

Reuse of Problem-laden landfill

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HARBORSIDE INTERNATIONAL GOLF CENTER



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In 1991, the Illinois International Port District was faced with a requirement calling for the closing of a solid waste landfill that could not be used for industrial, commercial or residential development. The Environmental Protection Agency required that the site be encapsulated with a seal of impervious clay, planted and maintained with a covering of vegetation. The Port District elected to take the closure to the next level to achieve the site's highest and best use by developing a golf facility. This was the only use that would pay for its own maintenance and return an operating profit. However, due to the project's location in the industrial south side of Chicago, the local demographics could not support the expense of converting this brown field into a golf course. It would be necessary to tap the greater metropolitan area to "make the numbers work."



To achieve this goal, it was determined that the end product would have to be a "world-class" facility if it were to draw high-end golfers. Fortunately, the site nears I-94, I-57, and I-80, approximately 300,000 cars pass daily. It was deemed that access to the site outweighed the surrounding area and therefore, "build it and they will come" became the operative phrase.

The Harborside International Golf Center features a matched pair of 7,150 yard, 18 hole championship golf courses and a 58 acre practice facility, including a Golf Academy situated on 450 acres of sanitary and construction debris landfills. Provisions are present for a three-hole practice course. The golf course operates as a daily fee facility and was constructed from 1992 through 1995. Although the final cost approached \$30 million, the Port District does not have any taxing or bonding abilities and had to finance the project conventionally.

The site was originally used for the disposal of the City of Chicago's municipal solid waste. Later it was used to dispose of incinerator ash and wastewater sludge. The greatest challenge in the designing of Harborside was that the land consisted of a 200 acre partially closed sanitary landfill and an ongoing construction debris landfill located on the remaining 250 acres. Further complicating the task was that the site was devoid of any topsoil. The treated sludge, which was the only available cover material, would have to be brought to the site for a three-year period at 250,000 cubic yards per year until an alternate disposal site was found. The design had to incorporate the deliveries into the construction schedule.

The remaining 250 acres was about 30 feet lower and wrapped around the northern and western sides of Lake Calumet, an 800 acre lake which connects to Lake Michigan via the Calumet river. Non-organic, non-hazardous material (i.e. broken concrete, demolished buildings, bridges and roads, and general mixed dirt from excavation sites) covered this portion of the site. Therefore, an impervious cap was not required for this section. However, no sludge could be placed within a 300-foot buffer zone around the Lake Calumet shoreline. Three low grade wetlands had been formed in depressions of old fill operations. It was decided to relocate these to the upper section of Lake Calumet and upgrade them.

Harborside's fairways, greens and contoured bunkers were crafted in a pioneering use of wastewater biosolids carefully blended with other locally available materials. The solids were installed in a complex layering process to form a golf course out of the previously flat topography. The result is a sweeping links-style facility reminiscent of Scottish seaside courses with no trees whose roots might permeate the underlying clay cap. To obtain clay for the cap from the closest available source, and clear the way for a future marina, sections of the shallow north end of Lake Calumet were sealed off, drained and fish were seined and returned to the open water. Over 550,000 cubic yards of stiff blue clay was excavated with backhoes and large off-road trucks. This was placed in three compacted 8" lifts over the shaped sludge to form the 2-foot landfill cap.

The golf course irrigation system is extensive yet miserly in the use of water. The irrigation water is drawn from Lake Michigan and amounts are regulated by a multi-state commission. Drainage and irrigation systems were carefully designed to protect the integrity of the clay cap, with sensors and controls to manage storm water runoff and a special pump station to draw irrigation water from Lake Calumet while protecting against Zebra Mussel infestation.

Due to the close proximity of Lake Calumet, the project team worked closely with the Illinois Department of Fish and Wildlife, the Illinois Environmental Protection Agency and the Army Corps of Engineers. Since these agencies each have their own mandates, the solution to one edict sometimes was in conflict with one of the other agencies. By conducting joint meetings where all parties could put their issues on the table, a "big picture" was developed and through the interaction of the public and private professionals, solutions were developed which satisfied all parties.

First and foremost was protection and enhancement for wildlife. Chicago and Cook County have set aside vast tracts of land for parks and forest preserves. Being part of the northern flyway, work on the excavation of the Lake was not allowed during migration periods. Staff members of Fish & Wildlife culled the desirable game fish from the undesirable rough fish when the sections were drained. Wetland mitigation was planned which would add to and enhance the overall ecosystem of the area.

Water quality was also a driving design parameter and the site drainage system became a critical element in the sculpturing of the golf course. Because the 200 acre landfill was to have a two foot layer of sludge placed over the clay cap, it was required that all storm water runoff be contained within the site. However, since this water had to be taken to one of two sanitary inlets, only amounts less than a 5-year storm event could be discharged into the Metropolitan Wastewater Reclamation District's sewer system. The golf course architect and the engineer collaborated in the design of an elaborate drainage system where all site drainage is collected and stored at seven dry detention locations within the site and routed back to a sewage treatment plant for processing.

The wetland issues were twofold. First was the "two for one" relocation and upgrading of the three small, low-grade wetlands in the construction debris fill. While this was not a necessity for the golf course, it was determined that incorporating the mitigation into the shallow end of Lake Calumet would allow for a synergistic upgrade of the entire ecosystem. This was achieved by creating an 8-1/2 acre peninsula in the lake. To offset the filling of one section of the lake, an equal amount was excavated in another section that was deep enough for fish to over-winter.

The second wetland issue was the protection of the existing wetland sections of the lake. These were located in the northern most reach of the lake and adjacent to No. 16, 17 and 18 on the Port course. Being old fill sites, these wetland areas are emergent in nature. A buffer was created to protect them. However, due to the expanse of the shoreline affected, several different solutions were incorporated to create an aesthetic system, which emulates what is found in nature. In the area adjacent to No. 16, deep water was excavated between the golf course and shoreline wetland No. 17 is a sharp dogleg left and has an additional 40-foot wide beach, which begins at the tees and wraps around the entire left edge of the fairway. The sand transition buffer then continues along the No. 18 tees, up to the first landing area of the par 5 hole. At this point, the wetlands end and the fairway was filled 8 to 10 feet, so drain basins could be incorporated to prevent any storm water from Rowing into the lake.

Perhaps the biggest dilemma from the outset was "how do you grow not just grass - but turf - on a 450 acre site that is completely devoid of topsoil or any other acceptable growing medium." The solution was found in the very item that was being disposed of on the site. Every year the Metropolitan Wastewater Reclamation District trucked 250,000 cubic yards of sludge to the site. Sludge is the end product of the sewage treatment process. As such, it is very organic in nature but has high levels of fats and salts. The result is a medium that, due to its high salt content, draws water out of plants and will not readily saturate. To help remedy this, a 6 to 8 inch layer of sand was placed over the fairway. This tapered to 4 inches in the roughs and 2 inches on the mounds in the outer roughs. The trenching of the extensive under network of a wall-to-wall irrigation system and drain tiles brought up enough sludge that, when final raking operations took place, an acceptable amount of organic material was present in the sand layer. In fact, virtually no fertilizer was needed and the grass grew so fast that it was hard to keep it cut.

SUMMARY - The development of the whole site was an environmental undertaking from its very inception. The site itself was the prodigy of the old practice of filling water bodies with by-products of urban civilization. Not only did this project have to finish what others had started decades ago; it had to do so in a manner that would:

- Right some of the environmental wrongs perpetuated on the site.
- Enhance the overall ecosystem of the area.
- Create a self-sustaining, world-class golf facility without the use of any public monies.
- Together with the Historic Pullman Preservation District, provide the nucleus for urban renewal and neighborhood upgrading.
- Establish the cornerstone for revitalizing an economically depressed area.
- Develop a solution to utilize urban sewage sludge to remediate the brown field site that contained no viable soil-growing medium.