# PENN VALLEY CONSTRUCTORS, LLC

"Partners in Excellence"

*ISSUE XLVI*

Since 1933

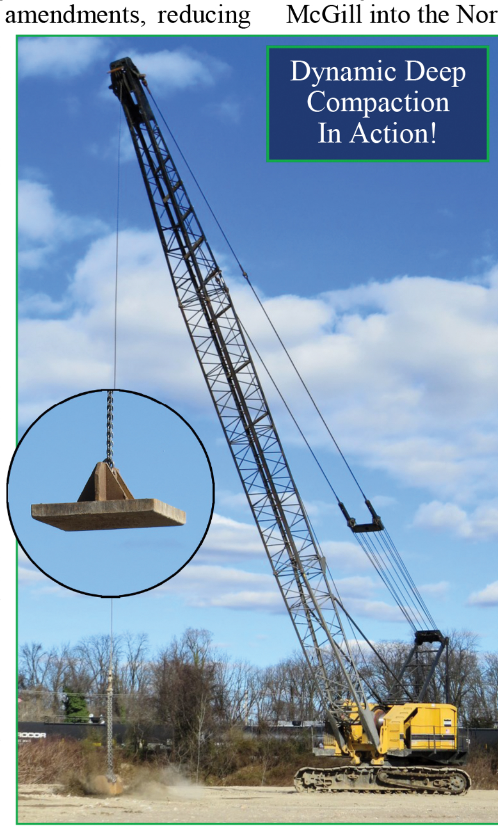

## McGill Compost—A Big, Muscular Building

**By Jon Otto w/ Noel Lyons**

McGill Environmental was founded over 30 years ago by Jim McGill, an Environmental Science graduate from Rutgers University and Noel Lyons, both originally from the same small town in Ireland. Long before sustainability became a trend, McGill built a business rooted in the principles of the circular economy, emphasizing that all organic waste comes from the earth and must be safely returned to rebuild the soil.

Environmental stewardship and sustainability are not just values at McGill – they are core to the business. Using patented composting technology, McGill transforms organic waste into valuable soil amendments, reducing landfill reliance while enhancing soil health. Through continuous investment in design, innovation, and sustainable practices, McGill strives to lead in composting solutions that benefit both the community and the planet.

From modest beginnings in eastern North Carolina, McGill now employees 200 people and operates across six east coast states. Whether through its composting services or its compost products, McGill creates opportunities for industry, municipalities, and individuals to be green and do so in a cost-effective manner. Customers range from municipalities – large and small, landscapers, golf courses, Fortune 500 companies, homeowners, and farmers. In addition to improved soil health benefits of McGill compost products include reduction of chemical and commercial fertilizer use.




To date, the company has recycled seven million tons of organic waste, producing over five million cubic yards of compost and soil amendments. Additionally, McGill annually recycles close to half a million cubic yards of wood into mulch products.

While historically composting in the United States has been an outdoor activity, McGill has evolved its composting design towards a more enclosed and controlled environment. The Fairless Hills facility marks a significant advancement for both McGill and the industry and an important geographic expansion for McGill into the Northeast market.

In August of 2016, shortly after McGill Environmental started to investigate the feasibility of a project in close by Fairless Hills, Pennsylvania, their president, Noel Lyons, reached out to Penn Valley to arrange a visit to our office located less than a mile from the site under consideration. They were just starting a very complicated permitting process which they told us would take longer than a typical permit. This proved to be very much the case. While we followed up with them periodically, they did not push our part of the project. Then, three years and one month later, on September 24, 2019, Kate Sullivan, McGill's project manager for the Fairless Hills project contacted us to arrange another meeting with Noel and her.

At the subsequent meeting held in October, we learned more about McGill's needs and the very exciting project they were planning


Dynamic Deep Compaction

for Fairless Hills. Based on other McGill sites in Ireland and the Southern US, Noel and Kate had developed a floor plan of a large facility of just about 124,000 square feet. The building was broken down into 3 major areas: a large open receiving and blending area of 28,000 square feet, composting bunkers and hallways of 70,000 square feet and the primary and final screening areas of 26,000 square feet. Although we shifted some of the interior flow and arrangements, these areas would not change in size during the development of the plans.

Noel and Kate already had a more or less fully designed site plan developed by Earthres Engineering of Pipersville, Pennsylvania. So, our initial focus was on investigating means and methods of construction and evaluating different construction types based on cost, schedule and durability. We partnered with architect Steven C. Tiberio, with whom we have worked for over 30 years and structural engineers, Leonard Busch Associates with whom we have worked for over 50 years(!) Both of these firms have extensive experience in designing complex industrial buildings.


Spread Footings with Rebar

As we started this process, everything changed very dramatically with the arrival of Covid in the late winter of 2020. Covid, of course affected everyone, but the construction industry was particularly hard hit. Unprecedented price volatility, particularly relating to steel products started in 2020 and continued through the duration of the project. Hand in hand with the volatile prices came extended and uncertain delivery schedules. Delivery of steel beams, normally at 8-10 weeks stretched out to 25 weeks and more. Bar joists went out to a year. Pre-engineered steel buildings went out to 30 weeks AND to fix a firm price, orders had to be placed for production without the normal protocol of approval drawings. Precast concrete wall panels and plank for roof systems which were initially the choice for significant parts of the project simply ceased to be a viable consideration as deliveries pushed out and prices danced up and down.


Crane Setting Engineered Form

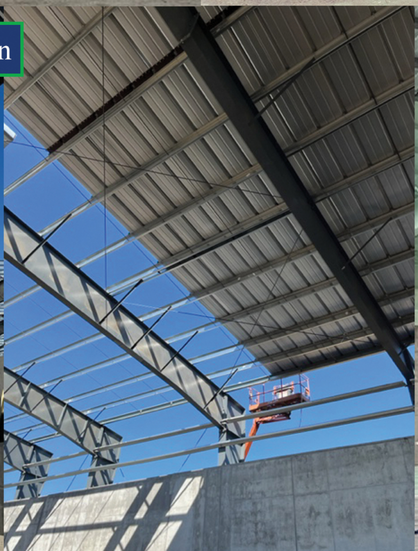
All these factors impacted both the schedule and the budget. As a result, we came up with a hybrid design most of which was supported on 20’ high cast-in-place reinforced concrete walls of thicknesses varying from 14 to 20”. For the 70,000 square feet of the building that housed the receiving and blending areas and the primary and final screening areas, we settled on a series of pre-engineered steel buildings that gave us the ability to provide long clear spans and to minimize the number of unwelcome interior columns. For the composting area, we settled on wall bearing beams, steel B deck and a TPO membrane roof system.

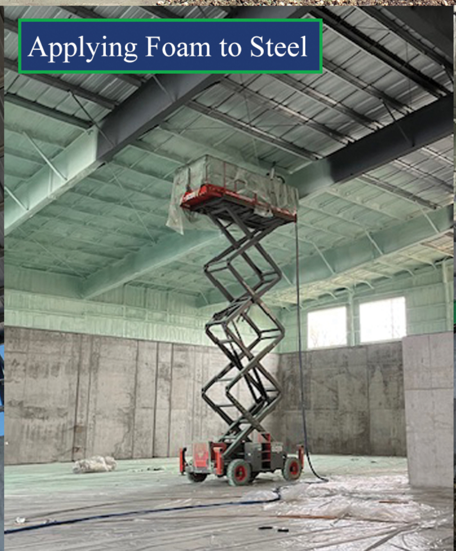
As we continued the design process, including special fire and safety considerations, Anthony Tartaglia, McGill’s head of construction got involved integrating owner supplied materials into the design. The permitting process continued slowly but finally in the fall of 2022 major site permits were released allowing us to move ahead. Noel and Anthony approved our construction contract, and we moved into the first phase of construction, soil conservation work and then soil densification.


Final Dressing of Compacted Pad


Concrete Pump Pouring Walls


Jack Beam at Screening



Blending Room Erection


Applying Foam to Steel


Duct Installation in Hallway


Finished Hallway and Ducts


Finished Blending/Receiving Area


Loading Compost Bays


Primary Screening Room


Air Distribution to BioFilter


Complete Facility Ready for Occupancy

Structural and Pre-engineered Erection in Progress

Soil densification on this site was necessary because fill had been placed to a depth of about 15 feet without proper compaction. The soil had to be compacted to avoid settlement or worse, differential (uneven) settlement. The method selected by the soils engineer was Dynamic Deep compaction. OK, so what the heck is that? Simplistically it involves dropping a heavy weight from a considerable height to a predetermined pattern, filling the holes, re-dropping, grading and testing.

When faced with this condition the soils engineer who is the professional making the recommendation on how to create a stable foundation has several choices, the first is deep foundations including various types of piles, caissons or geo-piers. These systems extend to a depth where the soil bearing is adequate to support the building which is in excess of 30 feet in this area. They all require pile caps, grade beams and reinforced slabs on grade. If it sounds expensive, it is. It is also time consuming. The second choice, if the poor soil does not extend down too deep or into the water table, is to remove all the soil down to a depth where the soil bearing is adequate and then either using the materials that had been removed or new structural fill to build the pad up under controlled compaction to the building subgrade. This is also expensive and time-consuming and will not work if the poorly consolidated soil extends below the water table. The third option is Dynamic Deep Compaction.

As briefly described above, a heavy weight (15 tons) is lifted by a 100-ton crane and dropped from a height of about 60'. The weight leaves a crater which is filled with stone or structural fill and the process is repeated in an area extending 20 feet outside the foundation line in, this case the area averaged 250 feet wide by over 600 feet long, until the soils are literally beaten into submission. In this case there were over 11,000 drops required to reach the desired soil bearing capacity. As with other methods, the soils are tested by an engineer and testing lab during the process and at completion, certified to the bearing capacity required. I call this the "Neanderthal method of compaction". It was also part of why we subtitled this newsletter as a "Big Muscular Building". When the weights hit the ground, you could feel the impact several hundred yards away. The impact is so great that it has to be monitored to ensure that neighboring structures are not damaged. During the process, no other trades can work in the building area.

Max Doors

First Batch in Blending Room

With the DDC completed in early March, other trades could move onto the job, most notably the concrete subcontractor. Brian Trabosh, our Estimator/Project Manager, chose Cavan Construction with whom we have enjoyed a 35 year relationship as our concrete contractor for the McGill project. Cavan has both the "Muscle" in equipment and experienced personnel and the technical knowledge to handle a serious concrete job like the McGill Fairless Hills project. For the next four months after the DDC was completed, **they were the job!**

Cavan brought two foundation crews to the site and started digging and forming the footings, installing the rebar and pouring the 4,250 linear feet of footings some of which were 10' wide and as much as 30" deep.

After the footing crews got far enough ahead, they were joined by the perimeter wall crew who tied rebar, installed the engineered forms, poured and vibrated the concrete for the exterior “push” walls. Soon that crew was joined by another wall crew that concentrated on the interior walls that separate the 20 composting “bunkers”. This is where the job really got “Muscular”. Ultimately, the structure would consume 370 tons of reinforcing steel and 9,600 cubic yards of concrete, nearly 1,000 truck loads.

As the bunker walls were completed and adequately cured, we started installing the 54,000 square feet of structural steel and deck which was the roof of the composting bunkers. The total weight of that steel was 120 tons.

Final Screening Area

As that operation continued, and footings were made ready, we started to erect the multiple pre-engineered steel buildings which were yet another “muscular’ aspect of the job. To minimize the interior columns, we utilized “Jack” beams which let us skip interior columns. Thus in the 225’ wide by 100’ long Blending Room, there is only one column. The other columns are replaced by two massive 50’ long by 60” deep 15,000-pound beams. This system was also incorporated in the primary and final screening rooms. The pre-engineered steel buildings totaled 70,000 square feet, reached heights of 45’ above finished floor and weighed a total of 638,000 pounds.

Next, the large crews required to prepare and pour the floor slabs moved on to the site joining the two wall crews and the two different steel erection crews. Concrete floor slabs 6, 8 and 10” thick were started as areas cleared of traffic, first the sloped slabs in the composting bunkers and then the heavy-duty slabs in the blending and receiving area.

At this stage the job was manned by 50 to 60 workers on a daily basis. Veteran Penn Valley Superintendent, Rich Traynor kept the job moving, kept the peace and most importantly kept the job site safe! By God’s grace, in the course of 15 months on the job, there were no significant injuries. Key to the project’s success was the close partnership among Brian, Rich and Anthony as McGill’s representative during the project.

With portions of the building getting undercover we started the next process, spray foaming the interior steel to protect it from the damp and mildly corrosive environment that would be created by the composting operation. We would use 5,500 gallons of foam and coat it with another 2,500 gallons of intumescent paint for fireproofing. As that operation progressed, we followed it with the very extensive system of ductwork consisting of over 3,800 linear feet of fiberglass duct ranging from 12” to 60” in diameter. This system distributes air within the building to control the temperature in the composting bays and ultimately delivers the air to the Biofilters where it is naturally filtered.

While the ductwork was being installed we also installed the twenty-one 29’ wide by 20’ high coiling fabric “Max Doors” which seal the individual composting “bunkers” and separate the interior primary screening area and the exterior covered final screening area.

With the completion of the doors and ductwork together with the fire alarm system and the lighting in early April of 2024, the building was ready for occupancy and the initial shipments of the raw materials that would soon be processed into natural compost. Now in operation, the plant will reach full production later this year, producing 100,000 cubic yards of compost annually. A muscular production coming out of a “Big Muscular Building!”

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Issue 46, January 2025

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