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Independent Verification Report

Golf Facility: Yulin Desert Links Golf Club
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Executive Summary

I arrived at Yulin Desert Links at 10:30 am. on May 13th in 2019. Firstly, I met and talked with course superintendent Mr. Jianzhong Meng, general manager Mr. Wenbin Jia, and course designer Mr. Jun Lu. Through deeply communicating, I collected and fully learned about the information and datum for this verification. And then, accompanied by Mr. Meng, I visited the temporary club house, maintenance center, staff dormitory, pump station and water treatment station, and viewed the course hole by hole. I also chat with owner of the club, Mr.Zi, to learn the history, current status and direction of development of the club and got more information that helpful for the verification.

Mr. Jun Lu, course designer, provided me with design plan and explanation documents of reconstruction. The golf course was built in 2010, opened up in 2011. Due to the exchange of owner, in 2015, it was rebuilt, completed in 2016. The course was designed and built by following general guidelines of GEO environmental sustainability. I learned from the site that green and sustainable management features of the course are mainly reflected in the followings:

Nature

Much of the course remains a natural sandy landscape and plant. The areas except tee ground, fairway and green are kept as nature areas, no cutting, irrigation, fertilization and other maintenance. These areas have similar vegetation types with the natural areas outside the course, mainly are sandy vegetation, the plant species including Artemisia sphaerocephala krasch, caragana, cotton canopy, ice grass, sand cover, salix, caragana korshinskii, and so on.

The reserved natural wild areas between different holes connected together by ecological corridor – back areas of tees and greens, protecting the habitat of wild animals including hare, fox, pleasant and wild bird.

The turf area of the course before the renovation was greatly reduced, and the turf area before and after the renovation was reduced by 30%. Another 4500 square meters of fairway turf was reduced in winter2018 and spring 2019.

Irrigation water source of the course is waste water from coal mining called sulfur dry water, are used to irrigate turfgrass after being filtered. The irrigation system used in the course is advanced automatic irrigation system, and the spray radius of the nozzle is adjustable to save water and avoid excessive irrigation damage natural sandy landscape.

The course had eliminated the artificial hardening of the driveway, and is paved with permeable stones, which is more harmonious with the natural landscape.

The course takes it as its responsibility to protect the natural habitat; Fully understand the importance of protecting vegetation in desert areas and the national policy of desert governance.

In the winter of 2018 and spring of 2019, the course reduced around 4500 square meters turf at none-landing area in fairways of 10th, 11th, 13th, 14th, 16th, 17th and 18th hole and keep these area to recover into natural area.

In rough areas which are far away from the fairway and on the steeper hills, I suggest to set ecologically sensitive regions to prevent players from treading on vegetation and destroy it when they looking for their golf balls.

The course taken measures to protect the natural ecological environment when constructing and maintaining: Avoiding over watering in rough areas in natural landscape; Planting and maintaining local wild plants; Clearing over grow wild plants once a year; Building bird's nest and osier cage to provide homes for wild animals; Salix branches used to make dams to prevent wind storms and fix sand to protect natural landscape.

They haven't established a formal management plan for wild environment, I suggested that they should establish this as soon as possible.

American artemisia sphaerocephala krasch is an invasive species, during its blooming season, it will make people allergy. The course controls it by pulling to enhance growth of local artemisia sphaerocephala krasch. The course collects seeds to plant ice grass to protect it.

I communicated with designer Mr.Jun Lu and course superintendent Mr.Jianzhong Meng about turfgrass seed selection. The golf course is located at north latitude 36 degrees, 57 minutes to 39 degrees, 35 minutes, east longitude 107 degrees, 28 minutes to 111 degrees, 15 minutes, at an average altitude from 1000 to 1200 meters. It is temperate semi-arid continental climate. It locates in sand and grass beach area at the southern margin of Maowusu desert. The annual average rainfall is 400mm, sunshine is 2600 to 2900 hours. The average temperature of the whole year is 8 ℃. In summer, high temperature time is short, temperature difference between day and night is large, the temperature between 35℃ to 36℃ is generally 7 to 10 days, and the temperature at night is around 20℃. Winter temperature is low, soil freezing time is a long, generally in around 3 months. Choose cool-season turfgrass is more appropriate. Kentucky bluegrass was used in semi rough, fairway and tee area. Creeping Bentgrass was used on green. The selection of these turfgrass species is more suitable for local climate and soil conditions, easy to maintain, less disease occurrence, and can reduce the use of pesticides. In some areas of the course has also tested the cold-tolerant and drought-tolerant purple fescue, and introduced the local salt-tolerant ice grass. It is expected to increase the

diversity of turfgrass species, increase the ability of the turfgrass to adapt to local environmental conditions, and reduce maintenance.

The course is located at the edge of the desert, and the soil is sandy. The turf maintenance uses appropriate amount of N/P/K compound fertilizer to ensure the nutrition of the turf every year. Recent soil test results show that the organic matter content in sandy soil grown in the turf increases, which improves the soil structure and improves the ability of soil to retain water and fertilizer. It is suggested to increase the use of organic fertilizer to further improve the soil structure of the turf.

In 2018, total N fertilization rate is 8.8g each square meter on green, and the average amount of N fertilizer per application is 1.3g each square meter. For the winter dormant bentgrass green, the N fertilization amount is slightly lower than average level. At present, the course does not completely refer to the results of soil and turf plant testing to guide the use of fertilizer, but mainly based on experience and amount of grass clippings to determine the time and amount of fertilization. A soil nutrient analysis of greens, tees, and fairways tested in October 2018 was provided. It is suggested that regular analysis and testing of turfgrass nutrients should be conducted as one of the guidelines for proper fertilization.

The weeds in the course are manually removed without use of herbicides. During the high incidence of disease, the course reduces the amount of pesticides by increasing coring and topdressing sand to control disease development.

The treatment of pests and diseases in the course follows the principle of prevention. By controlling irrigation and fertilization, it avoids the excessive growth of turfgrass during the peak period of pests and diseases, to reduce occurrence of pests and diseases. When the disease occurs, physical processing is first used, and the chemical agent is used only when the comprehensive quality of turf is unacceptable. Through good communication, the owner also accepted the maintenance using less water and fertilizer, and accepted the relatively dry fairway. In addition, the club currently has relatively small number of golfers, and it also provides conditions for not use of chemical agent to control pests and diseases.

The course is equipped with professional spraying equipment; the operators have been professionally trained and equipped with safety protective equipment during operation, and there are special sites for cleaning machine and turf area for disposal residual after the operation.

The club has formulated comprehensive emergency plans for accidents (including mechanical oil spills), respond to unexpected problems in a timely manner, and reduce negative impacts on the environment. Since the bank of water body is narrow and there is no high grass buffer.

I suggested to set up high grass buffer at the edge of water bodies in the course.

The amount of fertilizer used on the course has been reduced to keep it from seeping into the ground.

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The domestic sewage in the clubhouse and living area is discharged into the septic tank, and the kitchen waste water is discharged into the grease trap, which is regularly cleaned by the environmental protection company; the domestic garbage is cleared daily by the garbage removal company.

The maintenance centre has a special site for flushing turfgrass machinery, flushing sewage into septic tanks, and has special warehouse for temporary storage of waste oil, pesticide packaging and other hazardous waste, which is regularly transported by hazardous waste treatment company. Pesticides and fertilizers are separately stored in isolated warehouses. Fertilizers and pesticides are packaged in a completely sealed package. The loading and unloading and mixing of pesticides and fertilizers are mainly done by machinery. The warehouse floor where hazardous wastes are stored is professionally treated with anti-seepage treatment. There is a dedicated area for triple cleaning pesticide tanks and spray equipment.

Through on-site inspection, I confirmed the following contents:

- The use of chemical products such as fertilizers and pesticides has a special record
- Hazardous materials such as oil and pesticide packaging have special storage warehouses, which have anti-seepage and ventilation conditions, and have special storage records
- The gas station is equipped with a fire extinguishing device, which is inspected regularly
- The club has an accident emergency plan, and a special treatment area is provided
- A special cleaning area for maintenance equipment is set, and the sewage is discharged into the septic tank
- The club signed legal contract with a professional company to clean the septic tank

I confirm by on-site checking: sewage is discharged into the septic tank, and the septic tank is cleaned by professional and legal companies. The main treatment of sewage is a simple sedimentation treatment on the site.

Resources

The course uses a central controlled automatic irrigation system that only irrigates the tee, fairways and greens, and does not irrigate outside of turf. As the area of turfgrass decreases, the amount of water used for irrigation is also decreasing.

The course uses a combination analysis of data of soil moisture meter TDR, automatic weather station and sensory indicators to determine the timing and duration of watering; the central control software used is Rain Bird Nimbus II, each irrigation point is controlled by a decoder; Angle-adjustable nozzles prevent water spray to non-turf areas; irrigation pump stations and nozzles are well maintained; in addition to irrigation system watering, course superintendent also attaches great

importance to local artificial hydration, and also pays more attention to the use of penetrants to improve Water efficiency.

I checked the club's list of domestic water costs, which showed the decrease water usage in last two years. The club paid great attention to water conservation. At each water intake place, sensor taps are used and publicity logos for water conservation are posted. Water consumption in 2018 was less than it in 2017.

The irrigation water source of the course is treated coal mine wastewater, which solves the problem of wastewater discharge generated by local coal mining. The course sets up special water treatment equipment to re-treat the wastewater and use it to irrigate turfgrass, not only saving water, but also ensuring safely drain the waste water through turfgrass purification. The clubhouse uses tap water for drink and treated waste water for flushing and shower. Water usage of the club is regulated and supervised by local government.

Since course reconstruction, the course has hammered at reducing the area of maintained turfgrass and increasing natural area. The area of turfgrass has been reduced by 30% compared with that before the reconstruction, and fairway turfgrass has been reduced 4,500 square meters this spring. Correspondingly, the energy demand for mechanical fuel, irrigation electricity, etc. is reduced. The course has made plans to continue to increase the area of natural low maintenance areas.

I checked the club’s electricity bill invoice. All the lighting of clubhouses and staff quarters use low-power LED lighting facilities, and each lighting switch has a reminder to save electricity. In winter, club house use new heating materials, can save more energy compared with traditional heating facilities. Double glazing is used in the clubhouse windows to increase thermal insulation and save energy.

The club currently has two new energy electric vehicles; two mowers is with hybrid power.

I suggested the club to add solar water heating equipment for bathing to further reduce power consumption.

In the operation of the club, the use of disposable articles has been basically eliminated, and the items that can be recycled are replaced; the bathing water is treated with deep-treated coal mine wastewater; the dam used for wind and sand fixation on the course is made from local sand willow branches and can be recycled.

I have learned about the club’s purchasing situation. The club sticks to the principle of comparing goods and chooses durable and environment-friendly products; Mainly local purchase according to material requirements; Centralized procurement of bulk commodities to reduce costs.

The club house bathing water and the course irrigation water are all treated wastewater; the garbage bins in the course and the clubhouse are classified and collected to collect garbage for recycling.

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I checked and confirmed its wastewater treatment agreement, waste disposal agreement, and related invoices.

Community

From 2016 to 2018, the club held fellowship activities with the circuit near the course every year. Race car drivers visited the course to learn about golf.

Every year, the club works with the schools in Yulin City to organize activities, 100 to 200 primary school students come to visit, 15 to 20 college students come to the internship.

The club's driving range, putting course and football field are free to the public.

The club hosted the GCMC Desert Tour Golf Tournament.

The club hosted the Guangdong Women's Mulan Team Competition;

The club donated supplies to flood areas in 2017 and 2018, and donates money to poor people in the surrounding areas every year. Till now, the club made donation 12 million RMB for schools establishment, 800,000 RMB for supporting college students.

Golf has just taken off in the local area. Every year, there are 2,000 to 3,000 golf play rounds in the club, among which 50-60% are tourists. The good effect of golf on people's mind and body is being gradually recognized.

At present, there are no members recruited for the club. Some of the facilities of the club, include driving range, putting course and football field are free to the public. The club plans to receive mainly tourist golfers, and no membership.

At present, the club has 50-60 employees, and hires seasonal workers from May to September in the peak season. Employees are employed in full accordance with national regulations, professional and vocational training for employees, and welfare social security is fully guaranteed.

The club has no publicity. It only promotes the club's sustainable development concept by receiving daily players and a few activities, such as the GCMC desert tour.

The owner, Mr. Zi attaches great importance to the environmental protection and sustainable development of the club, actively participates in relevant activities of GEO and supports GEO environmental protection activities.

I suggested that the club can open more to the society, patiently promote golf, let more people understand the nature of the course's pursuit of naturalization, and understand the concept of sustainable development of golf environmental protection. And the club can cooperate with scientific research institution to study the purification

effect of golf course turf on coal mine wastewater and promote society to understand the environmental protection role of golf.

Conclusion

After on-site investigation and communication, I think that the club has achieved outstanding results in terms of naturalization of the course, pollution control, resource conservation and effective use. Although there are some shortcomings in community interaction and promotion these deficiencies have something to do with the fact that local golf has just taken off and also there is no supporting real estate community.

The club has a number of highlights:

- The course establishes water treatment facilities, uses coal mine wastewater to irrigate turfgrass
- Use treated wastewater for bathing and other domestic water
- Reduce high maintenance turf area, expands natural area
- Use angle-adjustable nozzles to reduce irrigation area
- The willow branches are used to prevent wind and sand from the dam
- The permeable material is used to build the cart path and make it harmony with natural environment
- The classified garbage bins are used in the stadium

Some inadequacies are found on site, the club has made adjustments and corrections in time, and the club has made long-term adherence development plan.

In view of this my recommendation for the club to achieve GEO Certified® is: **Approved.**