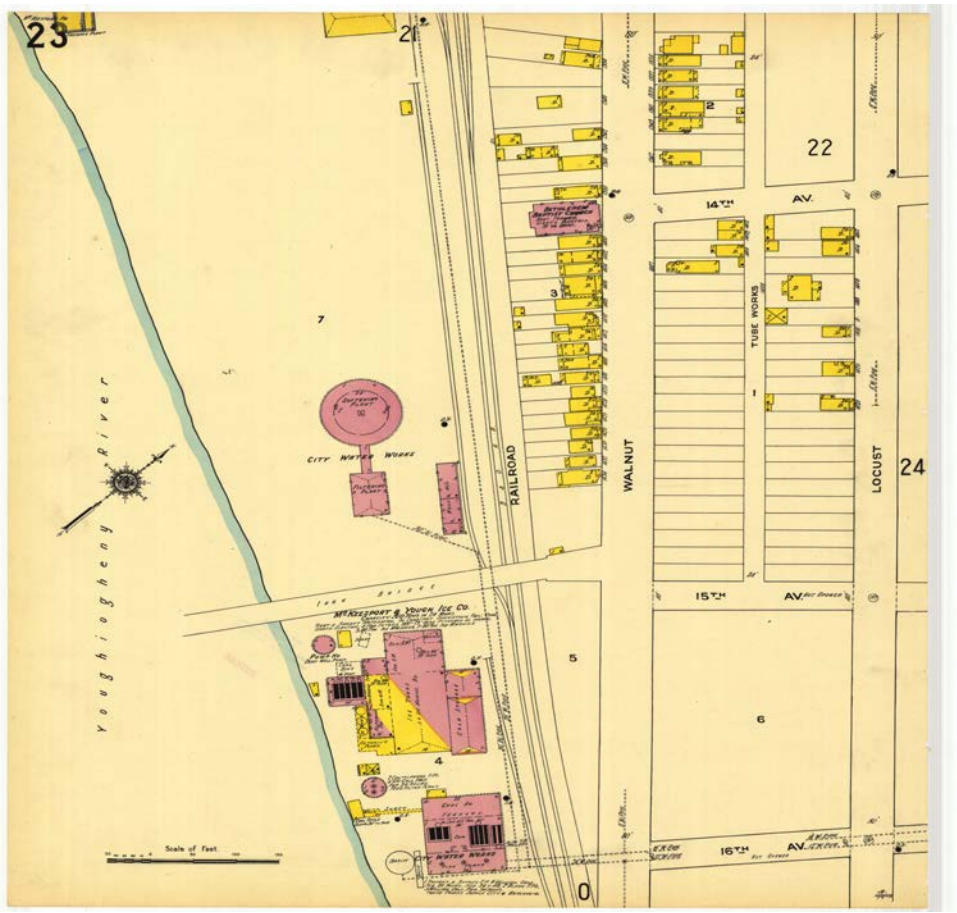
Youghiogheny River provides the border for both the historical property and the tax parcel along the entire southern expanse of the property. As the property is a water

softening building it is appropriate that the source of the cities water acts as such. The river provided the city's water supply starting with the 1881 pumping station. This source was also the impetus for the Water Softening Plant. Because of the industrial activities in the Youghiogheny River Valley especially the coal and iron production the river took on acidic and hyper-mineralized nature. With 50% water loss caused by corrosion and water born illness numbers increased by the use of private wells the plant and its location along the River became significant.

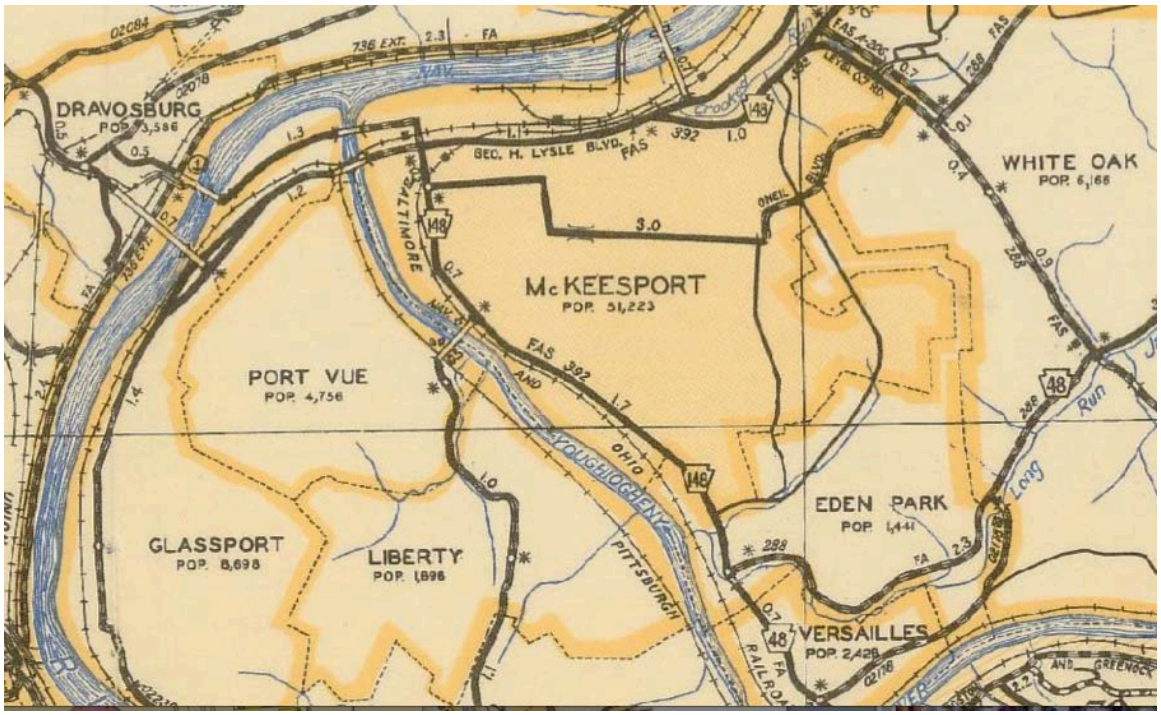
1983 Site photo (right) and site layout (left) including now removed Markets Street Ramp

Parallel to the boundary created by river along the down stream portion is an angular segment of the tax parcel created by a ramp connecting Market Street with Walnut (Rt. 48) at the 15th Street Bridge. The ramp was removed along with the original bridge in 1994 and not replaced when the new bridge was built at the same location. The tax parcel and therefor the historic property continue to utilize this former right of way. The top right corner of the right of way extends North to the Youghiogheny River Bike Trail while the lower section only goes as far North as the private drive labeled "driveway" on the County Tax Map.

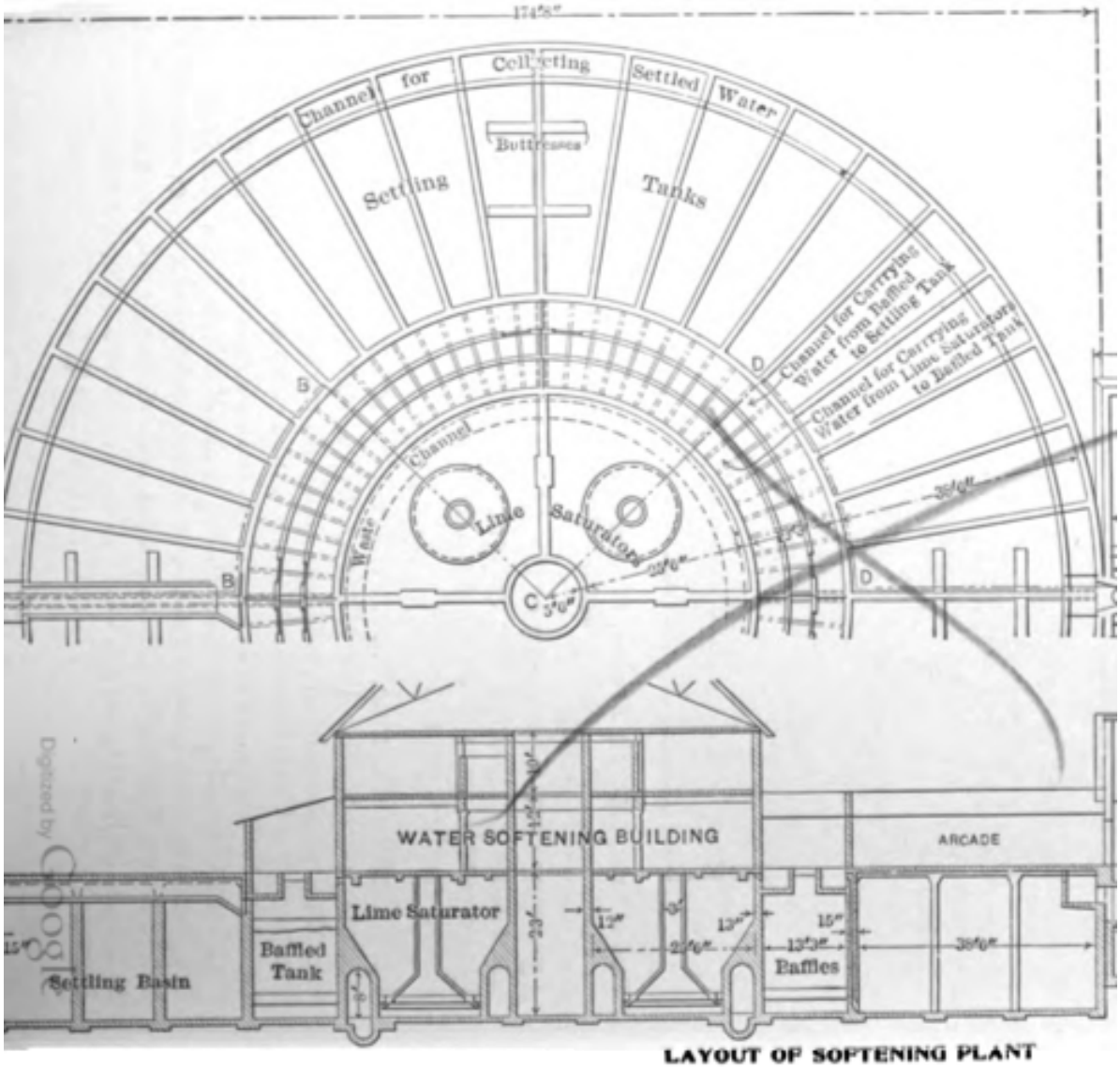
The far Southeastern edge of the property lies beyond the 15th Street Bridge extending to a chain link fence that runs along a line that can be extended from 16th Street. This boundary is roughly 200ft beyond the Bridge and is necessary to include the Active Intake System Building in the property. The remaining boundary of the up-river section is E. 15th Street between the bridge and the same extension of 16th Street used to denote the riverside portion.



1909 Sanborn Insurance Map Showing the Water Softening Building and its Ancillary Structures



McKeesport and its Bordering Communities 1950.
General Highway Map Allegheny County Pa.
Pa. Dept. of Highways
Statewide Planning Survey
Polyconic Projection



LAYOUT OF SOFTENING PLANT

Historic Meta-Narrative

The McKeesport Water Softening Plant has not been the home of great deeds or transcendent figures but is clearly a structure of great importance at the local level showing significance under A and C of the National Register Criteria for Evaluation. Although the plant has never been reviewed higher than the local level it displays current trends in preservation reflecting industrial, architectural and environmental history that mark it for distinction on the state and national level.

The Water Softening Plant stands as an excellent example of both green design and reaction to environmental concerns at a historical level and acts as a parallel to modern issues of industry including responsible use of natural resources, pollution, and our reaction to environmental degradation. Perhaps the sites greatest worth comes from the circumstances under which it was built and the creative engineering that solved these problems. Starting in the first half of the 19th centaury the Youghiogheny Valley saw a series of coal mines opened then subsequently abandoned as their minerals were exhausted. As mining activities moved up river towards the Connellsville region and new-exhausted mines were added to the ranks of the unattended the river began to take on acidic qualities that threatened to halt industry and the general development of the area. The McKeesport Water Treatment Plant and particularly the Water Softening Plant displayed an innovative use of technology in response to man made environmental degradation. Additionally, the structure was equipped with a number of features that would be called green or energy efficient in modern terms. The circular design of the building was intended to create both conservation of land and energy and the elevator

found within the building was water powered rather that utilizing the on site electric generators.

The Plant can also be used to highlight modern mineral use and environmental concerns. There is an emerging narrative in the analogy between the mineral based economy of the 19th and early 20th and the developing Marcellus Shale industry. This is true when looked at terms of mineral extraction and protection of water but can also be expanded to a comparison of the communities at large. As stated in the Pennsylvania Historic Preservation Plan "the rapid expansion of Marcellus Shale drilling in Pennsylvania brings economic growth and a new population needing housing, education, and social services in rural areas, which is stress-ing the capacities of some communities and infrastructure systems."[23] The parallels that can be drawn from this serves as an important warning that we must take care to not damage a resource as vital as water for the sake of industry and must be innovative in the ways we rectify our past actions to maintain a healthy environment because the consequences of industry may far outlast their benefits.

The plant also provides a sense of place to a community that has lost its industrial identity. It is clear the heavy industry will not return to the Youghiogheny Valley on any discernable scale and this creates the danger of losing the character of the community created in the nineteenth and twentieth centenaries. If the community is able to repurpose its heavy industry locations without preserving key pieces of architecture there is a danger of these historically important locations becoming no

[23] (Pennsylvania Historical and Museum Comission 2012) 33

more than generic landscapes that do not reflect the culture and history of the city. Highlighting and preserving the McKeesport Water Softening Plant along with other strategically selected assets will create a tangible link to the past while allowing the city to continue revitalization attempts. If these attempts are successful the remaining assets will add authenticity to sites that otherwise would be indistinguishable from business or residential areas in any other location.

Additionally, the structure works on an educational level creating a link to a quickly disappearing industrial culture that more recent generations have not experienced. As stated in the Pennsylvania Historical Preservation Plan; "youngest adult generation possesses little to no first-hand cultural memory of the concept of employee-employer loyalty, where the accepted life path was to work through a career in one locale"[24] It can be assumed that this generation is also not familiar with other aspects of industrial and economic history that can be interoperated through the Plant. These include the concept of locally owned business where employees and employers lived in relatively close proximity as well as civic pride in hometown brands. One of the clearest examples of this is the inclusion of high architectural design in industrial structures. The inclusion of these embellishments on utilitarian buildings is a clear indication of their worth to the community and likewise the community's worth to the business.

Finally, the McKeesport Water Softening can be a powerful tool for the

[24] Pennsylvania Historical and Museum Comission 2012, 33

interpretation of deindustrialization and it's impact on communities. As highlighted in the Pennsylvania Historic Preservation Plan, " In Pennsylvania the communities that had been the strongest benefactors of the second Industrial Revolution were the most devastated by the new global order. Millions of Pennsylvania workers lost their jobs due to plant closings; corporations pulled out of cities; whole industries disappeared; and previously thriving towns struggled to survive. Entire regions were traumatized." [25] In the plant we see both the development of an industrial city including a technologically advanced infrastructure as well as its downfall. The final years of plant operation show the difficulties by communities and their governments when faced with loss of industry and population leading to a decreased tax base and the inability to maintain infrastructure.

It is imperative that the McKeesport Water Softening Plant be designated and preserved for the benefit of this and future generations. Since the time of local designated was awarded in the 1980's a number of ancillary buildings have been lost. The Water Softening Building is a structure of great local significance and designation may be the impetus for its survival until it full potential can be achieved.

[25] (Pennsylvania Historical and Museum Comission 2012) 24

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