Final Environmental Impact Statement
for
Proposed Kohler Golf Course

Sheboygan County

January 2018

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

To the Reader

This document is an environmental impact statement (EIS) prepared to fulfill part of the requirements of the Wisconsin Environmental Policy Act (WEPA), Wis. Stat. 1.11, and Chapter NR 150, Wisconsin Administrative Code. The purpose of an EIS is to inform decision makers and the public about alternative courses of action and the anticipated effects of those alternatives on the quality of the human environment that could result from department actions—in this case the permitting and other decision actions related to the construction and operation of the proposed Kohler golf course and associated access and facilities, in Sheboygan County.

Kohler provided the Wisconsin Department of Natural Resources (the department) with an environmental impact report in March 2015, and has continued to provide the department with a variety of other environmental reports. In July 2015, the department held a public scoping meeting at UW–Sheboygan, to kick off the EIS process and give the public an opportunity to state what they felt the EIS should address. Approximately 200 people attended the scoping meeting, and 31 provided oral comments.

In June 2016, the department released a Draft EIS for public comment and held an informational hearing on the Draft EIS on July 20, 2016, at Sheboygan Falls High School. Approximately 200 people attended the hearing, 48 of whom offered oral testimony. All written comments received during the public involvement process were reviewed and made available on the department's Kohler golf proposal web page.

Due to substantial new information that became available regarding the project between mid-2016 and 2017, the department decided to prepare an updated draft EIS and put that document out for public comment in November 2017. and held a public hearing on November 30, 2017, at UW-Sheboygan. Approximately 90 people attended the hearing, 27 of whom offered oral testimony. All comments received during the public involvement process were reviewed and made available on the department's Kohler golf proposal web page.

In preparing this Final EIS, the department considered all of the comments received from the public during the process.

Please note when reading this document that certain details on endangered resources may have been redacted to comply with state law. As part of any project review, the Endangered Resources (ER) Review may contain Natural Heritage Inventory data and information (including specific locations of endangered resources) which are considered sensitive and are not subject to Wisconsin's Open Records Law (per s. 23.27, Wis. Stats.). The information contained in an ER Review is solely for planning and implementation of a proposed project, and by law shall only be shared with individuals who need the information to carry out specific roles in the planning and implementation

of a proposed project. As such, the information in this EIS may not have all the details included in the formal ER Review documents for the proposed project.

As you read this document, you can find additional information and direct access to the figures and tables by following the hyperlinks throughout the electronic version of this document. After following a hyperlink, you may click “Alt + left arrow” to return to your place in the document.

Information about the proposed project is available at the department’s project web page: http://dnr.wi.gov/topic/eia/kohler.htm. Contact Mike Thompson, DNR Environmental Analysis Program Supervisor, (414) 303-3408, for more information. Media contacts should be addressed to Jim Dick, DNR Office of Communication Director (608) 267-2773.

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1 Project Overview

Kohler Company (Kohler) proposes to develop an 18-hole, daily-fee public golf course, a clubhouse, and support amenities (the Project) on 247 acres of undeveloped private land (the Kohler Property) on Lake Michigan frontage adjacent to the northern boundary of the John Michael Kohler and Terry Andrae State Parks (Kohler-Andrae) in Sheboygan County (Figures 1, 2, & 3). A maintenance facility and the access road to the golf course are proposed on state land within Kohler-Andrae, and Kohler is currently requesting an approximate five-acre easement from the Wisconsin Department of Natural Resources (the department).

1.1 Project Description in Brief

Kohler has proposed to complete the Project on the Kohler Property, between the Black River and Lake Michigan, and on approximately five acres of state land within Kohler-Andrae, north of Beach Park Road. In addition to an easement on land within Kohler-Andrae, the Project would require federal, state, and local permits.

The Project would involve tree removal, wetland filling and grading, and possibly a high capacity well to create 18 holes for golf, a new restaurant/clubhouse and parking lot, an approximate 5.7-acre irrigation pond, a driving range, and associated cart paths and trails. All users of the golf course and Kohler-Andrae would use an entrance off of County Rd V at 12th Street, utilizing the existing two-lane bridge over the Black River. After crossing the bridge, a roundabout is proposed to allow state park traffic to go to the contact station and golf course traffic to travel north on a newly created entrance road. Exiting traffic from both the golf course and Kohler-Andrae would use the roundabout. In addition to the new access road, a new maintenance facility for golf course equipment and staff would be constructed on Kohler-Andrae property near the location of the current park maintenance buildings.

1.2 Project Purpose

Kohler's Project goals are to build a world class 18-hole public golf course on the shores of Lake Michigan that is rated in the top 50 golf courses in the world, while preserving

the natural beauty of the site and incorporating the existing aesthetics into the course design. The course is planned to be similar in stature to the Straits course at the Whistling Straits facility, also owned by Kohler. The golf course, restaurant, and clubhouse would be open to the public.

2 Authorities and Approvals (Federal, State, and Local Permits or Approvals Required)

The location and scope of the Project would require permits and approvals from federal, tribal, state, and local authorities as summarized in Table 1.

Table 1: Anticipated Permitting Requirements for the Project

AGENCY	INTEREST OR PERMIT
U.S. Army Corps of Engineers	Section 404 Clean Water Act Permit for Discharge of dredge and fill materials into waters of the United States
National Park Service	Conversion of Land and Water Conservation Fund Act Lands (LAWCON)
U.S. Fish and Wildlife Service	Federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MTBA)
Federal Emergency Management Agency (FEMA)	Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LMOR)
Wisconsin Department of Natural Resources	s. 281.36, Wis. Stats., and Ch. NR 103, Wis. Adm Code wetland fill permit
Wisconsin Department of Natural Resources	Chapter 30, Wis. Stats., Permits for Dredging, Ponds, Shore Protection
Wisconsin Department of Natural Resources	s. 29.604, Endangered and Threatened Species Protection
Wisconsin Department of Natural Resources	NR 151/NR216 Construction Site Storm Water Discharge Permit (s. 283.33, Wis. Stats.)
Wisconsin Department of Natural Resources	High Capacity Well Permit (s.281.34, Wis. Stats., Chapter NR 812, Wis. Adm. Code)
Wisconsin Department of Natural Resources	Easements and potential LAWCON conversion, including potential Natural Resources Board Approval
Wisconsin Department of Natural Resources	Potential tribal consultation under Executive Order #39
State Historic Preservation Office	Archaeologic Consultation
Sheboygan County	Shoreland-Floodplain Conditional Use Permit, Sanitary Permit, Shoreland-Wetland Rezone, Erosion Control Permit, County Cutting Notice per ss. 26.03
City of Sheboygan	Conditional Use Permit, Storm Water Permit, Erosion Control Permit, Building Permit, Architectural Review Board Approval

3 Project Description

3.1 Proposed Golf Course Features

Course Layout

The 18 holes for the golf course are proposed to be located on the Kohler Property (Figure 1). An approximate 5.7-acre irrigation pond is planned in the northern portion of the Kohler Property, while the practice range is planned to be in the southern portion. Tree cutting would open corridors to allow for views of Lake Michigan. Approximately half of the trees on the Kohler Property would be removed. The proposed layout of the course is designed with the first 9 holes starting from the club house, proceeding west, then north, and finally back along the lake to the clubhouse. The second 9 holes mirror this design to the south.

Clubhouse

A multi-level clubhouse is proposed to be between 13,000 and 16,000 square feet in size and consist of areas designated for indoor/outdoor dining, bar, locker rooms, retail, and banquet room. The clubhouse building would be designed to be eligible for Leadership in Energy and Environmental Design (LEED) certification.

The restaurant in the clubhouse would be available to the public and would open in spring and remain open through the New Year's holiday season. The dining area could accommodate approximately 60 interior dining seats and 50 exterior dining seats. The banquet room would have a capacity for approximately 70 people for special events. A Lake Michigan observation tower would also be accessible to guests.

A parking lot located near the clubhouse would accommodate approximately 280 guest vehicles at full capacity (Figure 19).

Maintenance Facility

The maintenance facility is proposed to be constructed on Kohler-Andrae property in the vicinity of the current state park maintenance buildings (Figure 19, Figure 22).

The maintenance facility is planned to include approximately 22,000 square feet of building space. Functions within the maintenance facility would include administrative offices, locker rooms, equipment storage, equipment wash and repair, and a dedicated self-contained area for storage, mixing, and loading of herbicides, pesticides, and

fertilizers. A closed loop system is planned for the equipment wash that would capture, filter, and re-use water from the wash area.

Entrance Road

Entrance to the golf course for all users would be through Kohler-Andrae property off County Rd V at 12th Street, utilizing the existing 2-lane bridge over the Black River. After crossing the bridge, a roundabout would be created to allow Kohler-Andrae traffic to go to the contact station, and golf course traffic to travel north on a proposed new entrance road through the Kohler-Andrae property. Exiting traffic from both the golf course and park would use the roundabout.

The access road and maintenance facility placement would require an easement from the department on approximately 5 acres of land, some of which is currently dedicated to park maintenance.

Utilities

It is anticipated that utility (gas, electric, and communications) service connections would be extended from existing facilities. Kohler has proposed to utilize Horizontal Directional Drilling (HDD) and a designated utility corridor to minimize wetland impact during the installation of electric, gas, and communication utilities (Figure 23). The utility crossing will result in changing the wetland type from forested to wet meadow and will result in 0.03 acres of temporary impact.

On August 7, 2017, the Kohler Property was annexed to the City of Sheboygan and Kohler will pursue use of municipal water for potable and irrigation water. The specific locations of the new water and sanitary lines have not been determined, however, they would likely follow a similar path to the other utilities. Some of the utility work would require an easement from the department to cross state lands.

3.2 Construction Sequencing

Commencement of the Project is anticipated to begin with selective tree removal and construction of the entrance road and roundabout followed by phased construction of

several holes. The maintenance facility and irrigation pond would also be constructed early in the development to support the ongoing course construction. The current scope of the Project includes construction and stabilization of nine holes each year and that the overall development will take approximately two years to complete.

3.3 Operations

3.3.1 Hours of Operation

The golfing season begins in spring and ends in fall with dates and times varying based upon weather conditions. During the season, golf play typically takes place from sunrise to sunset. Maintenance activities could begin as early as 5am. In-season dining would be available daily from 6am to 10pm with extended bar service. The restaurant and retail area is currently planned to be closed from January to the start of the golf season. At the close of the golf season until the New Year, the restaurant is proposed to be open Thursday through Saturday with hours of operation from 11am to 9pm.

Kohler-Andrae State Park is open year-round. Day use areas are open from 6 am to 11pm. Other users, including hunters, fisherman, and campers are allowed in the park at any time.

3.3.2 Special Events

Kohler's has stated that is their goal is to develop a golf course that is of similar caliber to its Whistling Straits facility located north of the City of Sheboygan. Kohler has stated that it hopes that the proposed course will be a site for future major professional golf championship events, though no details on the timing, magnitude, or plans for managing those events are available at this time.

Specific plans for the management of large crowds and coordination of traffic and emergency response to the Kohler and Kohler-Andrae Properties during special events have not been discussed to date.

3.3.3 Nutrient Management

Kohler has proposed use of an Integrated Golf Course Management Plan (IGCMP) which is designed for use near waterbodies and wetland areas. The goal of this type of fertilization program is to develop a healthy root system that promotes healthy turf which

is able to withstand wear and traffic, reduce the potential for lateral soil and nutrient transport to adjacent waterbodies and wetlands, and increase the plant's efficiency in use of natural and applied nutrients.

3.3.4 Pest Management

Pesticides include insecticides, herbicides, and fungicides as well as any substance used to control plant growth and pests. Kohler has proposed use of an Integrated Pest Management Plan (IPM) that can reduce pesticide usage by 30% or more and can also develop turfgrass that increases population of beneficial organisms and natural enemies to pests. The control methods used are based on pest populations and are not governed by spray intervals and calendar dates. Implementation of an IMP can reduce pesticide use, leaving pesticides as a last resort.

3.3.5 Water Use

In August 2017, the Kohler Property was annexed to the City of Sheboygan, and Kohler will pursue use of municipal water for potable and irrigation water. Prior to the annexation, water use for the Project, including potable water supplies as well as a non-potable supply for golf course irrigation, were anticipated to be obtained from wells. The source of water will be dependent on negotiations with the City of Sheboygan.

4 Project Alternatives

4.1 No Action

No Action - The proposed golf course would not be built and the Kohler Property would be left in its current undeveloped condition. During environmental impact statement scoping, commenters asked the department to consider a no build option where the proposed golf course would not be built and the site would be left in its current condition and donated or sold to an entity who would manage the site as a public space. Kohler is not obligated to donate, grant lake access, or sell its property. As such, the no build and no action alternatives are the same. If the proposed project is not constructed, then none of the environmental or economic effects described in Chapter 5 would occur.

4.2 Build Alternatives

Different Location/ Enhancement of Another Kohler Owned Course –
Kohler completed a GIS-based search for comparable properties with a search area defined as a half mile inland from the Lake Michigan shoreline within Sheboygan County. No comparable properties were found that matched Kohler's criteria.

Some Other Type of Development - As property owner, Kohler can determine – within environmental compliance and local zoning standards - whether, and how to develop the site. In 2011, Kohler proposed to develop an upscale camping facility on the Property but eventually decided not to pursue that venture.

Nine Hole Golf Course - During environmental impact statement scoping, commenters asked the department to consider an option to construct a nine-hole golf course with less environmental impacts than an 18-hole golf course. Park easements for the access road and flood plain, and possibly the maintenance facility, would still be needed for a nine-hole course. A nine-hole course would not meet the applicant's Project purpose.

Access Road Alignment Options – A new access road would be required for the proposed golf course. Options evaluated for access to the golf course included: coming

from the south through a shared access with Kohler-Andrae's main entrance; coming from the west off CTH V (South 12 Street) crossing Kohler-Andrae land and the Black River; and coming from the north through the existing Timberlake residential subdivision.

Kohler selected access from the south as their preferred option after considering the larger parkland easement and new Black River crossing that would be required if access came from the west, and to avoid the traffic impacts to the Timberlake subdivision if access came from the north. There are 26 residential properties in the subdivision and another 44 along the route linking it to CTH V.

Each of the alternatives evaluated for coming from the west, off CTH V (South 12 Street), would involve: a new crossing of the Black River floodplain forest resulting in 14 to 18 acres of wetland fill and fragmentation of the forest wetland area; a new bridge crossing of the Black River; and an easement to cross state land.

Alternative Golf Course Layouts

A total of sixteen alternatives have been considered and are described below. Each of the 18-hole golf course alternatives includes an access road, maintenance facility, and golf course development. Each alternative shows various configurations that were evaluated for location of holes with varying par designations, fairway widths, and hole lengths. The current proposed alternative (F-4) would have the least amount of direct wetland impacts resulting from fill, avoids impacts to recreational areas of Kohler-Andrae, and avoids archaeologically significant areas, including burial mounds.

Alternative A

The Alternative A (Figure 10) course layout design would be a near maximum build-out which would expand to the northwest within close proximity to the burial mounds, to the east on the beach adjacent to Lake Michigan, to the south on Kohler-Andrae property, and to the west within the Black River floodplain. The entrance route would originate on South 12th Street, and traverse the southern part of the Kohler-Andrae property crossing wetlands and the Black River. The proposed maintenance facility would be

located in the west central portion of the Kohler Property, north of the entrance route within a northern mesic forest. This alternative would require an easement of more than 32 acres from the State of Wisconsin and would result in approximately 14 acres of direct wetland impact from placement of fill.

Alternative B-1

The Alternative B-1 (Figure 11) course layout design would be a near maximum build-out within the existing Kohler Property, expanding to the northwest within close proximity to the burial mounds, to the east on the beach adjacent to Lake Michigan, to the south adjacent to the Kohler Property boundary, and to the west within the Black River floodplain. The entrance route would originate on South 12th Street, further north than Alternative A, and would traverse the Kohler-Andrae property crossing wetlands, recreational trails, and the Black River. The proposed maintenance facility would be located in the central portion of the Kohler-Andrae property south of the entrance route within a hardwood swamp and would be visually screened by a mound. This alternative would result in approximately 25 acres of direct wetland impact from placement of fill.

Alternative B-2

Alternative B-2 (Figure 12) would propose the same course layout design and entrance route as Alternative B-1. The Alternative B-2 proposed maintenance facility would not include the visual screening mound that was proposed in Alternative B-1. The entrance route would originate on South 12th Street and traverse the Kohler-Andrae property crossing wetlands, recreational trails, and the Black River. This alternative would result in approximately 24 acres of direct wetland impact from placement of fill.

Alternative C

Alternative C (Figure 13) would reduce the footprint of the course layout within the Kohler Property. Holes designed in the northwest location would be moved further to the south away from the burial mounds. Holes within the Black River floodplain would be moved further to the east. Holes adjacent to Lake Michigan would be moved to the west.

The entrance route and maintenance facility would remain in the same location as Alternative B-2. The entrance route would originate on South 12th Street and traverse the Kohler-Andrae property and cross wetlands, recreational trails, and the Black River. This alternative would result in approximately 16 acres of direct wetland impact from placement of fill.

Alternative D

Each of the alternatives D-1 through D-7 (Figure 14) would utilize the same course layout design with alternate entrance routes and maintenance facility locations that minimize impacts. As stated above, each of the alternatives described below would require an easement from the State of Wisconsin for the entrance road and maintenance facility located within the Kohler-Andrae property.

Alternative D-1

The entrance route would originate on South 12th Street, and traverse the southern part of the Kohler-Andrae property, crossing wetlands and the Black River. The maintenance facility would be located on the Kohler-Andrae property south of the entrance route within an alder thicket, wet meadow, degraded wet meadow, and two hardwood swamps. This alternative would result in approximately 18 acres of direct wetland impact from placement of fill.

Alternative D-2

The entrance route would begin on South 12th Street on the north end of the Kohler-Andrae property, crossing wetlands, recreational trails, and the Black River near the north-south midline of the Kohler Property. The maintenance facility would be located in an old field south of the entrance route. The entrance road to the maintenance facility would cross a wet meadow. This alternative would result in approximately 14 acres of direct wetland impact from placement of fill.

Alternative D-3

The entrance route for Alternative D-3 would begin at the intersection of Stahl Road and South 12th Street, in a Kohler-owned residential development immediately north of the

Black River Trails Kohler-Andrae property and continue straight east crossing the Black River, and then south adjacent to the burial mounds to the approximate midline of the Kohler Property. The maintenance facility for Alternative D-3 would be located on the upland area near the north edge of the Kohler-Andrae property south of the entrance route. This alternative would result in approximately 15 acres of direct wetland impact from placement of fill.

Alternative D-4

The Alternative D-4 entrance route would begin at the intersection of Stahl Road and South 12th Street, in a Kohler owned residential development immediately north of the Kohler-Andrae property. The Alternative D-4 entrance route would diverge from Alternative D-3, southeast across the Kohler-Andrae property, avoiding the burial mounds, and then east crossing the Black River. The maintenance facility for Alternative D-4 would be located on the upland area near the north edge of the Kohler-Andrae property (same location as Alternative D-3). This alternative would result in approximately 14 acres of direct wetland impact from placement of fill.

Alternative D-5

The Alternative D-5 entrance route would begin on South 12th Street, traverse the Kohler-Andrae property crossing wetlands, recreational trails, and the Black River near the midline of the Kohler Property. The maintenance facility would be located in an old field and northern mesic forest north of the entrance route. This alternative would result in approximately 14 acres of direct wetland impact from placement of fill.

Alternative D-6

The Alternative D-6 entrance route would begin on Beach Park Lane at the Kohler-Andrae property entrance and travel north adjacent to and within portions of the east side of the Black River floodplain to the midline of the Kohler Property. Alternative D-6 would not impact Kohler-Andrae property recreational trails/areas, as the entrance route and maintenance facility would be located in an area of the Kohler-Andrae property designated solely for park maintenance operations.

The maintenance facility would be located east of the entrance route in an area of the Kohler-Andrae property not typically utilized by the general public. This alternative would result in approximately 15 acres of direct wetland impact from placement of fill.

Alternative D-7

The Alternative D-7 entrance route would begin at Timberlake Road located north of the existing Kohler Property. This alternative would utilize Kohler Property and require no easement for use of Kohler-Andrae property. The road would travel south within the Black River floodplain to the midline of the Kohler Property before turning east. The maintenance facility would be located to the furthest extent north on uplands within the Kohler Property in close proximity to the burial mounds. Alternative D-7 would also route guest and maintenance traffic through several residential neighborhoods. This alternative would result in approximately 14 acres of direct wetland impact from placement of fill.

Alternative E

The Alternative E entrance route would begin on Beach Park Lane at the existing Kohler-Andrae entrance, and travel north within portions of the east side of the Black River floodplain traversing hardwood swamp/forested seep and hardwood swamp. The entrance route would then turn east at the Kohler Property and continue northeast through the Kohler Property and traverse northern dry mesic/mesic forest, and northern dry forest (pine plantation, and forested dune). Kohler-Andrae recreational trails/areas would not be impacted, as the entrance route and maintenance facility location would be located in an area of the park not typically utilized by the public. The maintenance facility would be located east of the entrance route within the Kohler-Andrae property. At the time the Draft EIS was released, this alternative's entrance route and maintenance facility locations would have generated the least amount of direct wetland impact resulting from fill (approximately 5 acres), reduced cultural resource and floodplain impacts, avoided impacts to recreational areas of Kohler-Andrae, and avoided an additional Black River crossing by utilizing the existing Beach Park Lane crossing (Figure 15, Table 10).

Alternative E would require an approximate five-acre easement from the State of Wisconsin for the entrance road and maintenance facility located within the south portion of Kohler-Andrae property.

Alternative F

Alternatives F-1 through F-4 are variations of Alternative E and would each have the same entrance route locations and contain adjustments to the course layout and location of the maintenance facility to reduce environmental impacts. The specifics of each alternative are described below:

Alternative F-1

Alternative F-1 (Figure 16) would position the golf course to the west, further from Lake Michigan and closer to the Black River. Impacts to the interdunal wetlands would be avoided but the impacts to the floodplain forest of the Black River would be increased. Direct wetland impacts from fill placement for this alternative would total 4.99 acres, 3.5 of which are associated with the Black River floodplain wetlands.

Alternative F-2

Alternative F-2 (Figure 17) would present steeper side slopes (6:1) over the preferred slopes (8:1) from Alternative F-1. Slopes would also be adjusted along the fairway at Hole 2 and along the fairway, green, and approach of Hole 11. The slope modifications would result in approximately 4.68 acres of direct wetland impact from placement of fill.

Alternative F-3

Alternative F-3 (Figure 18) would steepen side slopes from 6:1 to 4:1 at the Hole 2 fairway, Hole 11 fairway and the Hole 3 tee box resulting in approximately 3.99 acres of direct wetland impact from placement of fill.

Alternative F-4 (Current Proposal)

Alternative F-4 (Figure 19) would combine the slope modifications of Alternative F-3 and shift the golf hole corridors to further minimize wetland impacts. Wetlands P-2, P-6, and P-203 would be avoided and impacts to P-202 would be further minimized. Impacts to

the Black River wetlands would be minimized by shifting the entrance road and moving tee boxes east, away from the wetlands. Additionally, 0.22 acres of wetland impact would be avoided by replacing proposed culverts with bridges for the cart paths that cross the contiguous linear ridge and swale wetland. This alternative would result in approximately 3.69 acres of direct wetland impact from placement of fill.

5 Existing Environment and Environmental Effects of the Proposal and Alternatives

Each sub-section below includes a description of the existing environment (representing the No Action alternative) and a summary of impacts of the Project. If the Project is not completed, none of the Project impacts would occur. Additional information on the existing environment within Kohler-Andrae State Park can be found on the park webpage at http://dnr.wi.gov/topic/parks/name/kohlerandrae/.

5.1 Physical and Biological Environment

5.1.1 Geology and Soils

The topography of the Kohler Property is nearly level to gently rolling with elevations ranging from approximately 582 feet above mean sea level (msl) to 595 feet above msl (Figure 2). The water level associated with Lake Michigan is approximately 580 feet above mean sea level (msl), and varies based on regional precipitation. The dune elevations rise from approximately 585 feet above msl to 595 feet above msl. Inland from the dunes, the land undulates between approximately 585 and 595 feet above msl. The Black River and its riparian wetlands are located approximately 584 feet above msl on the west limits of the Kohler Property.

In this area, there is not a defined base of dune but as the water levels remain higher, sand areas that were built over the extended low water level are disappearing and the edge of the water is getting closer to the toe of the primary dune. The predominant landscape forming feature of this site is the historical high and then receding lake levels. This has resulted in a unique ridge and swale complex with high ridges interspersed by low swales where wetlands may occur. As the dunes deteriorate with time, the higher ridges start to reach a more stable angle and the swales form “pocket” areas. On most of the site the grade varies ten feet or more with steep slopes between the ridges and the swales. In order to create the proposed walking and cart paths, the steep slopes would likely have to be graded.

Kohler proposes to integrate the existing dunes and natural contours into the course design. Surface water drainage patterns are not anticipated to be altered significantly during construction. Due to the permeable sandy soils, storm water runoff would be managed near the source within biofiltration areas. To construct the biofiltration areas to hold water long enough and support plant growth, it's anticipated that less porous soil and topsoil would need to be brought into the site. In addition, the biofiltration areas should be designed so that there is room for filtering before the run-off reaches the shallow groundwater elevation, which has been measured in monitoring wells on the Kohler property at about 585 above msl, and can fluctuate seasonally,

The soils underlying the Kohler Property are mainly sand and muck soils (Figure 6). Sand beaches along the lakeshore are bordered by sand dunes approximately 10 feet high. Soils along the Black River and riparian wetlands include Adrian, Palms, and Houghton mucks. The remainder of the Property is mapped as Granby loamy fine sand, Oakville loamy fine sand, and Dunes. The Adrian, Palms, and Houghton mucks and Granby loamy fine sand units are rated as hydric soil mapping units by the Natural Resources Conservation Service (NRCS), while the Oakville and Dune units are not hydric.

Oakville soils are well drained and moderately well drained soils with a loamy sand horizon underlain by fine sand and sand. There are two Oakville mapped units on this site based on the slopes. For these soils, organic matter content and natural fertility are low and permeability is very high.

The Dune soils are excessively drained medium and fine sand adjacent to beaches and lakes. On these soils, organic matter content and natural fertility are very low and permeability is very high. Areas that are not stabilized by vegetation are subject to wind movement.

The Granby soils form a swale near where the access road, clubhouse, and practice range are proposed. Granby soils have about one foot of loamy fine sand over sand. The water table is at the surface with frequent ponding and occasional flooding.

NRCS has developed ratings based on the use of soil material at the site:

- "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

- "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

- "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

The soils on the site present challenges for the construction and long-term maintenance of the proposed golf course.

NRCS soils data indicate that the Oakville soils are somewhat limited in suitability for lawns, landscaping and golf fairways because the soils have a low exchange capacity, are droughty and can have significant slopes. The dune soil areas are unrated but have these same deficiencies. The Granby soils are very limited due to ponding, saturation, low exchange capacity, and flooding. When water levels drop the Granby soils can also be droughty.

NRCS pesticide ratings for the soils onsite indicate that the dune land soils are somewhat limited and all other soil types present are rated very limited. In the Oakville soil areas, low adsorption and seepage create leaching. For pesticide run-off, most of

the soils are not limited except for the steeper Oakville soils where even with sand, the slopes can cause run-off and are rated “somewhat limited”.

NRCS irrigation ratings for the soils onsite indicate that the Oakville series is very limited for irrigation due to rapid movement through soil, seepage, low water holding capacity, and slope. The Dune soils are not rated but can be reasonably expected to have these same limitations.

Both the Adrian muck and Granby soils are rated very limited for local roads; the proposed access road is in both soil types. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. Excavation of these soil types, if present, will likely be necessary.

The proposed club house is located in an area of Granby and Oakville soils. For small commercial structures that are less than three stories high and do not have basements, the less steep Oakville soils are not limited. The steeper Oakville and Granby soils are both rated as very limited. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs.

Subsurface materials consist of glacially deposited, unconsolidated sediments overlying Silurian, Ordovician, Cambrian, and Pre-Cambrian age bedrock (Carlson et al. 2011) (Kammerer et al. 1998). From the land surface downward, the unconsolidated materials are: 15-30 feet of reworked, permeable postglacial sand; 80-100 feet of Ozaukee Member basal till, consisting of clayey silt, and some well logs show stream-deposited clayey sand and gravel present within this layer (Carlson et al. 2011). The Ozaukee basal tills are low permeability layers that significantly restrict vertical groundwater flow to the underlying Silurian dolomite, protecting it from groundwater quality and quantity impacts. The Silurian dolomite which is approximately 400 feet thick, is the main source of drinking water in the area. Most groundwater flow in the dolomite is through horizontal bedding plane fractures. Underlying the Silurian dolomite aquifer is

approximately 200 feet of low permeability Ordovician age Maquoketa shale which prevents groundwater movement to the underlying Ordovician and Cambrian dolomites and sandstones, and Precambrian crystalline rock formations (Kammerer et al. 1998). Because the Ozaukee member and the Maquoketa shale act as aquitards and greatly slow the movement of groundwater between more permeable layers, three separate aquifers can be defined: 1) the shallow sand aquifer; 2) the Silurian dolomite aquifer; and 3) the deep Cambrian-Ordovician aquifer.

5.1.2 Air quality

According to the U.S. Environmental Protection Agency (EPA), Sheboygan County is identified as a “nonattainment” area for ground-level ozone. This area does not meet the EPA’s 2008 8-hour ozone national air quality standard (75 parts per billion; EPA 2014).

A preliminary assessment of a typical golf course in the northeastern United States calculated 9,936.8 gallons of fuel (26.9 t Ce/yr) were used in an 8-month period for maintenance (Portness, 2008). In 2014, an 18-hole Kohler golf course used 4,133.6 gallons of gasoline and 3,422.95 gallons of diesel fuel for maintenance vehicles. Similar results are anticipated for the Project. Additionally, emissions and fuel use are planned to be minimized through an approximate five-year capital equipment replacement program, which calls for purchases of new equipment with current air emission regulations and fuel use efficiencies.

During normal operation of the golf course, daily traffic is expected to include passenger vehicles, and delivery trucks. Gasoline and diesel fueled maintenance vehicles will be used on the golf course.

The Property and operation of the golf course is not expected to significantly contribute to long-term increases in air emissions. There is not expected to be a concentration of vehicles associated with daily golf course operations and few vehicles are likely to use the Property during winter months when the golf course is closed.

The Project is expected to have intermittent and temporary air emissions during construction. In the long term, there will be an expected negligible increase in emissions from staff, guests, delivery and maintenance vehicles. Projected traffic volumes are not expected to impact air quality.

Projected carbon sequestration has not been determined. Bartlett et al. (2011) reported that golf courses with a high percentage of trees would have a net carbon sequestration. Removal of trees on the Kohler Property would decrease the amount of carbon sequestration. Research shows that turf grass also sequesters carbon (USDA 2003). Carbon equivalent emissions from vehicle fuel use, nitrogen fertilizer application, and irrigation pumping would lower the carbon sequestration potential of the Project. The carbon balance could be shifted toward net sequestration by retaining more woody and native vegetation and by investment in course-wide energy efficiency technologies.

5.1.3 Surface Waters

The Project is located in two different 12 digit sub-watersheds - the Black River watershed (Hydrologic Unit Code (HUC) 040301011201), and the Barr Creek-Frontal Lake Michigan sub-watershed (HUC 040301011202) (Figure 20). The Black River originates near the Village of Oostburg, and flows east and north through agricultural land to Kohler-Andrae and forms the western boundary of the Kohler Property. The Black River discharges into Lake Michigan within the City of Sheboygan approximately 1.25 miles north of the Kohler Property. In general, the bottom substrate primarily consists of sand, with some silt and detritus. The riparian buffer area is mainly wetlands and woodlands. An unnamed tributary flows from South 12th Street in the northwest corner of the Kohler-Andrae property into the Black River.

According to the Great Lakes Information Network, Lake Michigan is the second largest Great Lake by volume with just under 1,180 cubic miles of water, and is the only Great Lake located entirely within the United States. Lake Michigan is approximately 118 miles wide and 307 miles long, has more than 1,600 miles of shoreline, averages 279 feet in depth, and has a maximum depth of 925 feet. The drainage basin is

approximately 45,600 square miles with approximately 14,200 square miles located within Wisconsin.

Lake Michigan is a cold water, oligotrophic lake with summer maximum water temperatures below 72 degrees. Native fish species include lake trout, whitefish, largemouth bass, bullheads, northern pike, lake sturgeon, yellow perch, and sculpins. Numerous invasive aquatic species are also present throughout Lake Michigan. There are more than 15 million fish stocked annually in Lake Michigan.

The eastern edge of the area's ecological landscape is heavily influenced by the cool waters of Lake Michigan, which has created a cool, moist climate and distinct landforms affected by phenomena such as water level fluctuations, fogs, wave spray, storm wave impacts, ice push, and deposition and erosion of sediments. This physical setting has promoted a unique set of biotic communities, species assemblages, and natural community mosaics of unusual composition, limited geographic distribution, and high ecological value. Species endemic to Great Lakes shoreline habitats occur here. Undeveloped shoreline habitats and the relatively clean, open waters of Lake Michigan in this ecological landscape are highly significant to migratory birds (Steele 2007). Lake Michigan is a Conservation Opportunity Area of global significance. The Wisconsin shore of Lake Michigan within this ecological landscape has shoreline features shaped by wave and river dynamics that made the mouths of rivers along the lake suitable sites for small harbors. These are the present-day locations of the cities of Algoma, Kewaunee, Manitowoc, Two Rivers, Sheboygan and Port Washington.

5.1.4 Storm Water Management

The City of Sheboygan (The City) and the department each have requirements for post-construction storm water management, which would apply to the Project as summarized below.

The City's Post-Construction Storm water Management Zoning Ordinance requires the use of best management practices (BMPs) for peak runoff discharge, total suspended solids (TSS), and storm water infiltration. The City requires BMPs to maintain or reduce the peak discharge rate for the 2-year, 24-hour design storm, as compared to pre-

development conditions. At a minimum, the site must detain the 10-year, 24-hour storm released at the pre-construction discharge rate for the 2-year storm. The City also requires the removal of 80 percent of TSS from post-development runoff, based on average annual rainfall, as compared to what it would be in the absence of runoff management controls. Lastly, the City requires that the quantity of post-development storm water infiltrated should be at least 60 percent of what it was prior to construction.

Likewise, the department's requirements for post-construction storm water management include BMPs for peak runoff discharge, TSS, and infiltration. The department requires BMPs to maintain or reduce peak discharge rates for both the one- and two-year, 24-hour design storms, compared to pre-development conditions. The department also requires the removal of 80 percent of TSS from post-development runoff, based on average annual rainfall, as compared to no runoff management controls. Lastly, the department requires that the quantity of post-development storm water infiltrated should be at least 90 percent of what it was prior to construction.

The Project proposal is to utilize the Kohler Property's high infiltration rates of 26 to 52 inches per hour to meet regulatory requirements. The infiltration rates are based on double ring infiltrometer testing conducted at four locations on the site from 2011. In order to comply with storm water standards found in ch. NR 151 Wis. Adm. Code and ch. NR 216 Wis. Adm. Code, several options have been proposed.

Impervious surfaces would be kept out of protective areas to the maximum extent practicable, generally defined as 50 feet from lakes or rivers and 50 to 75 feet from wetlands, based on the type of wetland, per ch. NR 151 Wis. Adm. Code.

The bulk of the storm water management plan consists of filter strips to treat most impervious areas for quality and quantity prior to infiltrating and discharging to any nearby surface waters, including wetlands. Biofiltration areas and oil/water separators are proposed to provide storm water treatment for areas such as the maintenance facility, parking areas, and roadways. BMPs would be designed, installed, and

maintained to reduce petroleum in the runoff. Storm water runoff from fueling and maintenance areas would not be infiltrated. The biofiltration areas proposed consist of depressed areas with three feet of engineered soil, mulch, and wetland type plantings. All treatment areas are planned to be constructed 5 feet above the anticipated high groundwater elevation or achieve 80 percent TSS removal prior to infiltrating. Depth to groundwater would need to be verified for required separation distances.

Drives and cart paths are proposed to be treated with natural filter strips. In areas where a filter strip is not possible, treatment with swales leading to a biofiltration area designed to discharge through infiltration would be needed. In this case, depth to groundwater would need to be verified for required separation distances. Drives in close proximity to wetlands would need to utilize a curb and gutter system to convey runoff to a sumped catch basin for treatment of storm water.

5.1.5 Drinking Water

At the time the June 2016 Draft EIS was released, the Project included facilities (maintenance shop, rest stations, and clubhouse/restaurants) that were expected to require construction of public water supply wells for drinking water. Since the annexation of the Kohler-Property to the City of Sheboygan in August 2017, Kohler is now pursuing use of municipal water for irrigation and drinking water.

5.1.6 Groundwater resources

As described in the Geology and Soils section above, the groundwater system in the Project area includes three separate aquifers: 1) the shallow sand aquifer, 2) the Silurian dolomite aquifer, and 3) the deep Cambrian-Ordovician aquifer. The shallow sand aquifer includes beach and nearshore sands near Lake Michigan as well as sand seams present within the Ozaukee Member basal till, neither of which are regionally extensive. With a depth to groundwater of only a few feet, groundwater within the beach and nearshore sand is highly susceptible to contamination from activities at the land surface. Wetlands at the site are directly connected to this shallow aquifer. The Interdunal and Ridge and Swale wetlands are dependent on groundwater for recharge and maintenance of water levels and water quality. The Sedge Meadow, Hardwood Swamps and Alder Communities are located in less permeable soils. They are

dependent on both groundwater and surface water runoff to maintain water levels and determine water quality. The deep Cambrian-Ordovician aquifer is approximately 750-950 feet below ground surface and consequently very expensive to access. Additionally, water from the deep aquifer may contain elevated concentrations of natural contaminants such as radium, gross alpha, and dissolved solids. Therefore, due to water quantity and quality concerns with the shallow and deep aquifers, almost all water supply wells in the area tap the Silurian dolomite aquifer.

The Silurian dolomite aquifer generally lies about 120 feet below the ground surface and is confined by the overlying Ozaukee till, consisting largely of low-permeability silt and clay. The aquifer is typically under artesian conditions with water levels well above the top of the aquifer and, in many instances, at or above the ground surface. Static water levels reported in well construction reports for nearby private wells open to the Silurian dolomite range from 60 feet below the land surface (bls) to 1 foot above the land surface. The underlying Maquoketa shale acts as an aquitard and greatly slows the movement of groundwater to and from the underlying Cambrian-Ordovician dolomites and sandstones. The Silurian dolomite is fractured and most groundwater flow is through horizontal bedding plane fractures.

5.1.6.1 Groundwater Quantity and Drawdown

Since the August 2017 annexation of the Kohler Property into the City of Sheboygan, Kohler is now pursuing use of municipal water for potable and irrigation water. Prior to the annexation, water use for the Project included potable water supplies as well as a non-potable supply for golf course irrigation and were anticipated to be obtained from wells. The source of water will be dependent on negotiations with the City of Sheboygan. If the option to utilize wells is chosen the following information is applicable.

Kohler has proposed that one on-site high capacity irrigation well with a pump capacity of 450 gpm will pump water from the Silurian dolomite aquifer to an irrigation pond for storage and eventual distribution to the irrigation system. The well water would fill an irrigation pond and water from the pond would be distributed via an underground irrigation system to the appropriate areas of the golf course. The anticipated average

annual water use for the irrigation system is between 15 million and 25 million gallons per year.

Additional wells for the non-irrigation water needs of the facility will be needed, but the proposed location, capacity and number of wells has yet to be determined. It is assumed that the other wells would also be constructed in the Silurian dolomite and their pumping capacities would be much less than that of the irrigation well. Based on water use reported at Kohler's Whistling Straits golf course or similar facilities, the department anticipates total volumes required for potable use to be 1.5 to 2 million gallons per year for golf course operations.

Kohler plans to use irrigation best management practices (BMPs) to minimize water use required for irrigation. Planned irrigation BMPs include scheduling irrigation to match turf and soils conditions to conserve water, reduce runoff, and prevent disease. Evapotranspiration rates and pending weather fronts are also factored into irrigation schedules. Other BMPs to regulate water use include:

- Use of a computer controlled irrigation system for maximum efficiency
- Incorporation of a prescriptive irrigation system where sprinklers are fully adjustable to water just the playing surfaces while avoiding native or out of play areas
- Use of soil moisture sensors to determine watering needs
- Use of quick couplers for hand water of isolated dry areas to prevent over watering of adjacent areas
- Use of a cycle-soak feature which automatically turns sprinklers off to prevent surface water run off until water has moved into soil to be used by plant roots
- Daily inspections of pressure readings and proper pump operation
- Use of low trajectory sprinkler nozzles apply water closer to the ground to minimize drift from wind
- Completion of monthly irrigation system audits

To evaluate irrigation needed at the proposed golf course the department reviewed water withdrawal reports for irrigation wells at Kohler-owned golf courses including Blackwolf Run and Whistling Straits for 2010-2014.

Table 2: Total Annual Irrigation Withdrawal per 18-holes (gallons)

	2010	2011	2012	2013	2014
Blackwolf Run	20,489,700	23,407,500	42,257,750	17,736,100	14,053,200
Whistling Straits	10,904,250	18,273,550	26,083,850	16,204,300	11,003,950

Table 3: Highest Monthly Irrigation Withdrawal per 18-holes (gallons)

	2010	2011	2012	2013	2014
Blackwolf Run	5,923,350 Aug.	7,229,250 Aug.	13,890,150 June	6,585,750 Aug.	5,285,200 July
Whistling Straits	3,115,500 Oct.	5,682,750 Aug.	5,797,350 July	4,841,450 Aug.	3,490,000 July

Kohler expects needing irrigation system flow rates of up to 1,500 gallons per minute (gpm) and average long-term volumes of 15,000,000 to 25,000,000 gallons per year can be anticipated for the Project. Based on the historical 18- hole average of other Kohler courses 15,000,000 to 25,000,000 gallons per year is a reasonable estimate, though higher annual withdrawals are possible in drought years.

A field study was initiated by Kohler to characterize the geological and hydrogeological properties of the shallow sand and Silurian dolomite aquifers below the Kohler Property (Excel 2015). Ten wells were constructed at depths ranging from 25 to 500 feet bls and a pumping test was conducted using one of those wells as the pumping well and the other nine as water level observation wells. Based upon the well logs, dolomite bedrock begins approximately 120 feet bls and extends to a depth of approximately 500 feet bls. The bedrock is overlain with a confining layer of up to 90 feet of silt and clay, which is overlain by a layer of sand to the land surface.

Water level monitoring in observation wells during the pumping test showed no hydrologic connection between the shallow sand and Silurian dolomite aquifers on the Kohler Property. That is, water levels in wells in the shallow aquifer were not affected by pumping from the Silurian dolomite aquifer. Regional wetlands are not anticipated to be affected by the drawdown associated with the irrigation well due to the separation between the shallow aquifer and the aquifer to be pumped. Additionally, any domestic wells installed within the shallow aquifer (such as sand point wells) are not anticipated to be affected by the drawdown associated with the irrigation well.

Department staff evaluated potential impacts to nearby private wells by conducting a groundwater drawdown analysis based on an industry-standard relationship between pumping and drawdown (Theis, 1935). The analysis was conducted using a “worst case” well chosen based on well construction report information showing its location in close proximity to the pumping well (located on South 12th Street), and a shallow depth compared to other nearby wells. Data used in the analysis is listed in Table 4 below.

Table 4: Parameters Used in Private Well Drawdown Analysis

Parameter	Value or range used in drawdown analysis	Data source(s)
aquifer transmissivity	240 to 6700 ft^2/day	Kohler's pumping test data and specific capacities of 6 nearby high-capacity wells finished in the Silurian dolomite aquifer.
aquifer storativity	0.00002 to 0.0007	Kohler pumping test data and pumping test at Kettle Moraine Fish Hatchery (Conlon, 1995)
pumping rate	8,800,000 + 140,000 gal/mo (total equivalent to 207 gpm)	Highest monthly irrigation withdrawal per 18-holes for Blackwolf Run and Whistling Straits during the June-July 2012 drought, plus average 2011-14 monthly Whistling Straits non-irrigation use. (WDNR Drinking & Groundwater Use Information System)
pumping duration	60 days	Anticipated period of highest pumping.
pumping location	Lat. 43° 40.674' Long. 87°42.621'	WI Unique Well # XI831 (Excel, 2015)
distance to "worst case" private well	3000 feet (approx.)	houses on the west side of S 12th Street
construction of "worst case" private well	static water level = 40 ft. well depth = 117 ft.	Well found in T14N, R23E, S15, NE of SE

Based on the range of parameters above, the drawdown in the "worst case" well was estimated to be in the range of 2.4 to 23 ft. The range of drawdown was estimated by using the range of transmissivity values calculated from specific capacities of nearby high capacity wells along with a published storativity value for the Silurian dolomite aquifer (Conlon, 1995). An average transmissivity from nearby high capacity wells and

the published storativity value were used to forecast an average predicted drawdown of 6.9 feet in the “worst case” well.

A second analysis was completed based on the drawdown data from four observation wells monitored during the Kohler pumping test. Values for aquifer transmissivity and storativity were derived from the test results. Transmissivity ranged from 3300 to 3700 ft^2/d and storativity ranged from 0.00002 to 0.00026. Using these values yielded a range of predicted drawdowns at the “worst-case” well from 5.0 to 7.0 ft. with an average value of 6.1 feet of drawdown.

In addition to the drawdown analysis for the “worst case” well above, analyses of the reduction in the amount of available water in that well and another nearby well were completed. The second well is located at greater distance from the Kohler well but is shallower and has a lower water table level than the “worst case” well. The percentage of available water in those wells that would be unavailable due to drawdown (i.e., saturated thickness reduction), corresponding to the above range of drawdown is 2.1 to 21 percent.

Uncertainty in the estimated drawdowns and saturated thickness reductions reported above was addressed by use of a range of transmissivity and storativity values based on field data. There is additional uncertainty in the other parameter values used (e.g., pumping rate), and in the assumptions built into the Theis analysis regarding the nature of the aquifer, specifically that the aquifer is homogeneous and isotropic. It should be noted that prediction of drawdown in fractured dolomite aquifers almost always involves high levels of uncertainty because a substantial amount of the groundwater flow is through fractures and it isn’t known where those fractures occur. Therefore, actual drawdowns may vary from the range reported above.

In the event that an adjacent well is impacted by drawdown from the irrigation well, it may become necessary to lower the pump within the existing well casing, or drill the well deeper to provide adequate head in the well. While golf course irrigation is not

anticipated to adversely impact the surrounding neighborhood, Kohler would develop a program with the City to mitigate potential impacts to adjacent private water supply wells. This program should include covering the cost of lowering pumps and/or drilling deeper for affected wells. A similar program was implemented at Whistling Straits.

5.1.6.2 **Groundwater Quality**

Several best management practices relating to nutrient management are proposed to minimize potential for adverse impacts to adjacent waterbodies and/or wetland areas which include:

- Avoiding application when heavy rain is forecasted
- Avoid applications on frozen ground
- Using drop spreaders when within 20 feet of a waterbody or wetland
- Covering drainage structures prior to fertilizer applications
- Removing fertilizer particles off impervious surfaces by blowing
- Calibration checks of spreaders prior to each fertilizer application
- Implementing light, frequent application of nutrients rather than heavier, less frequent applications.
- Selecting the most appropriate turfgrass

Nutrient management is a key part of the Project-specific integrated pest management (IPM) plan and the ability to support healthy growth of the turf grass.

Chapter NR151 Wisconsin Administrative Code requires a performance standard, which includes an annual maximum amount of nutrients that can be applied to golf course turf grass areas to protect surface and groundwater. Information provided by Kohler stated that in 2014, on average, all Kohler golf courses in Sheboygan County, applied fertilizer at 32 percent of the maximum amount on tees, 40 percent of the maximum amount on greens and 20 percent of authorized state and federal levels on fairways. Quantities are the minimum necessary to achieve desired results to minimize cost and prevent damage to the turf.

Kohler would develop a nutrient management plan (NMP) for the Project similar to the plans used at the other Kohler courses in the region. Careful application of fertilizers at rates based on current soil tests and plant requirements also decreases nitrogen leaching from established turf grass (Barton and Colmer 2006). Using new pesticide products with slow release organic products, lower active ingredient concentrations, and lower leaching capabilities reduces, but does not eliminate the risk of leaching into the groundwater (Kovach et al., 1992). Precision irrigation management could minimize leaching by scheduling irrigation so that water does not move beyond the active rooting zone.

As with nutrient management, best management practices can be implemented for pest management in order to minimize the potential for adverse impacts to waterbodies and wetlands. Kohler has proposed the following:

- Develop a healthy, pest resistant turf
- Keep pests at or below acceptable threshold levels
- Use natural control methods that maximize beneficial organisms
- Wise use of chemicals
- Devise a strategic approach for harmful species that may remain as a host for fungi, bacteria, parasites, and predators
- Use of available pest growth models
- Acceptance of a certain level of loss or damage
- Training staff to implement IPM
- Use of diagnostic laboratories to identify and manage pests

Kohler would apply pesticides in accordance with an IPM plan and according to product labels. New IPM practices are being tested and developed on an ongoing basis, and contemporary water and pest management practices reduce the risk of environmental impacts significantly compared to twenty years ago. Pesticide application, storage, loading, and mixing would be done in compliance with chapters ATCP 29 and 33, Wis. Adm. Code (ARM Pub 158 (Rev. 12/2012).

The foundations of the IPM plan include horticulture practices (fertilization, soil tests, irrigation, drainage and minimizing turf stress) to promote healthy, vigorous plants that withstand pest outbreaks without pest controls. Pest control measures are first attempted by physical, mechanical, and cultural controls. The use of a pesticide is a last consideration after other measures are unsuccessful. Pesticide applications are made to specific target areas to reduce the overall size of the treatment area.

By their very nature, most pesticides create some risk of harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms. Studies have shown that several commonly used pesticides have been identified as probable human carcinogens and may be linked to birth defects, endocrine disruption, reproductive effects, neurotoxicity, and kidney/liver damage. Chronic, long-term exposure to many pesticides and the associated health risks are not completely understood and it may take years of research before the effects are fully known. Considering their toxicity and ability to leach, monitoring groundwater quality for pesticide contamination and minimizing pesticide use through implementation of an IPM are potential ways to reduce the potential negative effects of pesticide use (New York State, 1991).

At the same time, pesticides can be useful because of their ability to kill potential disease-causing organisms and control insects, weeds, and other pests. Biologically-based pesticides such as pheromones and microbial pesticides are becoming increasingly popular and often are safer than traditional chemical pesticides. Further examination of alternative pesticide management approaches (including alternative products), gaining a better understanding of golfer expectations, educating those that maintain the courses, and incorporating IPM plans may reduce the health and environmental risks associated with pesticide use as well as minimizing costs of operation.

Fertilizer and pesticide requirements may be different during course construction and establishment than for long-term maintenance. Establishment of grasses on fairways,

tees, and greens each require specific ratios of nitrogen/phosphorus/potassium for establishment. Once grasses have been established, less fertilizer is needed for maintenance (Walker and Branham, 1992).

DATCP regulates pesticides in groundwater under ch. ATCP 31, Wis. Adm. Code. If pesticides are detected in groundwater at concentrations exceeding the standards set in chapter NR 140, Wisconsin Administrative Code, DATCP can require mitigation. Pesticides with groundwater preventive action limits and enforcement standards are listed in ch. NR 140 Wis. Adm. Code. While studies are limited, one study of 9 Florida golf courses concluded that while pesticides used at golf courses can leach to shallow groundwater, when detected, concentrations were generally low, with few sample analytical results exceeding Maximum Contaminant Levels for drinking water (Swancar, 1996).

5.1.7 Floodplain

A portion of the Project is proposed to be constructed along the eastern edge of the Black River floodplain (Figure 7). Construction within the floodplain would include minor filling for a small portion of the golf course and the entrance road. Any development in the floodplain would have to meet the county, state, and the Federal Emergency Management Agency (FEMA) floodplain standards. The west boundary of the Kohler Property follows the centerline of the Black River. The Black River floodplain has been evaluated for this Project from its confluence with Lake Michigan to Beach Park Road (the main entrance to the State Park). According to the Flood Insurance Study for Sheboygan County published by FEMA in 2009, the Black River has a tributary area of 18.3 square miles and a peak discharge of 2,500 cubic feet per second at the mouth during the 100-year flood event. The Black River flows from south to north and has a 100-year flood event elevation of 589.48 feet above msl at the southern Project limits and decreases to 588.65 above msl when it reaches the northern Project limits (Figure 7).

A floodplain study has been completed using HEC-RAS modelling software to assess the potential impact to the Black River floodplain elevation due to the fill proposed for the golf course, and the entrance road. Based upon the analysis, localized increases in the floodplain elevation are expected on the Kohler Property and the Kohler-Andrae property. Floodplain impacts are not expected to affect adjacent properties. Potential impacts vary along the length of the Black River, as detailed in Table 5.

Increases in the floodplain may require department and FEMA review and approval through the Letter of Map Change process in addition to potential LAWCON conversion.

Table 5: Project Black River Floodplain Changes

Location	Existing Floodplain Elevation (ft)	Proposed Floodplain Elevation (ft)	Difference (ft)
Beach Park Road	589.82	589.83	+.01
Southern Lot Line	589.48	589.49	+.01
Northern Lot Line	588.65	588.65	+.00

5.1.8 Upland Communities

The Kohler Property and the Kohler-Andrae property contain several upland plant communities (Figure 8). Great Lakes Beach, dune, and ridge and swale communities are found near the Lake Michigan shore, while the Northern Dry-mesic/Northern Mesic northern dry forest complex and the Northern Dry forest and pine plantation are found further inland.

Trees and other vegetation would be removed from the footprint of the golf course fairways, greens, and tees and would be replaced with turfgrass. Vegetation would also be removed from the access road, utility right-of-way, building footprints, irrigation system, driving range, and cart paths. Mature trees and other native vegetation would be retained between the golf holes where possible.

Much of the 247-acre Kohler parcel currently includes forested habitat. The golf course design would remove approximately 100 to 120 acres of forested land cover. Forested land and specimen trees will remain as part of the design located predominantly between golf course features. Opening up blocks of forested land will result in greater potential for windthrow and wind damage to the remaining trees.

The Great Lakes Beach (Great Lakes Beach) community occurs at the interface of land and water along the margins of Lake Michigan, and is comprised of two zones: the lower beach and the upper beach. The lower beach community is directly affected by wave action and is characterized by a lack of perennial vegetation cover, the presence of drift, and the occurrence of annuals, including the rare plant species. This community is affected by fluctuating lake levels and waves associated with storm events. The upper beach includes a zone elevated several feet above the beach that is stabilized by perennial vegetation, including grasses, willows (*Salix* spp.), and cottonwood (*Populus deltoides*).

The Great Lakes Beach plant community (Great Lakes Beach) supports mostly native species with few non-native or invasive plants. The plants are highly specialized and conservative. Conservatism is based upon a species fidelity to specific habitat integrity and to varying degrees of disturbance. The most conservative species require a narrow range of ecological conditions, are intolerant of disturbance, and are unlikely to be found outside undegraded remnant natural areas. Native, conservative species are likely to be lost as more tolerant non-native species, such as reed canary grass (*Phalaris arundinacea*) invade. While conservatism and rarity are not always equated, many conservative species tend to be rare. Great Lakes Beach is imperiled in Wisconsin due to the rarity of the plant community (6-20 occurrences or few remaining individuals or acres) and because it is vulnerable to extirpation from the state.

The Great Lakes Dune community occurs on the semi-stabilized dunes above the beach. The landforms consist of windblown dunes up to approximately 10 feet in height. The dunes are partially stabilized by herbaceous vegetation which includes several rare species. Scattered shrubs include common and creeping junipers *(Juniperus spp.).*

Direct impacts to the Great Lakes Beach and Dune communities are not expected.

The Great Lakes Ridge and Swale Complex occurs landward of the dune communities. A series of narrow, sandy ridges alternates with swales parallel to the lakeshore. The vegetation on the ridges is typically northern dry to dry-mesic forest dominated by white pine (*Pinus strobus*), red oak (*Quercus* rubra), and sugar maple (*Acer saccharum*). In some areas, planted red pines (*Pinus resinosa*) replace the native forest species and also Great Lakes Dune habitat. This is evident in some areas where herbaceous dune species can be found in the understory.

Further from the lake the topography is gently rolling with less developed ridges and swales. Forested areas include some northern mesic forest. White pine, American beech (*Fagus grandifolia*), and red maple (*Acer rubrum*) are dominant species, with an understory dominated by sedges (*Carex spp.*), clubmoss (*Lycopodium obscurum*) and beech drop (*Epifagus virginiana*).

The majority of the Project area west of the lakeshore and east of the Black River consists of a northern forest complex on sandy upland. The topography is gently rolling, with longitudinal ridges running generally north-south, parallel to the lakeshore. This area has variable microtopography and vegetation ranging from dry mesic to mesic. The forest canopy is mature with approximately 75 to 100 percent cover on average and is dominated by white pine, red oak, and sugar maple. Numerous trees throughout the forest habitat have been blown over from the lakeshore winds and poor soil stability. Understory vegetation is consistent with northern dry to dry mesic forest groundlayer, with dominant species including Pennsylvania sedge (*Carex pensylvanica*) and clubmoss. The forest canopy and vegetation integrity is higher toward the west and north, and the presence of weedy and invasive species, especially Japanese barberry (*Berberis thunbergii*) is more pronounced toward the east and south.

The approximately 40-acre pine plantation occurs on an extensive area of the southwest portion of the Kohler Property, on dry uplands. The canopy is dominated by a mature stand of planted red pine, with a lesser component of white pine and Norway spruce (*Picea abies*). The groundlayer consists of northern dry mesic forest herbaceous

species. About one half of the pine plantation has sparse ground vegetation. About one quarter of the pine plantation had a dense clubmoss understory and about one quarter of the pine plantation in the southwest corner has areas of dense invasive Japanese Barberry which forms an impenetrable thorny tangle. Pockets of open canopy occur within the pine plantation that are consistent with dune or forested dune vegetation.

A section of the southeast portion of the Kohler Property is composed of northern dry forest on irregular, rolling terrain composed of stabilized sand dunes. The vegetation is characterized by an open tree canopy of less than 50 percent coverage with canopy dominants including white pine, and paper birch (*Betula papyrifera*). The groundlayer is dominated by Pennsylvania sedge and species of juniper.

5.1.9 Wetlands

Wetlands on both the Kohler Property and Kohler-Andrae property within the Project boundary were delineated by a consultant with field work being completed in September and October of 2014, and Spring 2015. Department and U.S. Army Corps of Engineers (USACE) staff conducted a field review and approved the delineation approach on October 17, 2014. Greater detail on the wetland permitting analysis and information considered, including the department's Wetland Rapid Assessment Methodology (WRAM), is available in the wetland permitting documents.

There are approximately 81 wetlands within the Project boundary ranging from small wetland depressions to an extensive riparian wetland complex associated with the Black River (Figure 7 & 19, Table 10).

On the east limits of the Kohler Property, Great Lakes Interdunal (0.29 acre) and Great Lakes Ridge and Swale wetlands (5.24 acres) exist between the dunes, parallel to the shoreline. On the west limits of the Kohler Property and extending onto the Kohler-Andrae property, a wetland complex with alder thicket, southern sedge meadow, seepage slope, and northern hardwood swamp occurs along the Black River and tributary corridors (118.18 acres).

The wetland plant communities exhibit high to exceptional condition with a majority of stressors (e.g., invasive species) either absent or minimally present. Habitat is provided for a variety of flora and fauna, including threatened, endangered, and special concern species. The combination of contiguous upland and wetland plant communities in a large, unfragmented block of habitat adds to the significance to the Property's (Kohler and Kohler-Andrae) value for wildlife. The wetlands are hydrologically connected to Lake Michigan. The interdunal wetlands along Lake Michigan are exceptionally rare. Sand dunes that are eroded by wave action provide a littoral drift source that is critical to lessening erosion in the remainder of lake and protects the wooded areas landward of the dunes. The Interdunal and Ridge and Swale wetlands located in permeable sand are dependent on groundwater to maintain water quality and water levels which support the rare plant communities. The wetland communities near the Black River, including the Sedge Meadows, Hardwood Swamps and Alder Communities provide value in storing and attenuating peak surface water flows, reducing the potential for downstream flooding. The wetlands also provide storm water and flood storage benefits. The relationship between groundwater and wetlands can be complex in that wetlands can be points of recharge to and discharge of groundwater. Wetlands that recharge to groundwater can remove some contaminants. Where groundwater feeds and discharges to wetlands, wetland water quality can be improved. The degree to which the wetlands in the Black River floodplain recharge to or receive discharge from groundwater is unknown.

The wetland impacts described below are based on the selection of Alternative F-4, the current proposal. As stated above, compared to the other alternatives presented by Kohler, the Alternative F-4 entrance route, maintenance facility locations, and course layout would result in the least amount of direct wetland impact from placement of fill (Table 10, Figure 19). Alternatives A, B, C, and D (with the exception of D-7) involve a new road crossing through and requiring wetland fill in the Black River hardwood swamp. The proposed access road for Alternative D-7, would have the least overall wetland impact compared to Alternatives A, B, C, and D1-D6.

Interdunal Wetlands

The interdunal wetland community occurs in concave swales parallel to the lakeshore, located between elevated dunes. The vegetation is characterized by a mix of hydrophytic and non-hydrophytic species, with moderate tree canopy coverage. The department has classified interdunal wetlands as “critically imperiled” in Wisconsin (five or fewer occurrences or very few remaining individuals or acres) and globally because of extreme rarity (6 to 20 occurrences or few remaining individuals or acres) and/or factor(s) making it very vulnerable to extinction throughout its range.

The integrity of the interdunal wetland plant community is rated as high to exceptional with dominant species including Baltic rush (*Juncus balticus*), sedges (*Carex spp.*), Canada bluejoint grass (*Calamagrostis canadensis*), northern bugleweed (*Lycopus uniflorus*), willow species (*Salix sp.*) and goldenrod (*Solidago sp.*). Highly conservative species also occur. The hydrology that supports interdunal wetlands is nutrient poor (oligotrophic) and provide habitat for rare sand dwelling plants and animals. These wetlands are dependent on groundwater recharge to maintain groundwater levels and groundwater quality that supports the rare plant species.

Alternative F-4 would result in no filling of interdunal wetlands. Secondary impacts from tree clearing and grading activities will alter the local hydrology of these wetlands. Additional secondary impacts from irrigation water, pesticides and fertilizer applications on sandy soils in which these wetlands are located, (especially those located near Hole #16 and the driving/practice range) would impact water quality by increasing nutrients and leading to changes in the plant assemblages in the interdunal wetlands to plants more adapted to eutrophic conditions.

Ridge and Swale Wetlands

The Great Lakes ridge and swale wetland community occurs in several small pockets ranging from .004 to 0.23 acres in size within swales parallel to Lake Michigan. These wetlands consist of a mix of southern sedge meadow vegetation, with lesser components of emergent aquatic, northern hardwood swamp and alder thicket. They include a variety of conditions from exposed to shaded, year-round to seasonal

saturation, and within linear swales and isolated depressions. Dominant vegetation consists of bluejoint grass, and tussock sedge (*Carex stricta*). Occasional green ash (*Fraxinus pennsylvanica*) trees occur within this wetland type. Areas of tag alder (*Alnus incana*) occur within this wetland type, forming pockets of alder thicket. Although invasive species occur in some of the wetlands, they are rarely dominant. Most of the species are conservative. In general, the Great Lakes ridge and swale wetlands at the site have exceptional floristic diversity and are relatively free of invasive species. These wetlands support threatened and endangered species habitat functions and are important breeding grounds for amphibians. These wetlands are dependent on groundwater recharge to maintain groundwater levels and groundwater quality that supports the rare plant species.

The department has classified ridge and swale wetlands as “imperiled” in Wisconsin (6 to 20 occurrences or few remaining individuals or acres) and are Globally either very rare and local throughout their range or found locally (even abundantly at some of its locations) in a restricted range. Rarity and other factors make this community type vulnerable to extinction throughout its range.

There are 67 Great Lakes Ridge and Swale wetlands delineated on the site, totaling approximately 5.24 acres. Approximately 1.465 acres of ridge and swale wetlands would be directly impacted by the Project through filling in order to construct the Project with much of that impact concentrated in the location of Hole #18 and the clubhouse/parking areas. (Figure 19, Table 10).

Of these 67, 20 will not be filled during golf course construction. Secondary impacts are likely to occur from tree clearing and grading activities, which can alter the local hydrology of these wetlands. Additional secondary impacts from irrigation water and fertilizer run-off into the adjacent wetlands would impact water quality by increasing nutrients and leading to changes in the plant assemblages to plants more adapted to eutrophic conditions.

Sedge Meadow

Sedge meadow wetlands occur within the Black River floodplain along the river banks, sometimes forming extensive corridors which provide vegetative cover offering shoreline protection. The wetlands within the Black River floodplain and surrounding areas store and lessen peak flows in the river which reduces flood flows downstream. The wetlands also provide value in protecting water quality of the Black River.

In addition to floodplains, the sedge meadow wetlands are often found on sites with essentially intact groundwater processes, including active groundwater discharge areas, which is important to maintaining the integrity of the native plant community.

The sedge meadow communities have a high level of species diversity and support native sedges, forbs, and grasses. Common species within the sedge meadow include bluejoint grass, lake sedge (*Carex lacustris*), swamp milkweed (*Asclepias incarnata*), water horehound (*Lycopus uniflorus)*, and wild mint (*Mentha arvensis*). Invasive species are present.

Secondary impacts from tree clearing are likely and are proposed to be minimized by properly installing and maintaining exclusionary fencing and erosion control BMPs to minimize sedimentation during construction.

Hardwood Swamp Community

The hardwood swamp community forms extensive stands within the Black River floodplain, with smaller areas located within isolated depressions and along tributary streams. Hardwood swamp is relatively infrequent within the surrounding agricultural and urban areas. Due to the large extent of the hardwood swamp on the site and the variety of microhabitats, the community has a high species richness (80 species present) and is characterized by a tree canopy dominated by green ash and black ash (*Fraxinus nigra*). Some trees in this community have been blown over from the lakeshore winds, high water table, and poor soil stability. The understory varies from dense to relatively open, with tag alder often forming a shrub layer. Invasive species, primarily reed canary grass, impact ground layer diversity locally. Common ground layer

species include bottomland aster (*Symphyotrichum ontarionis),* water horehound*,* white avens (*Geum candense*)*, and* bristly buttercup (*Ranunculus hispidus*)*.* The community is generally in moderate to good condition with invasive species mostly limited to the buffer. Degraded hardwood swamp areas were also observed with a predominance of invasive shrub species and garlic mustard.

Similar to the sedge meadow, the hardwood swamp provides vegetative cover along the banks of the Black River offering shoreline protection and storage which may lessen peak flows in the river and may reduce flood flows downstream. The hardwood swamp wetlands also provide value in protecting water quality of the Black River.

The Project would directly impact approximately 2.2 acres of Hardwood Swamp/Forested Seep on the margins of the large area of Black River riparian wetlands. This is primarily due to the proposed location and design of Holes # 1, 2, and 11. The forested seep area is the line between the riparian wetland and the upland and is currently proposed to be impacted by the Project from tree removal, changes in hydrology and direct filling from constructing the course's facilities. These impacts are proposed to be minimized by properly installing and maintaining exclusionary fencing and erosion control BMPs to minimize sedimentation during construction.
Secondary impacts to these forested wetlands are likely due to hydrologic changes from removing trees. Removing significant numbers of trees can alter the hydrology significantly by changing the amount of evapotranspiration occurring. The wetland type could change from a substantial increase in water. The remaining trees may not be able to withstand the substantial changes to the hydroperiod and may end up declining in number.

Seepage Slope

The seepage slope hardwood swamp community occurs in narrow bands along the upslope edge of wetlands on either side of the Black River in the transition zone from hardwood swamp to northern mesic forest. The community is characterized by a mature tree canopy of yellow birch (*Betula alleghaniensis*), green ash, beech, sugar maple, red

maple, and an open understory with lady fern (*Aspidium angustum*), skunk cabbage (*Symplocarpus foetidus*), bristly buttercup, woodreed (*Cinna arundinacea*), ostrich fern (*Matteuccia struthipteris*), and sensitive fern (*Onoclea sensibilis*). The community occurs on a gradually sloping landscape position, somewhat elevated above the Black River floodplain, and is characterized by groundwater discharge. The trees in this community show morphological adaptations such as buttresses and shallow roots as a response to the shallow water table.

Natural disturbances, especially wind throw, have led to development of microhabitats important to regeneration of yellow birch and to ideal salamander habitat. The groundwater discharge of the forested seep indicates essentially intact groundwater function. Invasive species are not common and no rare species are noted within this community.

Impacts to this area are the same as those described above in the hardwood swamp community section. Additionally, wildlife habitat, flood storage, and an area of beech reproduction (presence of seedlings, saplings, and mature trees) are likely to be impacted. Generally, the beech trees grow on uplands or at the edge of the wetland mainly outside the boundaries of the wetland areas.

Alder Community

The alder thicket is in moderate to good condition, occurring as a component in a complex of Black River floodplain wetlands. The community is characterized by the dominant shrub species, tag alder, and a perennially saturated substrate. Occasional green and black ash trees occur within the alder thicket but do not exceed 30 percent canopy. Common groundlayer species include skunk cabbage and water horehound. The most significant stressors appear to be inflows of silt and excess nutrients from sources upstream in the Black River and its tributaries, and the cover of non-native species, primarily reed canary grass. Historic agricultural use occurred within the buffer area and was likely limited to pasturing. Current agricultural impacts appear to be

minimal. Recreational usage is limited to the unpaved trails that run through the Kohler-Andrae portion of the area. Access through the alder thicket on foot is difficult.

5.1.10 Wetland Compensatory Mitigation

State and federal wetland permitting laws require compensatory mitigation for unavoidable wetland loss. Mitigation standards are outlined in Section 281.36, Wisconsin Statutes, and the Clean Water Act. Information about wetland mitigation guidelines is available at http://dnr.wi.gov/topic/Wetlands/mitigation/guidelines.html. The Project is located in the Northwestern Lake Michigan Bank Service Area.

Kohler is proposing to provide compensatory mitigation through the purchase of credits from the in-lieu fee program. The department evaluated the wetland mitigation proposal. Permittee-responsible mitigation was determined infeasible and no credits were available from an approved mitigation bank. The mitigation plan includes the purchase of credits from the WI Wetland Conservation Trust in-lieu fee wetland mitigation program to compensate for the permitted wetland impacts.

5.1.11 Surface Water and Water Quality

A water quality assessment was completed for a one-year period from October 2010 through September 2011 near Indian Mound Road. Water samples were tested for nitrogen, conductivity, pH, dissolved oxygen, and total phosphorus. Results were within a normal, expected range for flowing systems in Wisconsin with the exception of total phosphorus. The current NR102 standard for total phosphorus in streams is 75 ug/L. Water bodies with levels above this can be considered impaired. The sample results averaged 279 ug/L, over 3 times the maximum standard. The Black River is listed on the 2014 303(d) Impaired Waters List based on a degraded biological community due to high total phosphorus.

If buffers, erosion control practices, and setbacks are followed, the anticipated environmental impacts to aquatic resources within and adjacent to the Project boundary would be limited. The Black River would be buffered from the golf course by riparian wetlands, and there would be no surface water withdrawals for irrigation. Because storm water runoff will be infiltrated, surface water runoff will be minimized.

As part of the routine monitoring of beach water quality at Kohler-Andrae, nearshore lake water samples are collected and tested for the concentration of *E. coli* bacteria at fixed locations along the northern and southern stretches of the park, typically three days a week during the summer months. This monitoring has been conducted every summer for the past twelve years. The *E. coli* that is monitored does not itself present a health risk, but serves as an indicator of fecal contamination and the potential risk of exposure to associated pathogens. During sample-collection, the linear coverage of *Cladophora* algae along the shoreline is also estimated and recorded. *Cladophora* is considered a nuisance in that is unsightly and can have a strong odor when rotting; however, it does not present a health risk.

During the three-year period between 2010 and 2012 (when Lake Michigan water levels were historically low) *E. coli* concentrations at the sampling location nearest the Kohler Property exceeded the recreational water-quality standard (235 colony-forming units of *E. coli* per 100 mL) 14% of the time. This dropped to 6% during the period between 2015 and 2017 (when water levels rebounded to near-record highs). Similarly, the percentage of days when *Cladophora* on the beach was characterized as “moderate” or “high” dropped from 14% during 2010-2012, to 3% during 2015-2017.

Statistical analyses of ten years of *E. coli* results and contemporaneous data on nearshore, onshore, and hydro-meteorological conditions indicate that the sources of fecal contamination at Kohler-Andrae are largely local and non-human (i.e., gulls) and that elevated *E. coli* concentrations, when they occur, are more strongly related to lake levels and wave action than rainfall/ runoff events. Municipal sewerage of the Project area will further limit the potential for human-source contamination.

Research has shown that the reemergence of *Cladophora* blooms along the western shore of Lake Michigan in recent years is attributable to the explosion of dressinid mussel populations and subsequent increases in water clarity, and that local blooms are more closely related to nearshore substrate, bathymetry, and the presence of shoreline structures than they are to nearby inputs of phosphorous and nitrogen (Garrison et al., 2008; Riley et al., 2015). Blooms of toxic blue-green algae (cynobacteria) and other harmful algal blooms (HABs) have historically not occurred in Lake Michigan. HABs in

western Lake Erie and lower Green Bay have been attributed to large-scale increases in phosphorous and nitrogen from agricultural lands across the basins draining to those waterbodies (Smith et al., 2015). The department does not anticipate that the proposed Project would result in either HABs or increased *Cladophora* blooms within the lake.

5.1.12 Fisheries and Aquatic Biology

The Black River is the only inland aquatic resource within the vicinity of the Project. The primary land use in this watershed is natural lowlands with adjacent agricultural lands. Residential areas surround the Black River's very upper and lower reaches. The Oostburg Wastewater Treatment Plant is a permitted point source discharger to the upper reaches of the Black River. Current stream community models classify the Black River as a cool-warm transitional headwater stream. Fish communities in this type of stream are defined as follows:

Cool (Warm–Transition) Headwater – small, sometimes intermittent streams with cool to warm summer temperatures. Coldwater fishes are uncommon to absent, transitional fishes are abundant to common, and warm water fishes are common to uncommon. Headwater species are abundant to common, mainstem species are common to absent, and river species are absent.

Fish surveys from the Black River in the vicinity of the Project are 15 years old but there have been no significant changes in this area. There is a marked improvement in fish populations between the KK sample site upstream of the Project area and the Indian Mound sample site, just downstream of the Project area. In addition, land use in the area upstream of KK is primarily agricultural and the stream may have been channelized in the past. Using current index of biotic integrity (IBI) standards, the Black River fish community within the Project area rated excellent for a cool-warm fish community based on a survey from 1999, upstream of Indian Mound Road. Excellent scores within Sheboygan County are not common.

In Kohler-Andrae, the Black River flows through a large wetland complex and the riparian corridor becomes more forested. This wetland complex likely acts to maintain water quality, while the springs and forested riparian corridor on the Kohler Property

may help to maintain cooler water temperatures. Woody input from the trees also provides instream habitat. Based on the lack of change in the area just upstream of Indian Mound Road, it seems likely that the excellent cool-warm transition IBI rating is still valid for this reach.

Sections of the Water Resources of the Sheboygan River Basin – Supplement to The State of the Sheboygan River Basin Report (2001) were referenced in the environmental impact report provided to the department in April 2015. The report stated that specific segments of the Black River had poor water quality “with polluted runoff causing excessive sedimentation. As a result, habitat for fish, macroinvertebrates and periphyton is poor.” This statement should not be applied to the river in whole. In fact, the same report also notes that “WDNR personnel recently conducted fish surveys on the Black River in 1999, upstream of Indian Mound Road (river mile 1.6) and in 2000, downstream of CTH KK (Table 14). Stream habitat and available fish cover in these two areas of the Black River was rated as fair.” The report also notes that the IBI applied at the time rated the fish community as fair. As stated above, using current IBI methods based on stream community type the IBI rates excellent for the survey at Indian Mound Road.

In 2014 salmon were documented in the Black River on Kohler-Andrae property near the bridge. This is not the only time that Lake Michigan game fish have been seen in the river but it is the most recent and well documented, and indicates that anadromous species utilize the Black River when conditions allow.

No environmental impacts to aquatic resources are anticipated if the current crossing of the Black River is used, adequate buffers from the golf course is maintained, surface water is not used for irrigation, and wetland disturbance and storm water runoff to surface waters is limited.

5.1.13 Wildlife

The Project would result in significant changes to the current landscape and the associated habitats used by wildlife. Some of the changes could have positive impacts to certain types of wildlife, while others would have adverse impacts.

The Sheboygan County lakeshore is part of the Central Lake Michigan Coastal Ecological Landscape which extends from Milwaukee County north to Door County. The Kohler Park Dunes State Natural Area (Kohler Dunes), located within Kohler-Andrae, is part of this regional landscape. Kohler Dunes consists of a linear forest zone along Lake Michigan that contains a mixed pine-hardwoods dune forest community dominated with white pine, red oak, white birch, beech, and sugar maple. This is the largest dune complex on Wisconsin's western shore of Lake Michigan and provides habitat for species associated with the Great Lakes shorelines.

The Kohler Property is within the Harrington Beach-Kohler-Andrae Lakeshore Migration Corridor. This corridor is an Important Bird Area, or IBA, a worldwide program in which Wisconsin participates. The migration corridor extends from Sheboygan south to Port Washington in Ozaukee County. It encompasses Harrington Beach and Kohler-Andrae State Parks, Cedar Grove Hawk Research Station State Natural Area, and the Forest Beach Migratory Preserve. This IBA contains a variety of habitats including open Lake Michigan waters, sand beach, cool-season grasslands, upland deciduous forest, lowland forest of white cedar and black ash, and shrub lands.

The area south of Sheboygan, including the state park lands, has been recognized as an important resource for migratory birds. It has been identified as an IBA due to the extensive use by birds as on-shore migratory stopover habitat and off-shore wintering waterfowl habitat. This area has also been identified by the Wisconsin Stopover Initiative as a Tier 1 area, the highest level of significance for migratory bird stopover habitat (Grveles et al. 2011). This area was recognized as an IBA due to the extensive use by birds as on-shore migratory stopover habitat and off-shore wintering waterfowl habitat.

The 2013 Christmas Bird Count for Sheboygan noted 50 species, and the Wisconsin Breeding Bird Atlas lists 41 probable and 15 confirmed species for the Sheboygan South survey area. About 41,000 raptors of 26 species have been banded from 1950 through 2013 approximately 8-miles south at Cedar Grove Ornithological Research Station. Additional bird observations on the property are listed in Table 6.

Migratory birds that utilize Lake Michigan waters and the beach area along the Kohler Property would likely be minimally impacted by the Project. These areas will remain undeveloped, but there would be an increase in human disturbance nearby that could negatively impact the birds.

The department's *Ecological Landscapes of Wisconsin* publication says this about the lakeshore landscape in the Sheboygan area: "The Lake Michigan shoreline is heavily used by migratory birds of many kinds, including waterfowl, loons, grebes, gulls, terns, shorebirds, raptors, and passerines. Many sites along the Lake Michigan shore are popular with birders because of the high diversity of birds and many rarities that can be observed there. Providing and maintaining a sufficient variety and abundance of the habitats needed by these birds is a priority conservation goal."

The Kohler Property is almost 100 percent contiguous forest. Up to 50 percent of the forest would be removed if the proposed project is constructed. The remaining fragmented forest would provide some habitat during songbird migration. Invasive species management and restoration of native trees and shrubs in invasive removal areas would help control exotic and invasive species in the retained forest. The forest edge along turfgrass and human use areas created from fragmentation of the forest would probably increase the challenge of exotic and invasive species management. The edge would likely provide some habitat for species that inhabit transitions between forest and openings. Habitat value would likely be diminished. Tree clearing would occur on the Property for each hole, the access road, the clubhouse/parking lot complex, the practice range, the maintenance facility, the restrooms, and the irrigation pond. Tree clearing may also occur in forested areas between tee and fairways to provide lines of sight. Interior forest bird nesting habitat is likely present within and adjacent to the Project boundary and would essentially be eliminated. Wildlife species inhabiting these areas would be permanently impacted by the loss of habitat. However, impact to these species is not expected to create a significant effect on regional populations.

Following construction of the proposed golf course, forest cover within the Kohler Property would likely provide stopover habitat similar to that in the adjacent residential areas and Kohler-Andrae. However, reduction of the forest to 50 percent cover would result in a substantial reduction of available stopover habitat on the Kohler Property. The department recognizes a 10-mile zone landward of the shoreline as potential stopover habitat. However, few forests of this size exist within that zone along this stretch of shoreline.

The approximate 5.7-acre irrigation pond that would be constructed could provide new open water habitat for amphibians, reptiles, water birds, and aquatic organisms. In order to function as a viable wildlife pond, its design would need to include such features as natural substrate, varying depths, natural aquatic structure, submergent and emergent aquatic and shoreline vegetation, and the exclusion of surface water run-off to prevent entrance of nutrients and chemicals from surrounding turf areas. These natural features are usually omitted in irrigation ponds due to problems they cause with irrigation equipment. A pond lacking enough natural features would provide little benefit to wildlife, other than Canada geese (*Branta canadensis*). The resident “giant” Canada goose (*Branta canadensis maxima*) usually utilize this perfect mix of open water, surrounded by turfgrass in wide-open spaces that golf course irrigation ponds offer. Their numbers, feeding, and defecation often increase to the point that they become a nuisance to the operation of the course. A natural pond with a wide, natural shoreline buffer would help make the pond less appealing to them. However, a mix of population control methods and hunting are often needed.

Incidental wildlife observations were recorded during on-site biological survey events. Table 6 lists the wildlife observed, excluding endangered, threatened, and special concern species which are summarized in biological survey reports provided under separate cover. Additional wildlife species are likely present but were not observed or surveyed.

Table 6: 2014 Wildlife Observations on the Kohler and State Park Properties

SCIENTIFIC NAME	COMMON NAME
Pseudacris crucifer	Spring Peeper
Lithobates sylvaticus	Wood frog
Ambystoma laterale	Blue-spotted salamander
Plethodon cinereus	Eastern red-backed salamander
Chelydra serpentina	Snapping turtle
Thamnophis sirtalis	Common garter-snake
Odocoileus virginianus	White-tailed deer
Anas discors	Blue-winged teal
Dryocopus pileatus	Pileated woodpecker
Poecile atricapillus	Black-capped chickadee
Strix varia	Barred owl
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	Red-tailed hawk
Bubo virginianus	Great Horned Owl

The amphibian species observed include the red-backed salamander (*Plethodon cinereus*) which utilize wooded upland habitats whereas the blue-spotted salamander (*Ambystoma laterale*), the spring peeper (*Pseudacris crucifer*), and the wood frog (*Lithobates sylvaticus*) depend on wetlands for breeding and wooded uplands for foraging and hibernation. Reptiles observed include the snapping turtle (*Chelydra serpentina*) and the common garter snake (*Thamnophis sirtalis*). Snapping turtles inhabit a variety of aquatic habitats, including wetlands, ponds, rivers and streams, as well as adjacent habitat. Common garter snakes generally inhabit wetlands and adjacent uplands. Additional amphibian and reptile species may also be present. Native amphibians and reptiles within the Project area would likely be impacted by construction activities occurring within suitable habitat.

Native mammals within the Project area would likely be impacted by construction activities occurring within suitable habitat. White-tailed deer would likely adapt well and flourish in the fragmented forest edge habitat of the Kohler Property. It is likely there would be the need to control deer populations with hunting to diminish damage to plantings that would likely result from increased deer numbers.

5.1.14 Endangered and Threatened Species, Natural Communities, and Habitat

Kohler submitted an Endangered Resources Review request to the department on August 26, 2014, and to the USFWS on October 3, 2014. The department received a second request for updated information on March 17, 2017. Several rare species have been identified as potentially occurring on the Kohler Property and impacted Kohler-Andrae property (Table 7). In addition, the U.S. Fish and Wildlife Service has required surveys for a rare mammal. Surveys for rare species were conducted on the Kohler and Kohler-Andrae property within the Project boundary between 2011 and 2017. These surveys were summarized in numerous survey and habitat documents. Records of rare species occurrences on or adjacent to the Kohler Project are summarized below.

Table 7: State/Federal Endangered, Threatened and Special Concern Species Occurring on or Adjacent to the Kohler Project.

Taxa Group	Protected Status				
	State Endangered or Threatened	State Special Concern	Federal Endangered or Threatened	Other Federal Protection	Not Applicable
Bird	2		1	1	
Invertebrate	1	3			
Mammal	1		1		
Natural Community					8
Plant	7	4	1		
Summary	**11**	**7**	**3**	**1**	**8**

The rare bird surveys encountered no evidence of active or historical nesting on Kohler Property or Kohler-Andrae property within the Project boundary.

Surveys encountered the presence of a rare invertebrate. Avoidance of the rare invertebrate would also protect other rare invertebrate species, which were not surveyed for but are known to occupy similar habitat. If impacts to the rare invertebrate cannot be avoided, an Incidental Take Permit would be required.

Preliminary surveys on the Kohler and Kohler-Andrae Properties also indicated the possible presence of several mammal species, including the rare mammal for which the survey was being conducted. Because preliminary surveys indicated the possible presence of the rare mammal, additional coordination will be required by the U.S. Fish and Wildlife Service.

Rare plants have been observed on the Kohler-Andrae portion of the Project boundary, as well as private Kohler property. Several of the rare plants only occur within the private property portion of the Project area and are not covered by the state endangered species law. Survey results are still being finalized, but at least one rare plant is located within the Kohler-Andrae portion of the Project boundary.

5.1.15 Invasive species

Invasive plant species, including species listed as Restricted under Wisconsin's Invasive Species Rule (NR 40) were found throughout the Kohler Property as shown in Figure 9. Japanese barberry was present in terrestrial habitats, ranging from 70 percent cover in the forests near the southern border of the Kohler Property, to 5 to 10 percent cover throughout the majority of the northern dry mesic forest on the Kohler Property. Reed canary grass was present throughout the degraded wet meadow and alder thicket associated with the Black River, ranging from 5 to 20 percent cover. Multiflora rose was found throughout the degraded hardwood swamp on the Kohler-Andrae portion of the Project boundary. Japanese knotweed (*Polygonum cuspidatum*) was found in a localized area near the northwest corner of the Kohler-Andrae property within the Project boundary. Other invasive species observed include bush honeysuckle (*Lonicera spp.*), garlic mustard (*Arabis petiolata*), and dame's rocket (*Hesperis matronalis*). Purple loosestrife (*Lythrum salicaria*) was not observed.

Due to its current density, management of Japanese barberry would be the primary focus. Other invasive species of lower density and scattered throughout the Project's boundary would also be managed. Kohler has stated that herbicides would be applied by licensed professional pesticide applicators and in accordance with product labels. Kohler intends to complete invasive species management and replant native trees, shrubs and groundcover in areas beneficial to the habitat.

The management of invasive species would have a significant, long term positive benefit to the property and biological community. Invasive species removal allows native plant communities to repopulate, significantly enhancing the habitat and promoting increases in native biological and wildlife diversity.

5.2 Socioeconomic Environment and Land Use

5.2.1 Demographics

Population: Growth, Age, and Distribution

Prior to August 2017, the Project site was part of the Town of Wilson. The Town of Wilson's highest population was in 1980 with 3,604 residents. Through land annexations by the City of Sheboygan, the Town of Wilson's population was reduced by 762 residents. During the 1990's, the Town of Wilson's population increased by 16 percent (385 residents) (Bay Lake, 2007). According to the 2000 census, the Town of Wilson had 3,227 people, 1,235 households, and 974 families with a population density of 57.8 people per square mile. The racial makeup consisted of 96.81 % White, 0.22% African American, 0.15% Native American, 1.36% Asian, 0.84% from other races, and 0.62% from multiple races. The population of Hispanic or Latino of any race was 2.32%. Current population estimates are approximately 3,500 residents (Wikipedia, 2015).

Age distribution has experienced several shifts between 1980 and 2000. Residents under the age of 10 have steadily decreased over the past 20 years while residents aged 65 and older have increased over the past 20 years. In 1980 the largest percentage of the Town of Wilson's residents were in the 25-34 age group. Each census since has seen the greatest increase in the subsequent age groups (35-44 and 45-54) indicating that the average age of residents is increasing. The population shift to the older age groups is expected to continue and may result in higher demand for elderly housing, nursing homes, assisted living facilities, along with other support serviced for older adults (Bay Lake, 2007).

Education

The Project area is within the Sheboygan, Oostburg, Sheboygan Falls, and Kohler School Districts. The Sheboygan area school facilities include one early learning center, 13 elementary schools, three middle schools, and two high schools. There are also several higher education institutions including Lakeshore Technical College District, Lakeland College, University of Wisconsin Sheboygan, UW Manitowoc, and Silver Lake College (Bay Lake, 2007).

Emergency Services

Prior to annexation, fire protection for the Project area was provided by the Black River Fire Department and the Village of Oostburg Fire Department while Emergency Medical Services/Ambulance services were provided by Orange Cross Ambulance, Inc., or by the Oostburg Ambulance Service. Police protection was provided by the Sheboygan County Sheriff's Department (Bay Lake, 2007).

Transportation

The Sheboygan Parking and Transit Utility is the nearest transit system to the Town of Wilson with the closest routes being Route 7 South which serves the intersection of South 12th Street and Weeden Creek Road and the Industrial Park Route which serves Weeden Creek Road from South Taylor Drive to County Highway OK. Transportation for elderly and disabled residents of the Town of Wilson is provided through programs administered and coordinated by the Sheboygan County Health and Human Services Department Division on Aging (Bay Lake, 2007).

Potential Effects

Significant demographic effects are not anticipated as a result of the Project. Seasonal increases in the Project area may occur. Emergency services in the area could be affected as a result of the Project, especially during major events. Details regarding traffic control, crowd management, and emergency response to the Project site have not been provided. The Project could affect local transportation to and from the site and a method of mass transit may have to be considered, especially during major events.

5.2.2 Recreation and Public Use

Lake Michigan and a number of inland lakes located within Sheboygan County provide a variety of recreational activities such as fishing, boating, bird watching, swimming, canoeing, and kayaking. While the County only maintains six public access areas, there are a number of access areas maintained by other jurisdictions. Lake Michigan is a prime destination for open water trout and salmon fishing. Sheboygan County hosts 34 charter fishing companies.

In addition, Sheboygan County contains a number of parks and natural areas, including Gerber Lake Wildlife Area, Esslingen Park, Roy Sebald Sheboygan River Natural Area, and Amsterdam Dunes, as well as Kohler-Andrae (described in detail in the next section). These parks and natural areas along with Kohler-Andrae provide residents and tourists with year-round outdoor recreation opportunities.

Trail systems within the county allow for various uses, including hiking, cycling, skiing, and snowmobiling. The County maintains about 228 miles of public snowmobiling trails (Sheboygan County, 2015). Other popular trails include the Old Plank Road Trail, Interurban Trail, and the newly constructed Shoreland 400 Rail Trail. The Kohler Property contains multiple primitive trails which historically have been used by area residents. These trails have provided recreational opportunities for many years but are currently restricted from public use.

The Riverdale Country Club, an 18-hole public golf course, is approximately one-half mile west of the Kohler Property on the west side of 12th Street. This course is located along a tributary to the Black River and is surrounded by increasing numbers of residential and agricultural neighbors since its opening in 1929.

The Town of Wilson owns a parcel of conservation property adjacent to the northern boundary of the Kohler Property. The Robert Balzer and Ruth Balzer–Schmitt Wilderness Park is a mesic forest dominated by white pine, with secondary dominants of oaks, maples, birch, and beech.

The Project would allow public access for golf and use of the associated facilities on the 247-acre property which is now privately owned and currently unavailable to the public. At this time, it is unknown if other potential public uses such as birding, hiking, and cross-country skiing would be made available to those who wish to utilize the property for recreational uses other than golf.

In connection with developing the golf course, Kohler would grant a lake access easement for lot owners in the Timberlake Subdivision. This easement would be located in the northeast portion of the Kohler Property and would provide subdivision lot owners direct access to Lake Michigan which currently does not exist.

5.2.3 John Michael Kohler and Terry Andrae State Parks

John Michael Kohler State Park (established 1966) and Terry Andrae State Park (established 1927) span over two miles of Lake Michigan shoreline and cover nearly 1,000 acres including the Kohler Park Dunes State Natural Area. Managed as a single unit of the Wisconsin State Park System, Kohler-Andrae receives approximately 400,000 visits per year resulting in an estimated $20 million in direct expenditures on food, fuel, accommodations, equipment, etc. Kohler-Andrae is open year-round and offers opportunities for hiking, camping, picnicking, cycling, horseback riding, swimming, fishing, hunting and trapping, cross-country skiing, and snowshoeing. The Kohler-Andrae campground has one of the highest occupancy rates of any state park, and day-use on summer weekends frequently fills all available parking spaces.

Kohler-Andrae borders the Kohler Property to the south and west (Figure 4). The Kohler Company originally acquired 468 acres in the vicinity of the Project, including the current Kohler Property, during the 1930's. In 1965, Kohler donated 221 acres to the State of Wisconsin for the creation of the John Michael Kohler State Park. The remaining the 247-acre Kohler Property was leased to the State for a ten-year period.

Federal Land and Water Conservation (LAWCON) funds were used to purchase additional property for Kohler-Andrae. As such, a separate review process involving both the U.S. Department of the Interior National Park Service (NPS) and the department is necessary to determine if the proposed easement constitutes a "conversion of recreational use" on the property. Kohler is consulting with NPS and the department to complete this review process and determine appropriate mitigation if the easement is allowed. The funding agreement requires a conversion process for new

roadway and floodplain easements in parkland and also requires that the replacement land be of equal or greater size, value, and recreational utility.

Higher levels of traffic could increase congestion at the Kohler-Andrae entrance and increase demand for overflow parking on nearby roads during Kohler-Andrae peak visitor times and golf course special events. Coordination with Kohler-Andrae may minimize traffic conflicts at the Kohler-Andrae entrance during peak visitor times and golf course special events.

Short term adverse impacts that cannot be avoided include approximately two years of construction traffic, noise, and dust. Coordination with local ordinances for construction traffic routing, hours of operation, noise, and vibration may reduce impacts to adjacent residents and Kohler-Andrae users. Hikers on the Black River Trail near the Black River would be the Kohler-Andrae patrons most likely to notice construction noise and changed aesthetics.

5.2.4 Master Plan Amendment process

In 2015 the department received a request from Kohler requesting an easement from the State of Wisconsin for approximately five acres of Kohler-Andrae property adjacent to the existing Kohler-Andrae State Park. Specifically, Kohler has proposed to construct and maintain the following on Park Lands: 1) a roadway and roundabout to access its lands, 2) utility access, and 3) a maintenance facility. In June 2017, the Natural Resources Board approved the department's recommendation to initiate a master plan amendment process to consider these proposed changes. The existing master plan was adopted in 1989. For the most current information regarding the master plan amendment process, please visit the department's Kohler-Andrae State Park Plan Amendment page.

5.2.5 Zoning and Local Development Plans

The Kohler Property is undeveloped and has been privately owned by Kohler for more than 75 years. The Kohler Property and the affected portion of Kohler-Andrae State Park were annexed by the City of Sheboygan in August of 2017 and are zoned SR-5

Suburban Residential (Figure 5). Active Outdoor Public Recreation is a permitted Special Use within the SR-5 zone under the City's zoning ordinance.

Given the proposed amount of forest clearing (100 -120 acres) Forestry Best Management Practices for water quality could help protect waterways and wetlands. A county cutting notice would also need to be filed with Sheboygan County.

The neighborhoods to the north and west are zoned by the Town of Wilson as R-1 Single Family Residential, while the properties to the southwest are zoned as A-2 Agricultural.

5.2.6 Changes in Private Property Values

It is difficult to predict how the Project would affect nearby property values, as the department was unable to find any studies on the effect of converting natural land to a golf course. Numerous studies have shown that golf courses and other types of open space increase property values; however, the magnitude of the increase depends in large part on neighborhood characteristics such as housing density, distance to commercial centers, and household income (Anderson & West 2006). Lutzenhiser and Netusil (2001) found that while the premium for being located immediately next to a golf course is slightly higher than a "natural area park," the opposite is the case at a distance of 1,500 feet. It is also important to note that the "protected" status of an open space (i.e., as part of a park or conservation easement) is responsible for much of the premium it confers on nearby properties (Geoghegan 2002). Another potentially confounding variable is the degree to which the premium of living near open space is offset by negative externalities such as increased traffic (Bolitzer and Netusil 2000).

5.2.7 Noise

Noise impacts occur when the predicted equivalent sound level (LEQ) approaches or exceeds the noise level criteria (NLC) established for a type of land use or when predicted sound levels substantially increase above existing levels. Noise level criteria is a term that the Wisconsin Department of Transportation (WisDOT) has substituted for "Noise Abatement Criteria" which is used in 23 CFR 772. WisDOT has adopted the land use categories, impact levels, and evaluation locations in 23 CFR 772 Table 1. For land

uses that include residences, parks, and churches, the NLC is 67 dBA. For commercial land uses the NLC is 72 dBA. Noise impacts for various alternatives are compared based on the number of noise receptors that approach or exceed an activity category and/or experience a substantial increase above existing levels. To date, a noise evaluation has not been completed, but it is not likely that the proposed golf course would generate a consistent, substantial increase in sound level during normal operations. The noise levels resulting from crowds, traffic increases, helicopters, etc., during major events could increase compared to normal operations. These increases are not anticipated to exceed the duration of any potential major/special events.

Construction equipment including trucks, excavators, and bulldozers would be used to construct the Project. To reduce potential noise impacts, construction equipment would be operated in compliance with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the Project. All motorized construction equipment would be required to have mufflers constructed in accordance with the equipment manufacturer's specifications or a system of equivalent noise reducing capacity. It would also be required that mufflers and exhaust systems be maintained in good working order, free from leaks or holes.

Kohler-Andrae park users would experience noise and disruptions that are associated with construction of a major development project. Hikers on the Black River Trail near the Black River would be the Kohler-Andrae patrons most likely to notice construction noise.

5.2.8 Visual and Aesthetic Resources

Coastal management in the Great Lakes region is a Federal-State partnership established by the 1972 Coastal Zone Management Act (CZMA). Administered by the National Oceanic and Atmospheric Administration (NOAA), the program provides states financial and technical assistance to develop and implement their own coastal zone management programs. The Wisconsin Coastal Management Program is administered by the Department of Administration (DOA), Bureau of Intergovernmental Relations.

According to NOAA, Wisconsin's coastal zone consists of 15 lakefront counties and approximately 820 linear miles of shoreline.

Kohler has stated that the lakeshore and associated dune habitats are essential to the natural and minimalistic golf course design.

Some trees bordering the beach would be removed, allowing longer sight lines between the Project and Lake Michigan. Trees present in dune habitat that is utilized by a rare species may not be able to be removed unless additional authorizations are obtained (i.e., an incidental take permit). Additionally, the number and area of trees removed would have to be reviewed to determine the potential impacts on the beach/dune community. The majority of the dunes and beach system would remain natural, allowing it to retain its distinctive scenic attractiveness and high scenic integrity. The viewshed associated with adjacent lands would remain largely unchanged, since the Project would be screened on three sides by woody vegetation, either original to the site or planted. The maintenance facility and fence would potentially be visible from the Old Park Road. The natural scenic beauty of the view of the dunes from the lake may be lessened by tree removal and structure construction. It is expected that at least the viewing tower associated with the club house would be visible from the lake and it is likely that the public view from the lake would also include the tees, greens, and other infrastructure.

5.2.9 Archeological and Historic Resources

Over the course of the last few years, Kohler has proposed a number of developments for the Kohler Property located immediately north of Kohler-Andrae. Anticipating that development of this area would likely necessitate permitting by both federal and state agencies (Section 106 of the National Historic Preservation Act for the former, and Chapters 44.40 and 157.70 of State statutes for the latter), Kohler proactively undertook cultural resource investigations to identify and evaluate historic properties potentially located on the parcel. Federal agency involvement (USACE), consistent with provisions of Section 106 of the National Historic Preservation Act, addresses mitigation of

potential adverse impacts to identified historic properties, including opportunities for consultation with members of the local community as well as tribal interests.

A review of information complied by the Wisconsin Historical Society indicates that seven (7) prehistoric archaeological sites, including one burial mound group, have been identified as co-incident with the property. The largest of these sites (SB-0173, which extends over most of the property) includes both prehistoric (predominant) and historic (much more limited) habitation components, each of which has been evaluated as potentially eligible for the National Register of Historic Places. Of note, inclusion on the NRHP does not preclude development. Burial mounds and other burial sites are provided with a very substantial measure of protection under provision of WI Statutes. Note further that the location of one reported site (SB-0174, a cache of “net sinkers” first reported in 1902) is unknown.

The USACE is the lead agency for addressing potential impacts to cultural resources and is coordinating the formal review process with the State Historical Society.

5.2.10 Roads and Traffic Management

Kohler investigated numerous alternative entrance routes to the Kohler Property and has selected a proposed route that reduces impacts to nearby residents and the environment. Access through residential neighborhoods to the north was investigated but not recommended due to traffic impacts to area residents. Multiple routes originating off 12th Street through Kohler-Andrae were also investigated, but generated greater environmental impact than the route being proposed. In conjunction with the master plan amendment process for Kohler’s requested easement, the department requested additional information regarding the various entrance routes. Please visit the department’s Kohler-Andrae State Park Plan Amendment page for the most current information.

A traffic study was completed to determine the traffic impacts of the proposed golf course. The State of Wisconsin rates the functionality of intersection movements based upon their Level of Service (LOS). The LOS rating for an intersection or traffic movement is calculated in a range from LOS A (very good) to LOS F (very poor). Per

AASHTO, an LOS D and above has been set as the acceptable LOS design standard for existing peak hour operating conditions for a rural, local roadway. In 2012, Kohler-Andrae had the fifth highest number of visitors (418,373) of all the Wisconsin State Parks (State of Wisconsin, 2013).

The traffic study concluded that all proposed traffic movements at the intersection of CTH V and Beach Park Road would operate at a LOS B or better. The study also shows that all movements at the proposed golf course entrance location to Beach Park Road would operate at LOS A. In both cases, the LOS would significantly exceed the minimum acceptable value. The LOS calculations were based upon the existing road intersection configuration and showed that no traffic improvements would be required. Kohler is proposing to modify the Kohler-Andrae entrance area by adding a roundabout (Figure 21) east of the existing bridge spanning the Black River with two lanes dedicated for visitors entering Kohler-Andrae and golf course traffic and exiting Kohler-Andrae visitors would utilize the roundabout. Kohler would fund the entire cost of the roundabout and entrance road changes.

While the traffic study indicates that the LOS would exceed the minimum acceptable value, the study determined Friday p.m. as the peak for traffic volume. The highest volume of traffic typically seen occurs on Saturday and Sunday afternoons, especially during the summer months; traffic routinely backs up extending onto CTH V and 12th Street and the parking lots reach full capacity. As a result of these backups, park users often have to wait in line to enter. The same would occur for golfers attempting to enter during peak times. Backups and entry delays would likely increase during times of peak use of Kohler-Andrae and also during any special events taking place at the golf course.

The currently proposed roundabout option was not analyzed as an option in the traffic report. It is unknown how the proposed construction would affect traffic entering or exiting the golf course and the state park.

5.2.11 Utilities

As described in the utilities section of Chapter 3, Kohler has proposed to utilize HDD and a designated utility corridor to minimize wetland impact during the installation of

electric, gas, and communication utilities (Figure 23). Utilities will be extended from South 12th Street. At this time, a temporary bore pit along South 12th street will result in approximately 1,500 square feet of temporary wetland impact and will traverse approximately 1,200 feet due east along the property line to an area that is currently proposed to be the western most tee box for Hole #7. Final location of the utility connection at South 12th Street will be coordinated with the utility company.

HDD methods often present lower environmental risk when compared to open cut methods (Onsarigo, 2011). There are however inherent risks of an inadvertent release of drilling mud that can occur as a result of low density soils, unconsolidated geology, inadequate bore design, or an inexperienced driller which can result in discharge volumes from a few gallons up to 10,000 gallons. While environmental impacts are typically acute and temporary, deposition rates far exceed natural rates of sediment deposition and can negatively impact wetland hydrology and wetland habitat. HDD frac-out impacts on streams include but are not limited to smothering and displacement of macroinvertebrates, filling of interstitial spaces in substrates, and interfering with fish gill development and function as a result of excess suspended solids (Hull 2014).

There are risks associated with HDD, primarily drilling fluid seepage or frac-out at the land surface. Frac-out risks can be minimized by monitoring drilling pressure during borehole construction; a loss of drilling pressure is an indication to stop drilling and evaluate the bore path for potential drilling fluid seepage.

Minimization of inadvertent returns also include collecting extensive geotechnical data and considering a deep HDD in areas of unconsolidated geology. HDDs are often restricted to certain maximum lengths by site geology and topography (Hull 2014).

According to Kohler, prior to mobilization, the HDD contractor will provide a site-specific Frac-Out Plan to address potential loss of drilling fluids which includes use of anti-seep collars to prevent lateral drainage of the wetland within the borehole, monitoring procedures, and a frac-out response plan.

5.3 Jobs and Economic Development

5.3.1 Recreation and Tourism

According to Kohler, Sheboygan County was ranked 7th of golf destinations in the world in 2000 and is a golf destination to tourists from within the county as well as travelers from out of state. Kohler has developed four golf courses, two at Whistling Straits and two at Blackwolf Run. Blackwolf Run consists of the River Course and the Meadow Valleys Course. Whistling Straits consists of the Straits Course and the Irish Course. All four courses are ranked in the top 100 public golf course list in Golf Digest Magazine's 2015/2016 issue (Whitten, 2015). The Straits course was ranked 4th in the U.S. An estimated 40,000 visitors play 100,000 rounds in Sheboygan County each year (SB Friedman, 2015) and Kohler anticipates that approximately 23,000 additional rounds of golf would be played at the new course.

Recent information describes a decline in the number of active golf players and the subsequent closing of golf courses. According to one report by Bloomberg Business in May 2014, the National Golf Foundation stated that 400,000 players left the sport the previous year. The report also states that 14 courses were built in the U.S. in 2013, while almost 160 shut down.

5.3.2 Employment, Labor Force, and Income

According to the 2010 census, the population of employed civilian citizens over the age of 16 in the Town of Wilson, Wisconsin was 1,797 (Table 8) (U.S. Census, 2010). Median household income is also greater in Wilson than Wisconsin or the U.S. ($83,311, $52,413, and $53,046 respectively). Employment in the Town of Wilson, City of Sheboygan, and Sheboygan County is predominantly in the manufacturing sector (greater than 30 percent). Educational and health care sectors employ greater than 15 percent of the workforce followed by the retail sector (approximately 10 percent).

Table 8: Employment and Income Comparison (2010)

LOCATION	POPULATION	CIVILIAN LABOR FORCE	MEDIAN HOUSEHOLD INCOME[1]
Town of Wilson	3,330	1,797	$83,311
City of Sheboygan	49,288	26,873	$43,533
Sheboygan County	115,507	28,131	$52,920
Wisconsin	5,686,986	2,872,104	$52,413
United States	308,745,538	138,668,798	$53,046

[1]2010 Census data not available, 2009-2013 American Community Survey 5-year estimates used for comparison
Source: U.S. Census Bureau 2010 and 2013 American Community Survey

SB Friedman Development Advisors (SB Friedman) was retained by Kohler to estimate the economic impact of the Project on three geographies including the Town of Wilson, Sheboygan County, and an 11-county region consisting of Brown, Calumet, Fond du Lac, Manitowoc, Milwaukee, Outagamie, Ozaukee, Sheboygan, Washington, Waukesha, and Winnebago counties. In order to quantify the impacts, specific data was analyzed using IMPLAN Professional ®, an economic assessment software that assisted in the quantification of the economic impacts associated with the Project.

Sources of direct economic impacts include temporary construction impacts over a three-year period, expanding golf as an ongoing economic engine, and creating significant public-sector tax revenue benefits. When fully operational, the proposed golf course is projected to create 227 full-time equivalent permanent jobs and generate nearly $21 million in annual economic activity for Sheboygan County households and businesses. Quantitative impacts are given in 2014 dollars. When fully operational, Kohler anticipates employing 168 people in full and part-time jobs with approximately $3.6 Million in annual associated salaries and benefits. Kohler has stated that approximately 88 percent of the positions are expected to be filled by residents of Sheboygan County. Expenditures from guests and hospitality are also expected to increase due to the proposed course, generating an additional $6.5M in lodging and purchases of food, beverage, and retail goods. The executive summary of the economic study is available by following the hyperlink in the electronic version of this document.

5.3.3 Temporary Construction Impacts

Total development costs of the Project are estimated at $25 million including hard and soft costs. Construction is expected to provide an immediate economic benefit for the three geographic regions analyzed as shown in Table 9 below. During the 3-year design and construction period, construction spending is expected to create an average of 67 direct full-time equivalent (FTE) jobs in the Town of Wilson. This equates to an annual increase of $3.9 million in salaries and benefits and an overall impact of $9 million using economic multipliers.

In Sheboygan County, direct FTE positions are estimated at 95 FTE jobs. And the total labor income is estimated at $5.3 million, with an overall impact of approximately $12.5 million based on economic multipliers. Considering the 11-county region total FTE jobs are estimated at 102, labor income at $5.8 million, and a total impact of $13.6 million based on economic multipliers.

Table 9: Total Estimated Annual Economic Impact for Construction

	JOBS (FTE)	SALARIES AND BENEFITS	IMPACT
Town of Wilson	67	$3.9M	$9.0M
Sheboygan County	95	$5.3M	$12.5M
11-County Region	102	$5.8M	$13.6M

5.3.4 Tax Revenue

Using existing data from the Wisconsin Department of Revenue and data from Kohler on comparable golf courses in the country, SB Friedman evaluated the impact of the Project on tax revenue. Including property, sales, income, motor vehicle fuel, and hotel room taxes it is anticipated that the new golf course will generate $1,116,000 in tax revenue (based on 2013 tax rates).

6 Department Evaluation of Project Significance

6.1 Summary of Adverse Impacts That Cannot Be Avoided

The site's nearly 100% forested canopy would be reduced by nearly half. Habitat value will diminish along forest edges near turf grass and human use areas.

Approximately 3.7 acres of wetland would be lost due to filling including impacts to approximately 1.36 acres of Great Lakes ridge and swale wetlands, a wetland type that is considered "imperiled" in Wisconsin. Additional wetland impacts resulting from alterations to wetland hydrology and the influence of increased nutrients could change the wetland type and allow encroachment of invasive species.

Reduction of the forest to 50 percent cover would result in a substantial reduction of available migratory bird stopover habitat on the Kohler Property. Interior forest bird nesting habitat is likely present within and adjacent to the Project boundary and would essentially be eliminated.

Site surveys encountered the presence of a rare invertebrate. Additional details are needed to verify that the Project will not impact the rare invertebrate. Protecting the rare invertebrate will also protect other rare invertebrates which were not surveyed for but are known to occupy similar habitat.

An Incidental Take Permit for impacts to a rare plant species on public property may be required.

Higher levels of traffic could increase congestion at the Kohler-Andrae entrance and increase demand for overflow parking on nearby roads during Kohler-Andrae peak visitor times and golf course special events.

Short term adverse impacts that cannot be avoided include approximately two years of construction traffic, noise, and dust. Hikers on the Black River Trail near the Black River

would be the Kohler-Andrae patrons most likely to notice construction noise and changed aesthetics.

Groundwater pumped from the proposed irrigation well (if needed) is projected to result in drawdown of water levels in nearby existing wells.

It is unknown to what extent storm water infiltration and nutrient and pesticide applications to fairways, tees and greens (for either establishment or maintenance) would impact groundwater quality in this permeable soil and shallow water table environment.

6.2 Environmental Effects, Their Long-term and Short-term Significance and Cumulative Impacts

The primary long-term impacts associated with the Project are the removal of forested lands and native vegetation, filling of wetlands and the grading required to shape the landscape to accommodate the golf course and associated facilities. The grading and vegetation changes will alter the hydrology of the site. The Project will result in loss of wildlife habitat and open some communities to potential encroachment by invasive species. Shorter term secondary impacts associated with the construction and physical development of the Project could occur as a result of a failure or the improper installation and maintenance of erosion control devices. Migratory bird stopover habitat and interior bird species habitat will be incrementally diminished on the west shore of Lake Michigan.

6.2.1 Potential Water Quality Impacts to Ground and Surface Water Resources

The Kohler Property has predominantly sandy soils with high infiltration rates and high hydraulic conductivity. This combined with a shallow depth to the surficial groundwater aquifer increases the potential for pesticides and fertilizer to leach into the shallow aquifer which may additionally reach the Black River, Lake Michigan, and the associated wetlands.

6.2.2 Wetlands

The Project would result in the filling of approximately 3.7 acres of wetland. Table 10 and Figure 19 summarize the permanently impacted wetland locations and wetland type on Kohler and Kohler-Andrae properties.

Even though the current proposal (Alternative F-4) results in no direct filling of interdunal wetlands, secondary impacts to wetland hydrology for those areas from tree clearing and grading activities will occur. The proximity of interdunal wetlands to the specific type of course features will determine the probability and magnitude of the secondary impacts. Additional secondary impacts from irrigation and fertilizer application is also possible.

The Project will result in approximately 1.36 acres of Great Lakes Ridge and Swale wetland fill (Table 10). Loss or degradation of Great Lakes ridge and swale wetlands would reduce habitat for numerous species, including amphibian and reptile breeding habitat, increase habitat fragmentation for many species of wildlife, decrease bird habitat through tree removal, and reduce tag alder habitat that supports blue-winged teal and kingfisher species.

The Project would fill 2.229 acres of hardwood swamp/forested seep wetlands, which is approximately 1% of the total riparian wetland complex located on the site. Secondary impacts could result from tree clearing, changes in hydrology, and encroachment of invasive species.

6.2.3 Wildlife and Rare Species

The site's nearly 100% forested canopy would be reduced by approximately half. Habitat value will likely diminish along forest edges near turf grass and human use areas.

The changes to the habitat will affect the site characteristics that has made it an important stopover habitat for migratory birds.

Kohler plans to avoid all impacts to a rare invertebrate. If impacts cannot be avoided, an Incidental Take Permit would be required. The avoidance of the rare invertebrate would

also protect other rare invertebrates, which were not surveyed for but are known to occupy similar habitat.

Higher levels of traffic could increase congestion at the Kohler-Andrae entrance and increase demand for overflow parking on nearby roads during Kohler-Andrae's peak visitor times and golf course special events.

6.3 Degree of Risk or Uncertainty

The department has considered information supplied by the applicant as well as information provided through public comments in developing this analysis document and the analyses required by various permit and decision authorities. There is a low degree of risk and uncertainty in predicting environmental effects, as the analysis has relied on the expertise of department professionals who have evaluated numerous major development projects. The types of impacts predicted and evaluated for this project are not atypical for a major development project.

The department will apply all legal standards in making regulatory decisions, including permit conditions to ensure compliance with those legal authorities, including those that are established to protect public health and safety.

6.4 Potential for Precedent

Department decisions on this proposal would have limited potential to establish precedent for future actions or to foreclose future options. Regulatory decisions will affect project outcomes and those decisions will follow the applicable legal requirements.

Future decisions on the proposed easements on state park land for roadway and utility access, the maintenance facility, and any associated floodplain would conform to Kohler-Andrae's master plan and federal grant funding contract conversion requirements. Easements to cross state lands are authorized under Wis. Stat. s. 23.09(10) and Wis. Admin. Code s. NR 1.485, which specifically allows easements for roadways and utilities. Easements on state park lands are additionally authorized

under Wis. Stat. s. 27.01(2)(g). The department has a standard form for these requests and reviews the details of each request according to state law.

Please visit the department's Kohler-Andrae State Park Plan Amendment page for the most current information on that process.

6.5 Degree of Controversy

Throughout the public EIS process, there has been substantial public opposition to the Project. Approximately 300 people attended two public hearings on the Project. All written and oral comments are posted at http://dnr.wi.gov/topic/eia/kohler.htm. Commenters expressed concerns about economic development, private water supply well impacts, employment, rare species, archeological resources, Kohler-Andrae land and operations, wetland and habitat impacts, tourism, migratory birds, nutrient management, tax revenue, pesticides, and public access along Lake Michigan and the Black River.

Kohler, the Friends of the Black River Forest, and others have websites and have offered media interviews regarding the Project and their concerns. Kohler retained SB Friedman to complete an economic impact study to show the anticipated economic benefits to the Town of Wilson and the surrounding area. The economic report is available by following the hyperlink in the electronic version of this document. Friends of the Black River Forest prepared an online petition opposing the Project. During the Updated DEIS comment period an online petition signed by over 13,000 people was presented to the department and the Natural Resources Board.

The department has received public comments regarding usage of any state property for access to the golf course, the undeveloped nature of the Kohler Property, the natural communities present, and the importance of the habitat provided. There has also been discussion regarding the presence of burial mounds and how those areas may be impacted by the Project. Citizens have also expressed their concerns about potential impacts that the Project may have on the property values adjacent to the proposed golf course.

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8 Appendix A – Figures

Figure 1 Proposed Golf Course Plan

Figure 1 Proposed Golf Course Plan

Stantec
Design with community in mind

Figure 2 Project Location & Topography

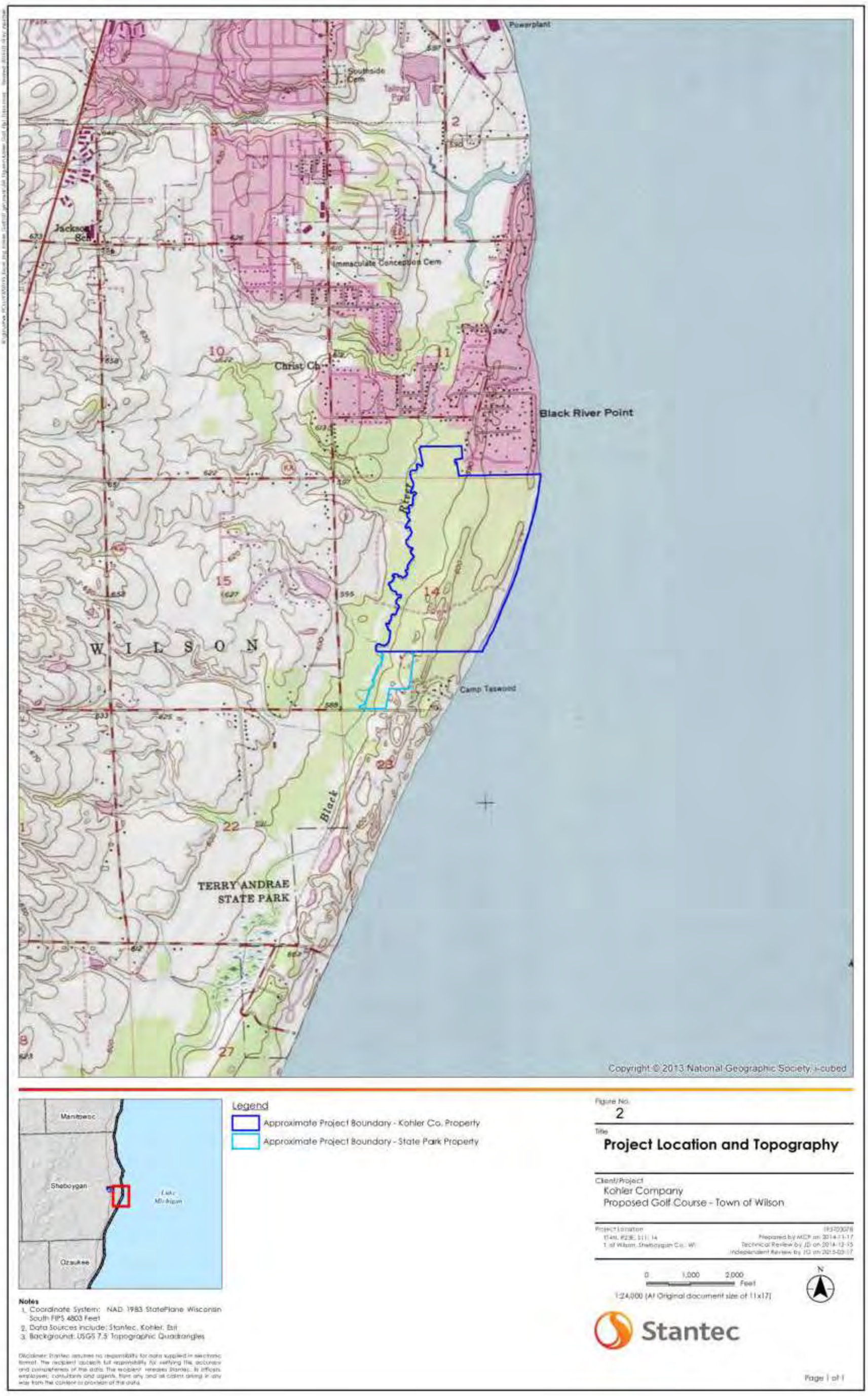

Figure 3 Project Location Orthophotography

Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources include: Stantec, Kohler
3. Orthophotography: 2010 WROC

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Legend

Approximate Project Boundary - Kohler Co. Property

Approximate Project Boundary - State Park Property

Figure No.
3

Title
Project Location and Orthophotography

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

193703078
Prepared by MCP on 2013-03-17
Technical Review by MR on 2013-03-17
Independent Review by JG on 2013-03-17

0 500 1,000 Feet

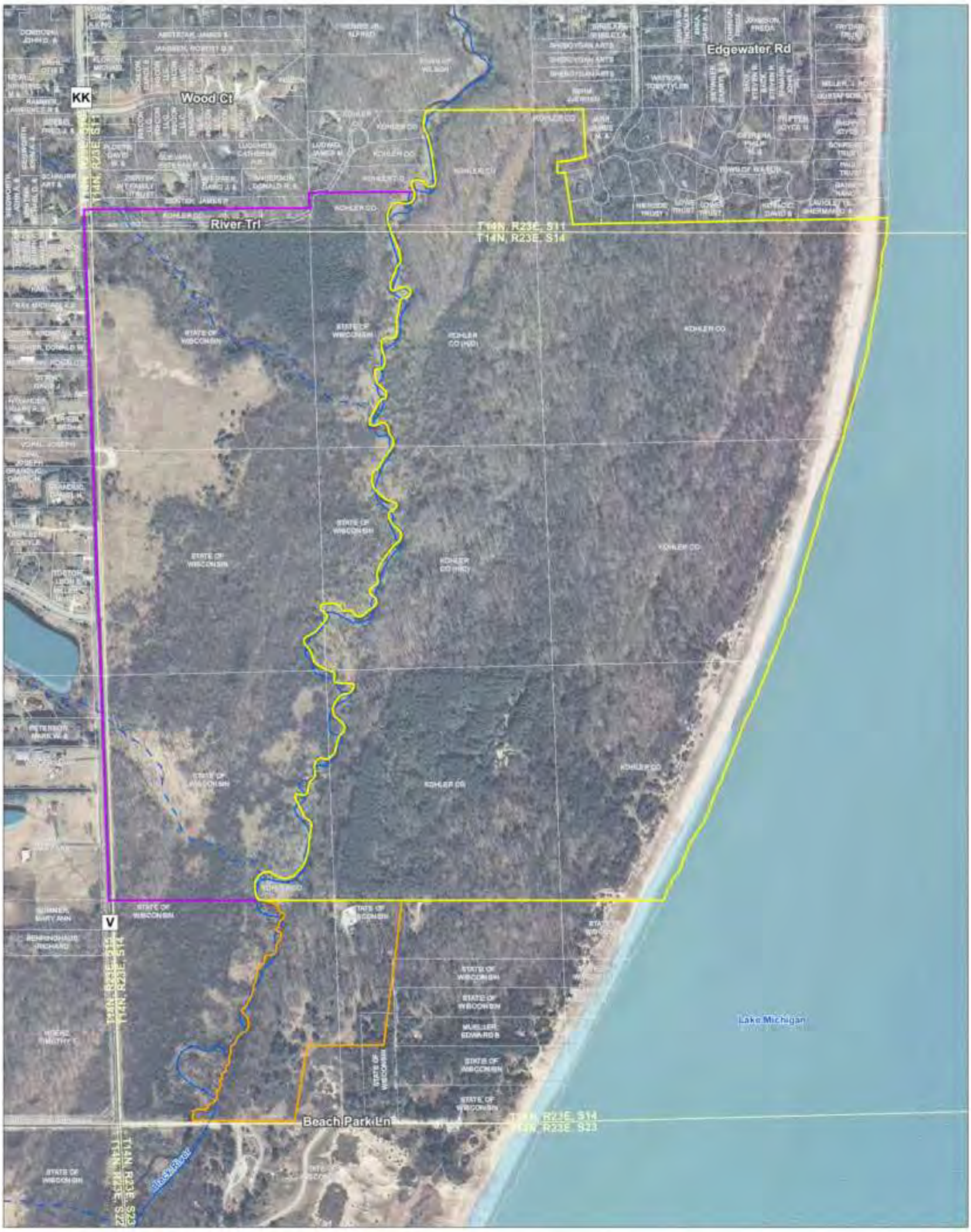
1:12,000 (At Original document size of 11x17)

N

Stantec

Page 1 of 1

Figure 4 Plat Map



Legend

- Approximate Project Boundary Kohler Co. Property
- Approximate Project Boundary State Park Property
- Additional Study Area
- DNR 24k Hydrography
- Perennial Stream
- Intermittent Stream
- Waterbody

Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources Include: Stantec, Kohler, WDNR, WDOT, Sheboygan County
3. Orthophotography: 2010 WROC

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Figure No.
4

Title
Plat Map

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

193703078
Prepared by MCP on 2013-03-24
Technical Review by WF on 2013-03-17
Independent Review by JG on 2013-03-17

0 300 600 Feet
1:7,200 (At Original document size of 11x17)

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Stantec

Page 1 of 1

Figure 5 Zoning Map

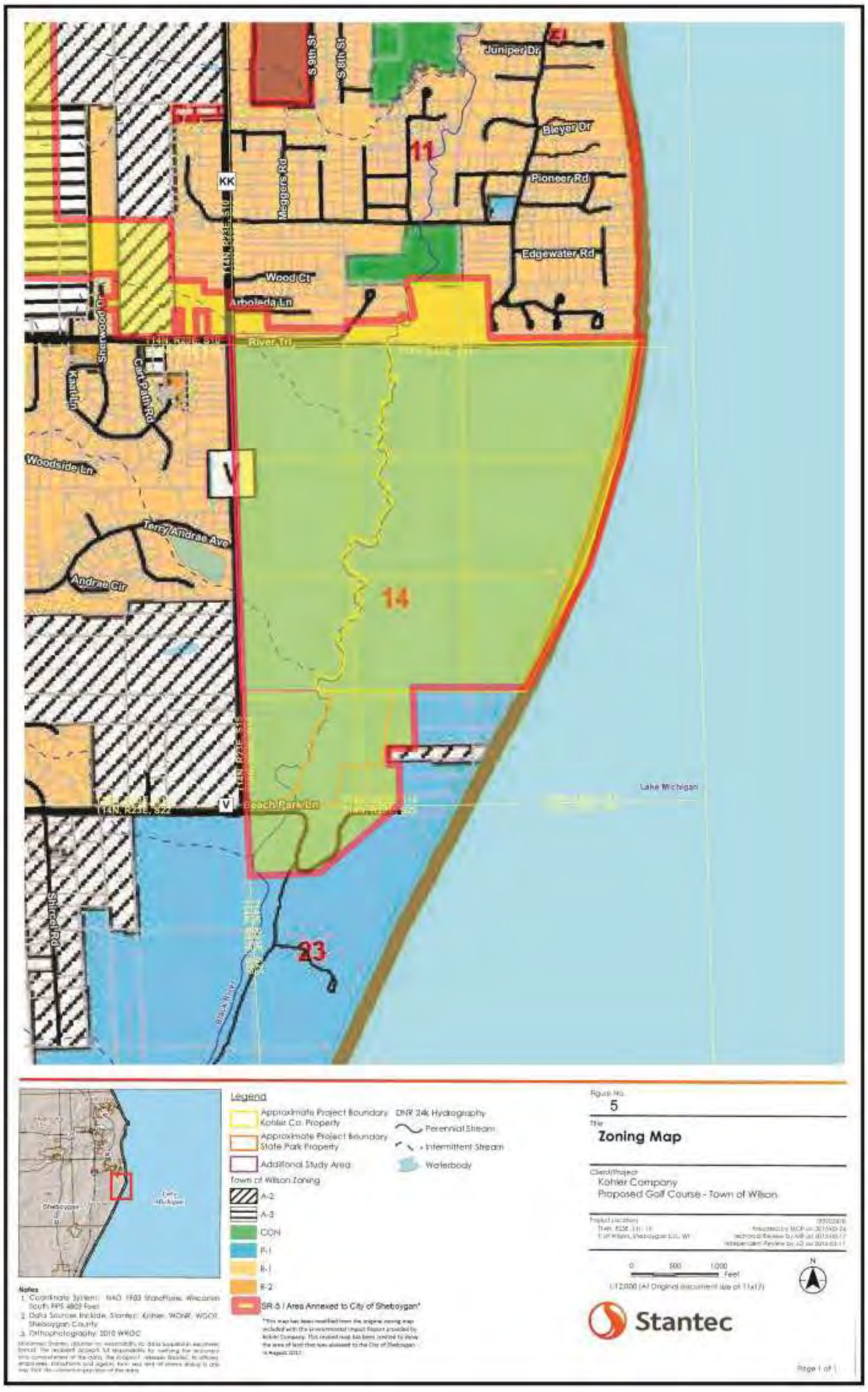

Figure 6 Wisconsin Wetland Inventory & NRCS Soil Map

Figure 7 Wetland Delineation and Floodplain Map

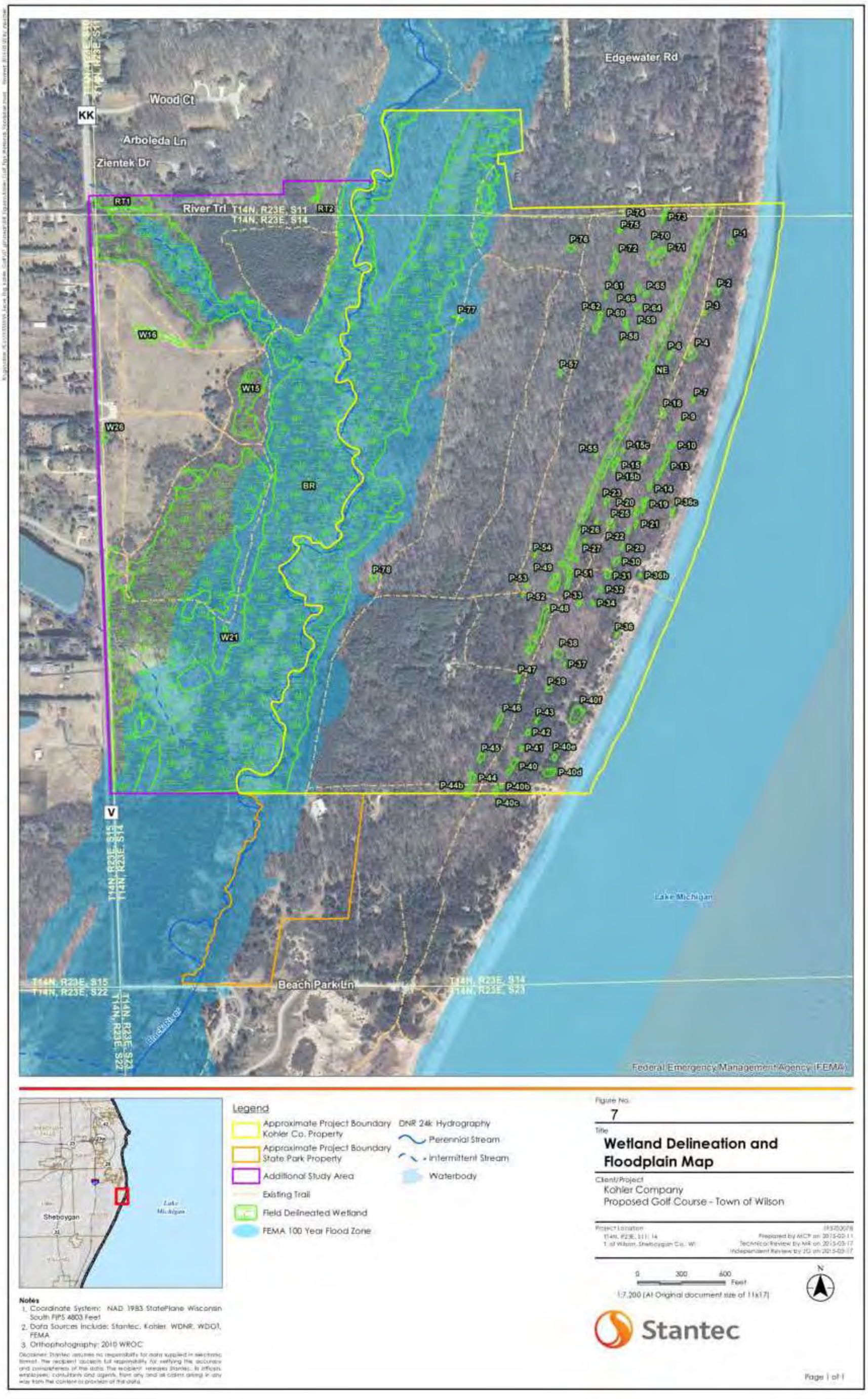

Figure 8 Plant Communities Map

Notes

1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources include: Stantec, WDNR, WDOT
3. Orthophotography: 2010 WROC

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Legend

- Approx. Project Boundary Kohler Co. Property
- Approx. Project Boundary State Park Property
- Additional Study Area
- Degraded Area (d)
- Existing Trail

Botanical Community

- AT - Alder Thicket (38.6ac)
- D - Developed (0.9ac)
- Dune (13.0ac)
- F. Dune - Forested Dune (10.5ac)
- GLB - Great Lakes Beach (7.3ac)
- HS - Hardwood Swamp (51.8ac)
- HS/FS - Hardwood Swamp/Forested Seep (15.5ac)
- IW - Interdunal Wetland (0.4ac)
- NDF - Northern Dry Forest (11.3ac)
- NDF(PP) - Northern Dry Forest (Pine Plantation) (42.7ac)
- NDM/NM - N. Dry-Mesic/N. Mesic Complex (158.0ac)
- NMF - Northern Mesic Forest (15.9ac)
- OF - Old Field (26.4ac)
- OW - Open Water (2.9ac)
- SWC - Swale Wetland Complex (5.2ac)
- WM - Wet Meadow (14.0ac)

Figure No.
8

Title
Plant Communities Map

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

193700078
Prepared by MCF on 2014-10-30
Technical Review by MMF on 2014-10-30
Independent Review by JD on 2015-03-17

0 275 550 Feet
1:6,600 (At Original document size of 11x17)

N

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Page 1 of 1

Figure 9 Invasive Plant Species Map

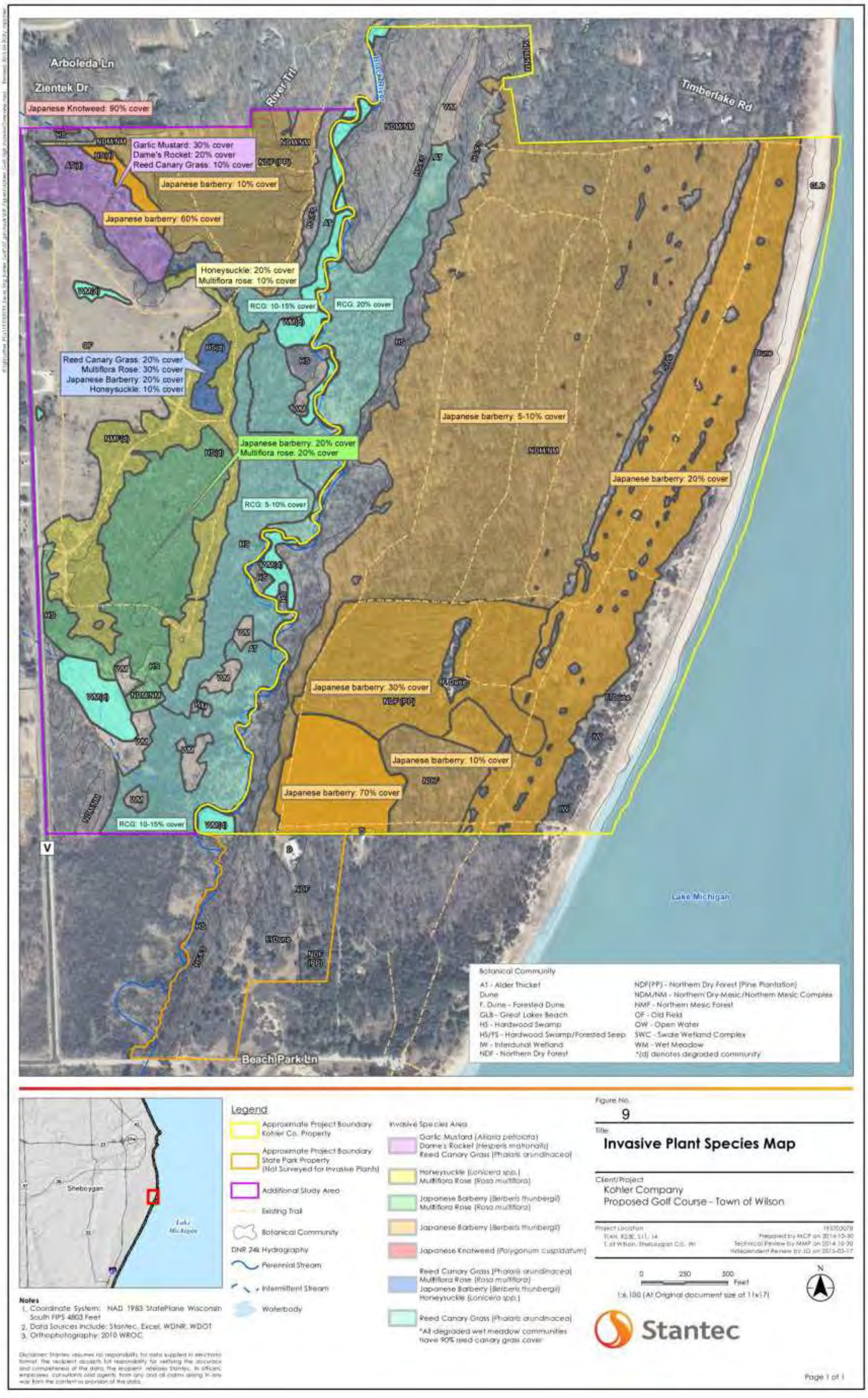

Figure 10 Project Alternative A

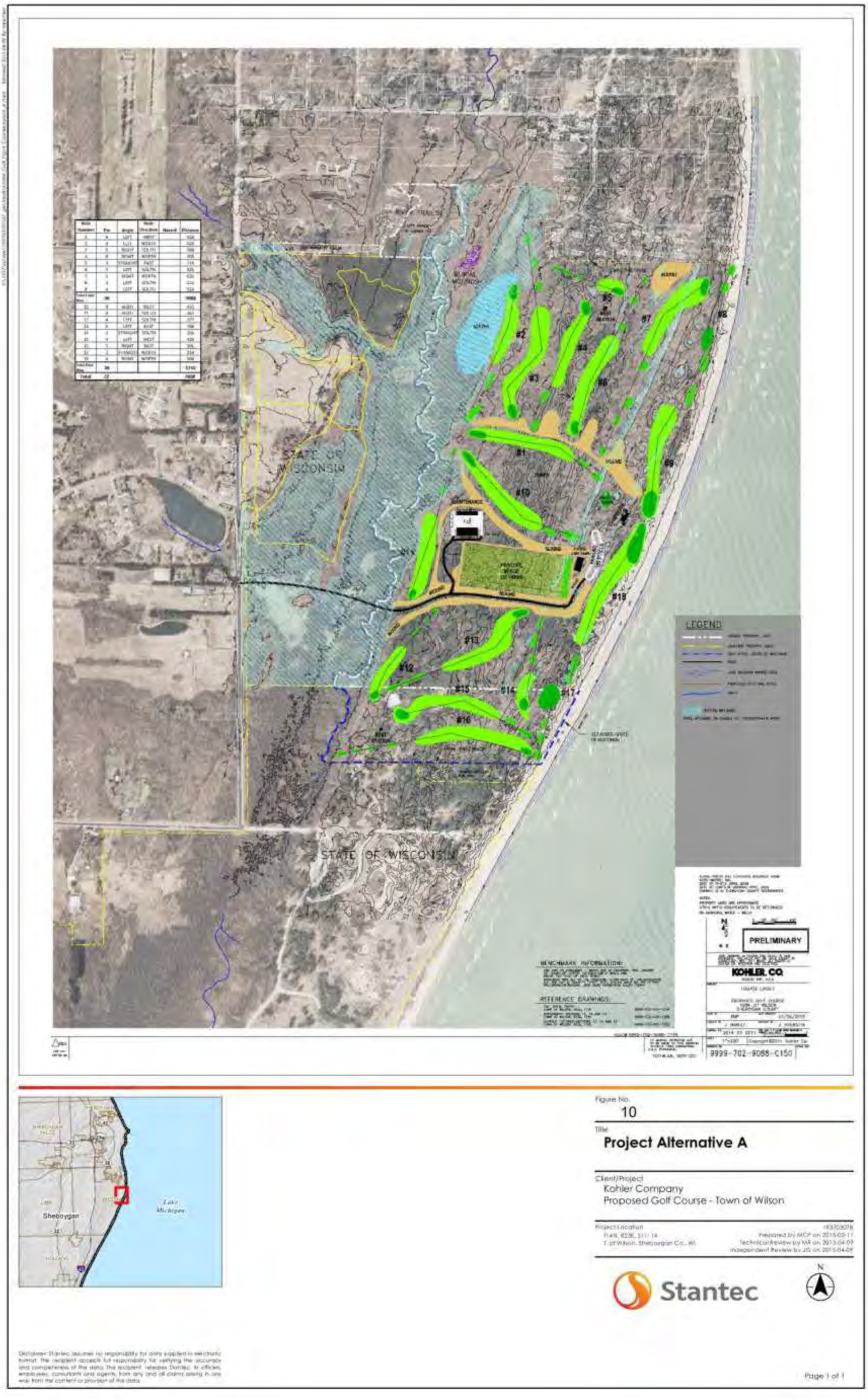

Figure 11 Project Alternative B-1

Figure No.
11

Title
Project Alternative B-1

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

Prepared by MCP on 2013-02-11
Technical Review by MF on 2013-04-09
Independent Review by JG on 2013-04-09

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Figure 12 Project Alternative B-2

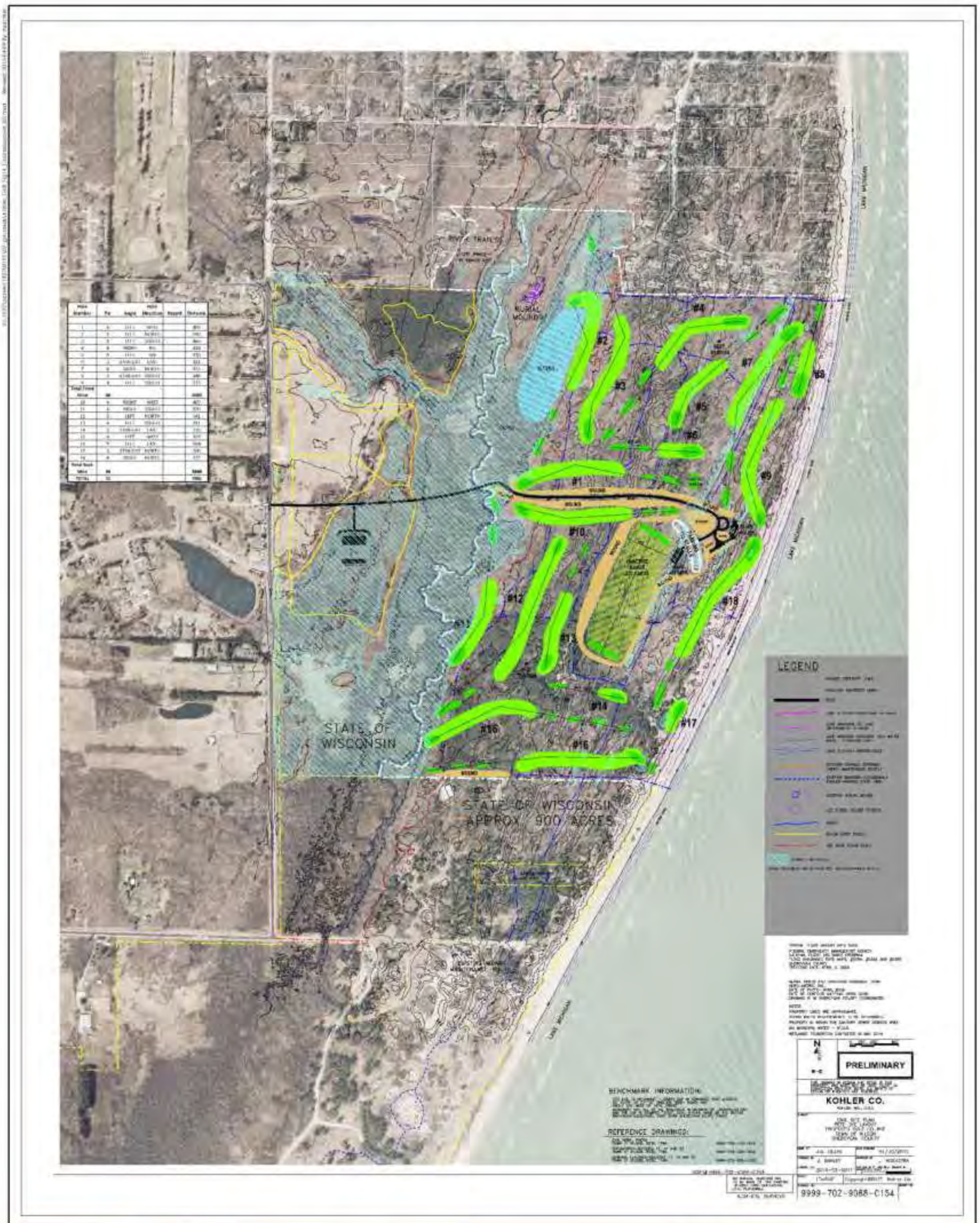

Figure No.
12

Title
Project Alternative B-2

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

193703078
Prepared by MCP on 2013-02-11
Technical Review by MF on 2013-04-09
Independent Review by JG on 2013-04-09

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Figure 13 Project Alternative C

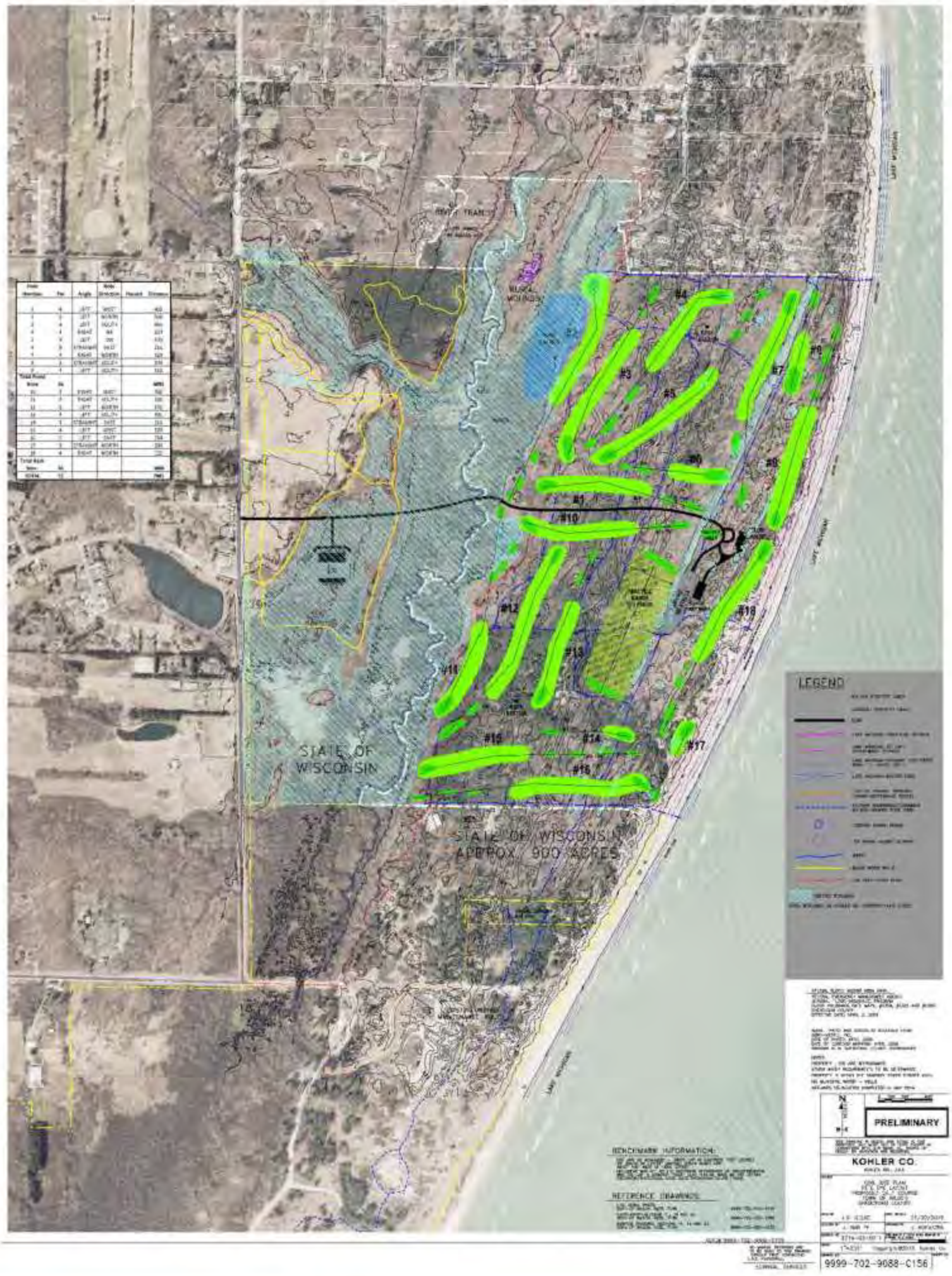

Figure No.
13

Title
Project Alternative C

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

193703078
Prepared by MCP on 2013-02-11
Technical Review by MF on 2013-04-09
Independent Review by JG on 2013-04-09

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Figure 14 Project Alternatives D1 – D7

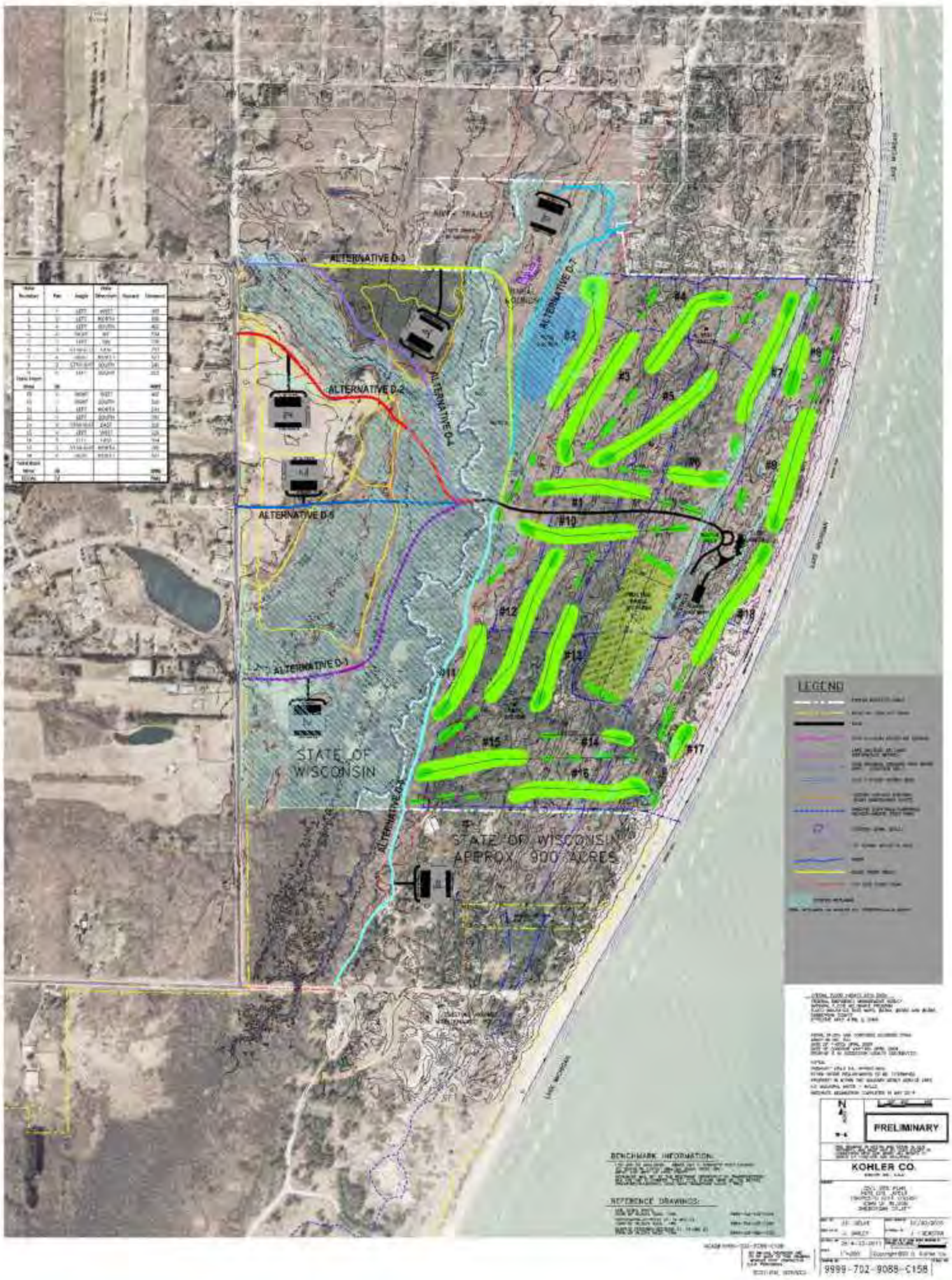

Figure No.
14

Title
Project Alternatives D1 - D7

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

Prepared by MCP on 2013-02-11
Technical Review by MR on 2013-04-09
Independent Review by JG on 2013-04-09

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Figure 15 Project Alternative E

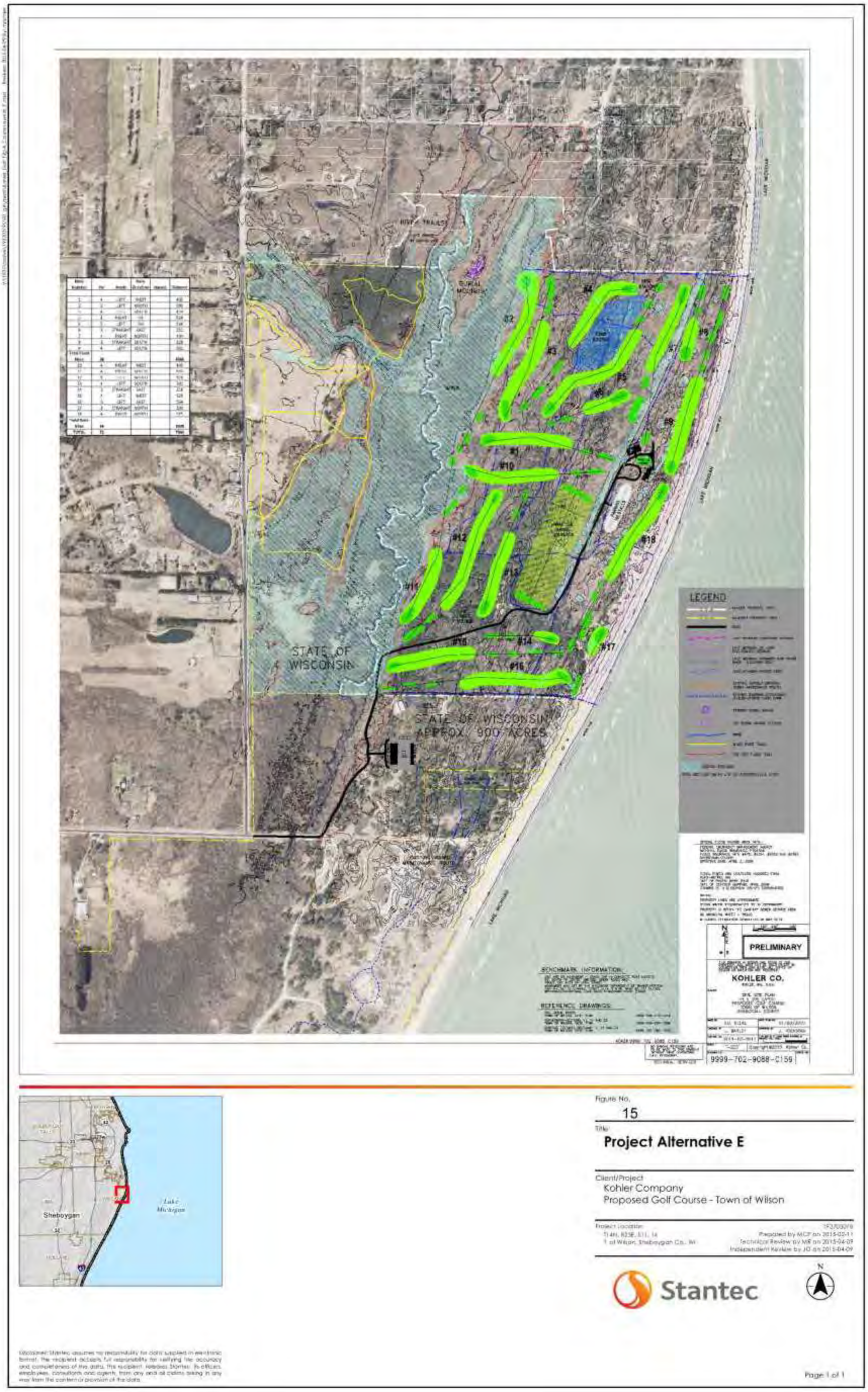

Figure No.
15

Title
Project Alternative E

Client/Project
Kohler Company
Proposed Golf Course - Town of Wilson

Project Location
T14N, R23E, S11, 14
T. of Wilson, Sheboygan Co., WI

Prepared by MCF on 2015-02-11
Technical Review by MR on 2015-04-09
Independent Review by JO on 2015-04-09

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Figure 16 Project Alternative F1

Figure 17 Project Alternative F2

Figure 18 Project Alternative F3

Figure 19 Project Alternative F4 (Current Proposal)

Figure 20 Surface Waters and Watersheds

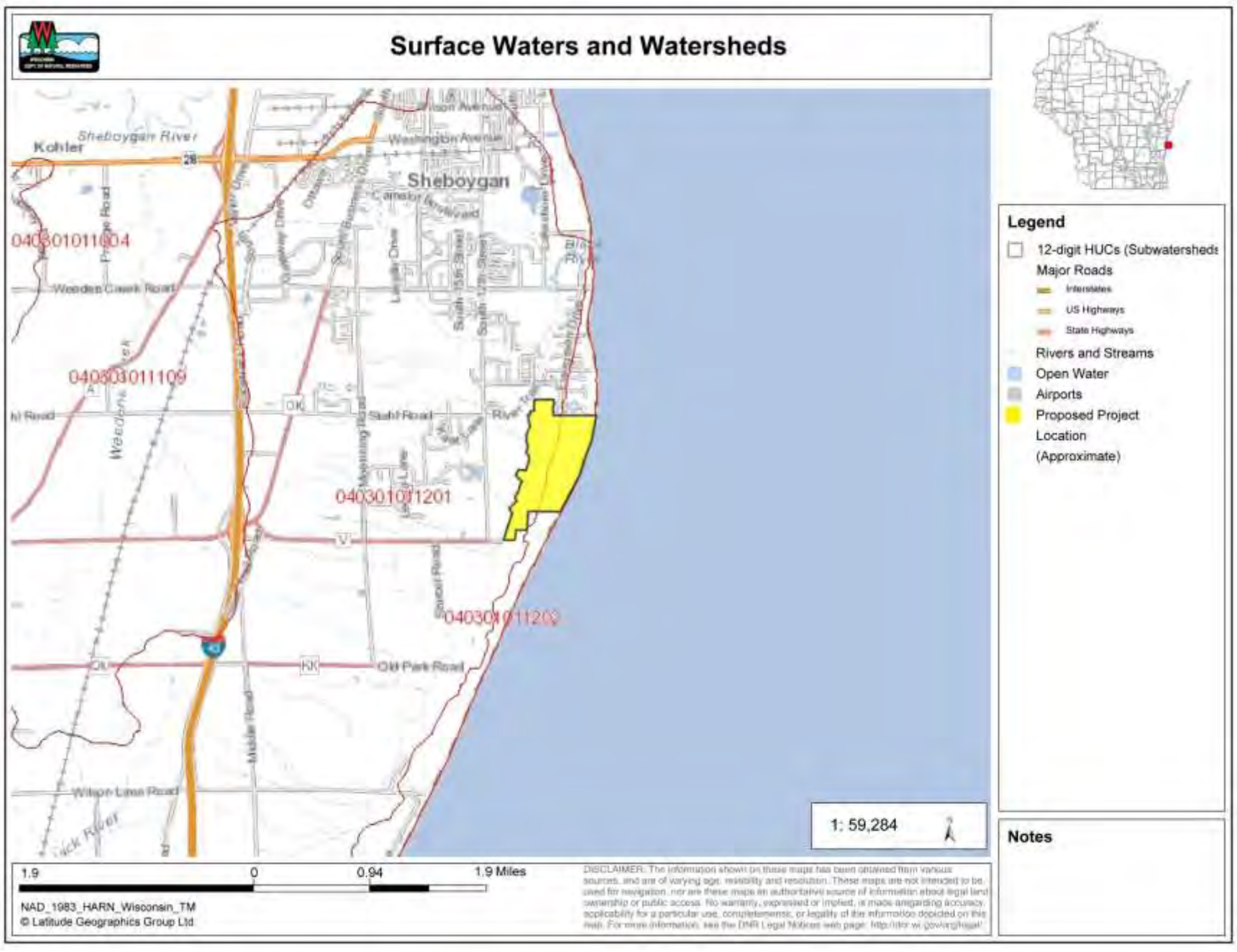


Figure 21 Roundabout Entrance

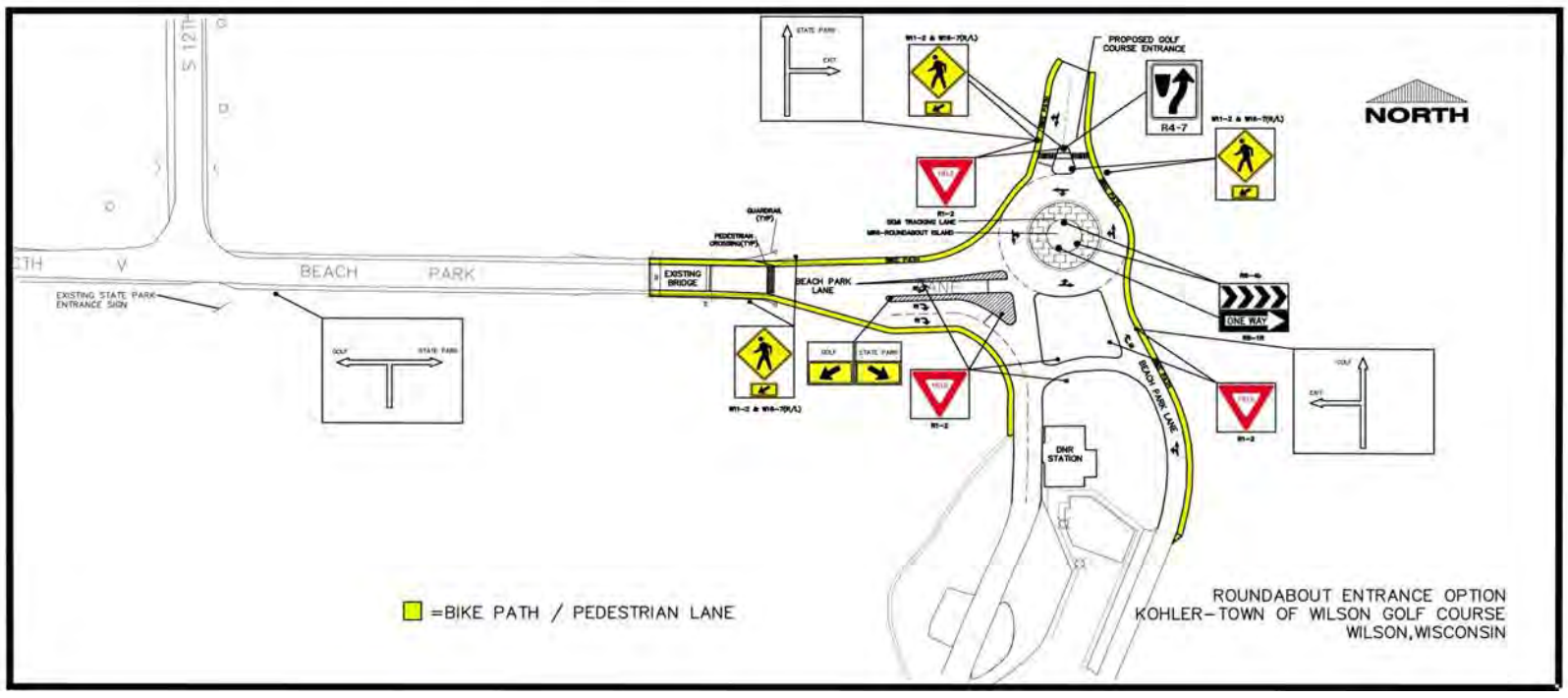


Figure 22 Maintenance Facility

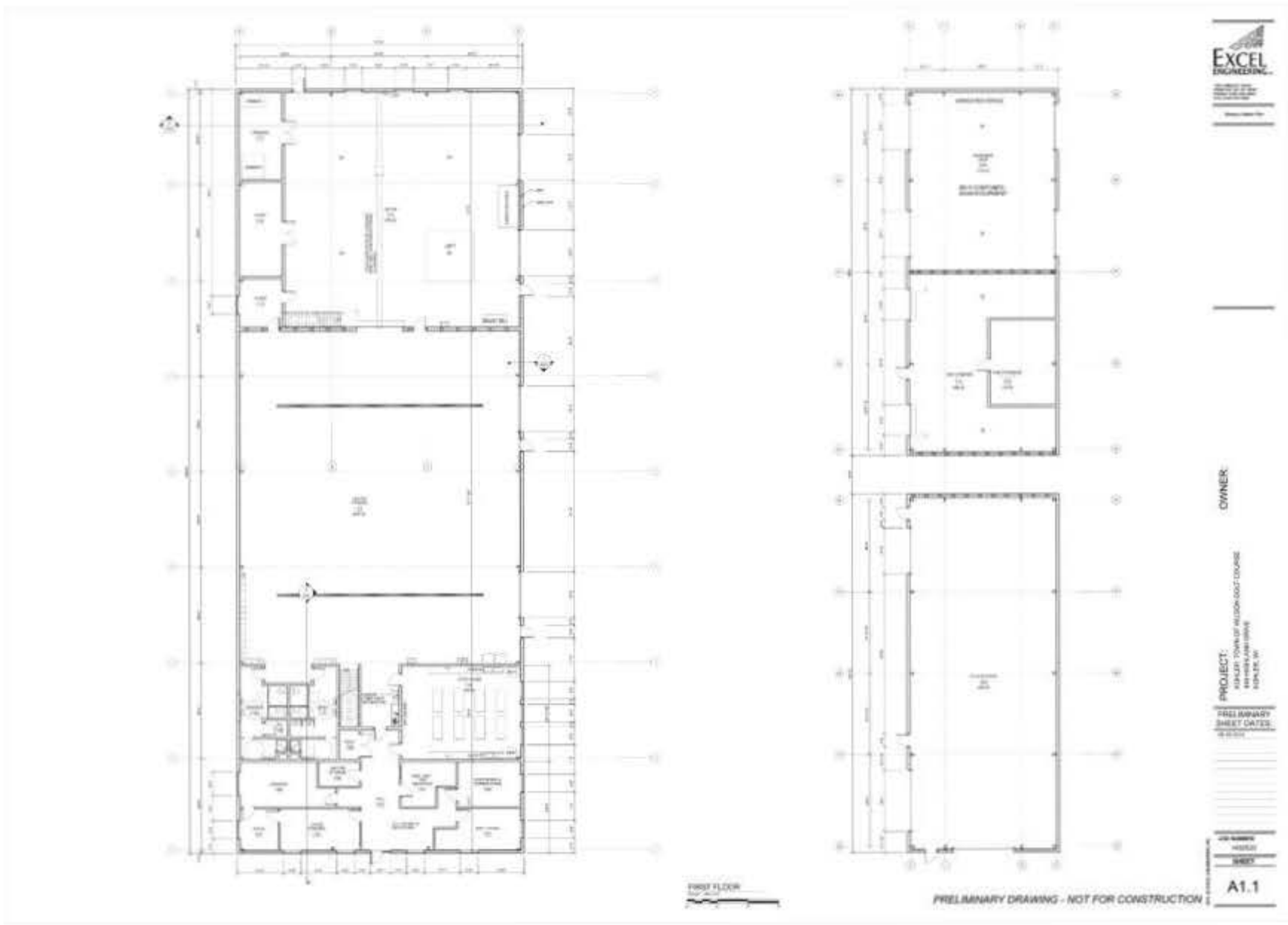
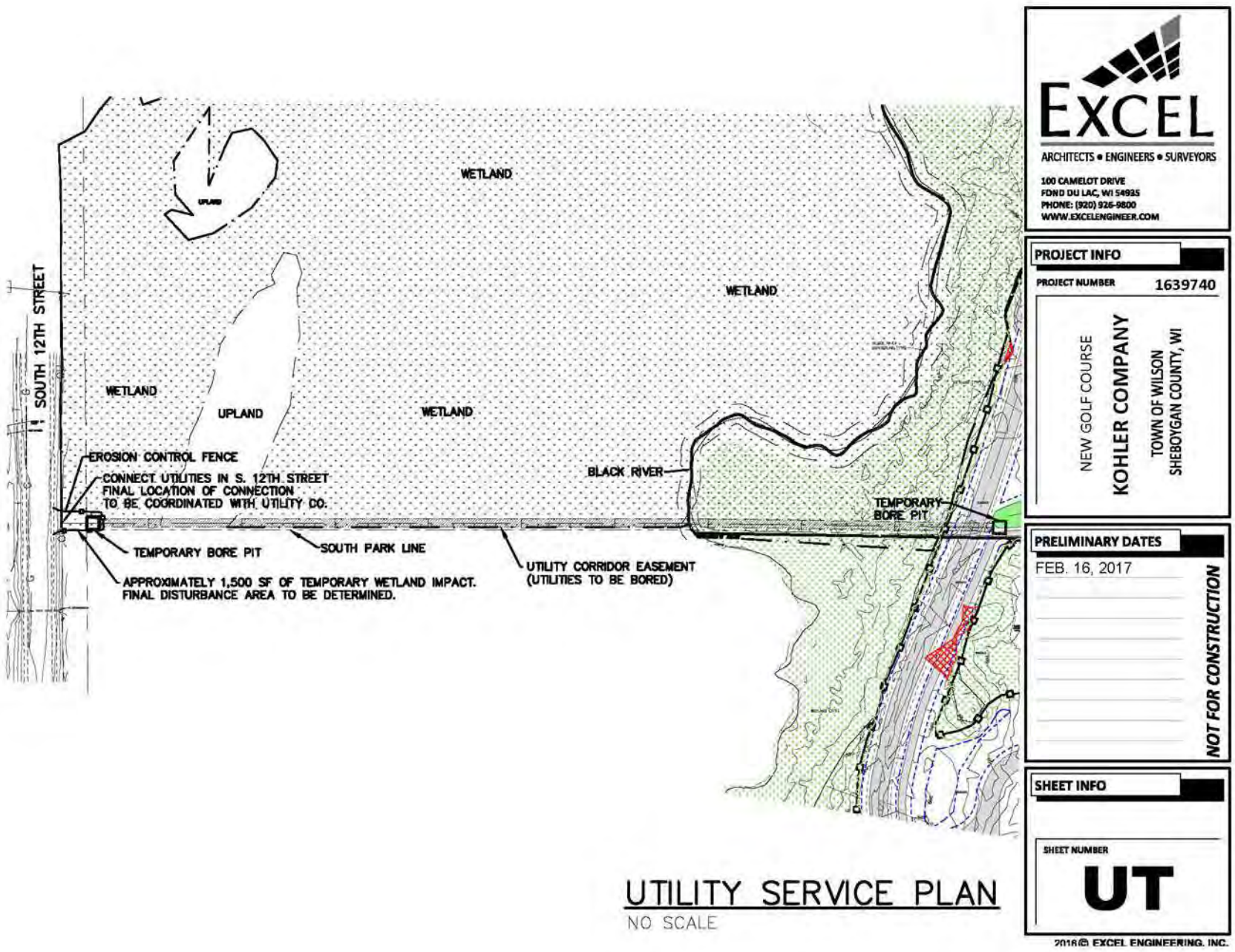


Figure 23 Utility Service Plan



9 Appendix B – Tables

Table 10 – Wetland Impact Summary

Table 10. Anticipated Wetland Impacts Summary. The information contained herein is a collaboration of wetland data provided by Kohler (represented by text in **black**), the department's field review and analyses represented in blue, and the addition of the "Activity/Source of Impact" column. Wetland IDs lacking dominant scientific and common names and floristic quality assessment data were not field verified by department staff to date. * Coefficients of conservatism range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a landscape relatively unaltered (pre-settlement condition). A Ci of 0 is given to plants that have demonstrated little fidelity to any remnant natural community and may be found almost anywhere. A Ci of 10 is applied to plants that are almost always restricted to pre-settlement remnants such as high quality natural areas.

Wetland ID	Acreage (on-site)	Natural Community Type	Dominant Species Scientific Names	Dominant Species Common Names	Floristic Quality Assessment Mean Coefficient of Conservatism (Mean Ci)*	Wetland Description/Other Notes (If Applicable)	Proposed Impact (acres)	Activity/Source of impact
BR	42.027	Lowland hardwood swamp Alder Thicket, Hardwood Swamp, Mosaic Beech/Maple Complex, Wet Meadow	*Fraxinus nigra, Calamagrostis canadensis*	Black ash, Canada bluejoint grass	Mean Ci=4.0	Upland: beech, red maple dominant with birch and white pine, including a 30" white pine. Understory with beech drops, some barberry, other wetland species Large wetland complex within the Black River floodplain and tributary streams. Contains mosaic beech/maple complex in the northeast portion. Dominant plant species include American Beech, American hazelnut, blue iris, blue-joint grass, box elder, bristly buttercup, cinnamon fern, common lake sedge, common tussock sedge, common wood sedge, eastern cottonwood, eastern marsh fern, Emory's sedge, giant goldenrod, green ash, Japanese barberry, multiflora rose, northern water-horehound, paper birch, purple meadow-rue, red oak, red raspberry, reed canary grass, showy bush honeysuckle, skunk-cabbage, speckled alder, sugar maple, white avens and yellow birch.	2.229	Access road, tee boxes for hole #3 Tee boxes/fairway for hole #2 Fairway/green for hole #1 Tee boxes/fairway hole #11
NE	2.944	Great Lakes ridge and swale Ridge and Swale Complex	*Phalaris arundinacea*	Reed canary grass	Mean Ci=4.0	Upland: Black-seeded rice grass (*Oryzopsis racemosa),* Solomon's seal (*Polygonatum pubescens).* Some standing water Linear wetland complex located within the interdunal swale landforms. Dominant plant species include blue-joint grass, Canadian wood-nettle, common lake sedge, common tussock sedge, fowl manna grass, green ash, red maple and speckled alder.	0.031	Parking lot
P-1	0.022	Great Lakes ridge and swale Ridge and Swale Complex	*Urtica dioica, Alliaria petiolata, Rubus idaeus*	Stinging nettles, garlic mustard, red raspberry	Mean Ci=3.6	Swale wetland. Dominant plant species include red raspberry and stinging nettle.	0.022	Cart path and fairway for hole #17
P-10	0.024	Great Lakes ridge and swale Ridge and Swale Complex	*Carex stricta, Acer saccharum (seedlings)*	Tussock sedge, sugar maple	Mean Ci=5.0	Uplands: beech, white pine, red maples. Large white pine 30", sparsely vegetated understory, a few barberries. Changes to black ash and alder dominated forest with understory of lake sedge, false nettle, a little reed canary grass. Some open water Swale wetland. Dominant plant species include northern water-horehound.	0.024	Fairway hole #18
P-13	0.089	Great Lakes ridge and swale Ridge and Swale Complex	*Carex stricta, Lycopus uniflorus*	Tussock sedge, northern bugleweed	Mean Ci=5.5	Swale wetland. Dominant plant species include blue-joint grass, northern water-horehound and rice cutgrass.	0.089	Clubhouse/cart path
P-14	0.020	Ridge and Swale Complex				Swale wetland. Dominant plant species include northern water-horehound.	0.020	Clubhouse
P-15	0.018	Great Lakes ridge and swale Ridge and Swale Complex	*Scutellaria galericulata*	Marsh skullcap	Mean Ci=4.2	Swale wetland. Dominant plant species include northern water-horehound and stinging nettle	0.018	Cart path
P-15b	0.045	Great Lakes ridge and swale Ridge and Swale Complex	*Carex stricta*	Tussock sedge	Mean Ci=5.0	Swale wetland. Dominant plant species include fowl manna grass and green ash.	0.045	Driveway/parking lot
P-15c	0.009	Great Lakes ridge and swale Ridge and Swale Complex	*Carex gracillima, Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.8	Swale wetland. Dominant plant species include blue-joint grass, green ash and toothed wood fern.	0.009	Tee box for hole #10
P-16	0.037	Great Lakes ridge and swale Ridge and Swale Complex	*Carex stricta,*	Tussock sedge,	Mean Ci=3.1	Swale wetland. Dominant plant species include blue-joint grass and northern water-horehound.	0.037	Fairway #18
P-19	0.041	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass.	0.041	Cart path, driveway, clubhouse
P-2	0.029	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis, Carex stricta, Thelypteris palustris, Rubus idaeus, Geum aleppicum, Scutellaria galericulata Scutellaria galericulata*	Canada bluejoint grass, tussock sedge, red raspberry, yellow avens, blue skullcap	Mean Ci=5.0	Swale wetland. Dominant plant species include common tussock sedge, green ash and red raspberry.	No Impact (NI)	None
P-20	0.031	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass.	0.031	Parking lot/driveway

Wetland ID	Acreage (on-site)	Natural Community Type	Dominant Species Scientific Names	Dominant Species Common Names	Floristic Quality Assessment Mean Coefficient of Conservatism (Mean Ci)*	Wetland Description/Other Notes (If Applicable)	Proposed Impact (acres)	Activity/Source of impact
P-21	0.016	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=5.0	Upland species on ridge: red and sugar maple, white pine and beech with some Canada thistle, barberry and red raspberry. Swale wetland. Dominant plant species include blue-joint grass and eastern willow-herb.	0.016	Cart path
P-22	0.007	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass.	0.007	Parking/driveway
P-23	0.016	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=5.0	Swale wetland. Dominant plant species include blue-joint grass and Japanese barberry.	0.016	Parking lot.
P-25	0.049	Great Lakes ridge and swale Ridge and Swale Complex	*Phalaris arundinacea*	Reed canary grass	Mean Ci=3.6	Also, speckled alder, skullcap, marsh fern, poison ivy Swale wetland. Dominant plant species include blue-joint grass, green ash and speckled alder.	0.049	Parking lot.
P-26	0.006	Great Lakes ridge and swale Ridge and Swale Complex	*Carex intumescens, Calamagrostis canadensis, Dryopteris carthusiana*	Greater bladder sedge, Canada bluejoint grass, spinulose wood fern	Mean Ci=5.7	Swale wetland. Dominant plant species include blue-joint grass and toothed wood fern.	0.006	Parking lot.
P-27	0.008	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass, green ash and Pennsylvania sedge.	0.008	Parking lot.
P-29	0.011	Ridge and Swale Complex				Swale wetland. Dominant plant species include greater bladder sedge, Japanese barberry and northern water-horehound.	NI	None
P-3	0.013	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=5.0	Swale wetland. Dominant plant species include blue-joint grass.	NI	None
P-30	0.039	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and northern water-horehound.	NI	None
P-31	0.039	Ridge and Swale Complex				Swale wetland. Dominant plant species include fowl manna grass and speckled alder.	NI	None
P-32	0.014	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and reed canary grass.	NI	None
P-33	0.013	Ridge and Swale Complex				Swale wetland. Dominant plant species include toothed wood fern.	0.004	Access road grading
P-34	0.011	Ridge and Swale Complex				Swale wetland. Dominant plant species include Canadian wood-nettle.	NI	None
P-36	0.006	Interdunal Wetland Interdunal Wetland	*Juncus balticus, Calamagrostis canadensis, Euthamia graminifolia, Solidago*	Baltic rush, Canada bluejoint grass, grass-leaved goldenrod, giant goldenrod, winged loosestrife	Mean Ci=4.6	Some pines and little bluestem grass around wetland but a little more open Interdunal swale wetland. Dominant plant species include Pennsylvania sedge.	NI	None
P-36b	0.008	Interdunal Wetland	*Juncus balticus*	Baltic rush	Mean Ci=4.5	Upland vegetation is white and red pines, creeping juniper Interdunal swale wetland. Dominant plant species include Baltic rush and creeping juniper.	NI	None
P-36c	0.014	Interdunal Wetland	*Juncus balticus*	Baltic rush	Mean Ci=6.0	Red pine surrounds wetland but more open to west Interdunal swale wetland. Dominant plant species include Baltic rush.	NI	None
P-37	0.006	Ridge and Swale Complex				Interdunal swale wetland. Dominant plant species include blue-joint grass and green ash.	NI	None
P-38	0.064	Ridge and Swale Complex				Interdunal swale wetland. Dominant plant species include blue-joint grass, green ash, northern water-horehound and speckled alder.	0.064	Tee box for hole #9 and cart path
P-39	0.021	Ridge and Swale Complex				Interdunal swale wetland. Dominant plant species include blue-joint grass and speckled alder.	NI	None
P-4	0.113	Great Lakes ridge and swale Ridge and Swale Complex	*Glyceria grandis, Calamagrostis canadensis*	American manna grass, Canada bluejoint grass	Mean Ci=3.9	Interdunal swale wetland. Dominant plant species include blue-joint grass and speckled alder.	0.113	Fairway for hole #18
P-40	0.060	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis, Phalaris arundinacea, Lycopus* sp.	Canada bluejoint grass, reed canary grass, bugleweed	Mean Ci= 3.0	Interdunal swale wetland. Dominant plant species include green ash, northern water-horehound, reed canary grass and speckled alder.	0.060	Fairway for hole #7.
P-40b	0.008	Ridge and Swale Complex				Interdunal swale wetland. Dominant plant species include common tussock sedge.	NI	None
P-40c	0.030	Ridge and Swale Complex				Interdunal swale wetland. Dominant plant species include blue-joint grass and common tussock sedge.	NI	None
P-40d	0.0076	Interdunal wetland Interdunal Wetland	*Juncus balticus*	Baltic rush	Mean Ci=4.0	Surrounded by white and red pines Interdunal swale wetland. Dominant plant species include Baltic rush, blue- joint grass, paper birch, red pine and white	NI	None

Wetland ID	Acreage (on-site)	Natural Community Type	Dominant Species Scientific Names	Dominant Species Common Names	Floristic Quality Assessment Mean Coefficient of Conservatism (Mean Ci)*	Wetland Description/Other Notes (If Applicable)	Proposed Impact (acres)	Activity/Source of impact
P-40e	0.024	Interdunal wetland Interdunal Wetland	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci= 4.3	Interdunal swale wetland. Dominant plant species include Baltic rush and red pine.	NI	None
P-40f	0.160	Interdunal wetland Interdunal Wetland	*Juncus balticus, Juniperus spp.*	Baltic rush, juniper species	Mean Ci=4.0	Surrounded by red, white and Scotch pines. Interdunal swale wetland. Dominant plant species include Baltic rush, common juniper and paper birch.	NI	None
P-41	0.012	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and speckled alder.	0.012	Fairway for hole #7 and cart path
P-42	0.019	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass, Japanese barberry, speckled alder and stinging nettle.	0.019	Tee box for hole #6
P-43	0.011	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass, green ash, red raspberry and speckled alder.	NI	None
P-44	0.049	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass, green ash, Japanese barberry and red raspberry.	NI	None
P-44b	0.036	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass, green ash, paper birch and red raspberry.	NI	None
P-45	0.047	Ridge and Swale Complex				Swale wetland. Dominant plant species include greater bladder sedge, green ash, Japanese barberry and northern water-horehound.	0.047	Fairway for hole #7.
P-46	0.056	Great Lakes ridge and swale Ridge and Swale Complex	*Carex projecta, Alnus incana, Scutellaria galericulata, Carex intumescens, Boemeria cylindrica, Spiraea alba, Carex retrorsa, Smilax sp., Viola incognita, Alliaria petiolata, Urtica dioica, Fraxinus*	Necklace sedge, speckled alder, blue skullcap, greater bladder sedge, false-nettle, meadowsweet, sweet white violet, garlic mustard, stinging nettle, green ash, northern bugleweed, ferns	Mean Ci=3.9	Swale wetland. Dominant plant species include blue-joint grass and common tussock sedge.	0.056	Tee box for hole #6 and cart path
P-47	0.017	Ridge and Swale Complex	Ridge and Swale Complex			Swale wetland. Dominant plant species include common tussock sedge.	0.017	Access road and fairway for hole #5
P-48	0.231	Great Lakes ridge and swale Ridge and Swale Complex	*Carex stricta*	Tussock sedge	Mean Ci=4.1	Standing water, near monitoring well Swale wetland. Dominant plant species include common tussock sedge, green ash and speckled alder.	NI	None
P-49	0.147	Great Lakes ridge and swale Ridge and Swale Complex	*Carex intumescens, Carex spp., Calamagrostis canadensis,*	Greater bladder sedge, sedge species, Canada bluejoint grass,	Mean Ci=4.2	Swale wetland. Dominant plant species include common duckweed, and green ash.	0.009	Cart path
P-51	0.114	Great Lakes ridge and swale Ridge and Swale Complex	*Matteuchia struthiopteris, Calamagrostis canadensis*	Ostrich fern, Canada bluejoint grass		Swale wetland. Dominant plant species include Canadian wood-nettle, green ash, northern water-horehound and speckled alder.	NI	None
P-52	0.003	Great Lakes ridge and swale Ridge and Swale Complex	*Berberis thunbergii*	Japanese barberry	Mean Ci=3.5	Swale wetland. Dominant plant species include Japanese barberry and stinging nettle.	0.003	Practice range.
P-53	0.006	Great Lakes ridge and swale Ridge and Swale Complex	*Symplocarpus foetidus, Acer saccharinum, Acer saccharum,*	Skunk-cabbage, silver maple, sugar maple, annual bedstraw	Mean Ci=4.3	Sparsely vegetated Swale wetland. Dominant plant species include green ash, Pennsylvania sedge and sugar maple.	0.006	Practice range.
P-54	0.007	Ridge and Swale Complex				Swale wetland. Dominant plant species include fowl manna grass.	0.007	Practice range.
P-55	0.007	Great Lakes ridge and swale Ridge and Swale Complex	*Fraxinus nigra, Fagus grandifolia, Acer rubrum,*	Black ash, American beech, red maple, reed canary grass, tussock	Mean Ci=5.0	Black ash, beech and red maple around wetland Swale wetland. Dominant plant species include green ash and Japanese barberry.	0.007	Tee box for hole #10
P-57	0.016	Ridge and Swale Complex				Swale wetland. No plant species were observed.	0.016	Fairway for hole #14
P-58	0.005	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and Pennsylvania sedge.	NI	None
P-59	0.004	Ridge and Swale Complex				Swale wetland. Dominant plant species include fowl manna grass and greater bladder sedge.	0.004	Fairway for hole #16
P-6	0.023	Great Lakes Ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass green ash and sugar maple.	Mean Ci=4.8	Swale wetland. Dominant plant species include blue-joint grass, green ash and sugar maple.	NI	None
P-60	0.019	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and northern water-horehound.	NI	None
P-61	0.007	Great Lakes ridge and swale Ridge and Swale Complex				No wetland vegetation observed. Upland notes: 17" beech tree, 24" red maple, white pines, red oaks Swale wetland. Dominant plant species include northern water-horehound.	0.007	Irrigation pond.
P-62	0.066	Ridge and Swale Complex				Swale wetland. Dominant plant species include common eastern wild-rye, fowl manna grass and sensitive fern.	0.066	Irrigation pond, fairway for hole #14

Wetland ID	Acreage (on-site)	Natural Community Type	Dominant Species Scientific Names	Dominant Species Common Names	Floristic Quality Assessment Mean Coefficient of Conservatism (Mean Ci)*	Wetland Description/Other Notes (If Applicable)	Proposed Impact (acres)	Activity/Source of impact
P-64	0.009	Ridge and Swale Complex				Swale wetland. Dominant plant species include blue-joint grass and northern water-horehound.	0.007	Fairway for hole #16 and cart path
P-65	0.015	Ridge and Swale Complex				Swale wetland. Dominant plant species include common eastern wild-rye, greater bladder sedge and green ash.	0.015	Fairway for hole #16
P-66	0.024	Ridge and Swale Complex				Swale wetland. Dominant plant species include green ash and stinging nettle.	NI	None
P-7	0.010	Great Lakes Ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis, Acer saccharum* (seedlings)	Canada bluejoint grass, sugar maple	Mean Ci=5.0	Swale wetland. Dominant plant species include blue-joint grass and sugar maple.	0.010	Fairway for hole #18
P-70	0.013	Ridge and Swale Complex				Swale wetland. Dominant plant species include common eastern wild-rye, green ash and northern water-horehound.	0.013	Fairway for hole #16
P-71	0.174	Ridge and Swale Complex				Swale wetland. Dominant plant species include common tussock sedge, green ash, northern water-horehound and stinging nettle.	0.173	Fairway for hole #16
P-72	0.072	Great Lakes ridge and swale Ridge and Swale Complex	*Acer rubrum, Fraxinus nigra, Pinus strobus, Lycopus*	Red maple, black ash, white pine, northern bugleweed, False nettle	Mean Ci=5.2	Mesic forest area: red maples, black ash, white pine Swale wetland. Dominant plant species include green ash and northern water-horehound.	0.072	Irrigation pond
P-73	0.025	Ridge and Swale Complex				Swale wetland. Dominant plant species include common eastern wild-rye, red raspberry and speckled alder.	0.013	Fairway for hole #16 and cart path
P-74	0.004	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.0	Some garlic mustard present Swale wetland. Dominant plant species include fowl manna grass and green ash.	NI	None
P-75	0.015	Great Lakes ridge and swale Ridge and Swale Complex	*Glyceria striata, Lycopus uniflorus, Urtica dioica, Alliaria*	Fowl manna grass, northern bugleweed, stinging nettles, garlic	Mean Ci=2.3	Surrounded by mature forest: red maples and paper birch Swale wetland. Dominant plant species include fowl manna grass.	0.015	Tee box for hole #14
P-76	0.045	Great Lakes ridge and swale Ridge and Swale Complex	*Carex* spp., *Aster* sp.	Sedge species, aster species	Mean Ci=5.4	Sparsely vegetated. Surrounded by large beech, red maple and white pine Swale wetland. Dominant plant species include common tussock sedge and fowl manna grass.	0.045	Fairway for hole #13
P-77	0.033	Great Lakes ridge and swale Ridge and Swale Complex	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=5.1	Surrounded by beech, red maple. Other grass and sedge species present Wet meadow wetland. Dominant plant species include blue-joint grass.	0.033	Fairway hole #11
P-78	0.031	Ridge and Swale Complex				Swale wetland. Dominant plant species include American beech.	0.031	Cart path
P-9	0.012	Great Lakes Ridge and swale Ridge and Swale Complex	*Carex stricta*	Tussock sedge	Mean Ci=5.7	Swale wetland. Dominant plant species include blue-joint grass and common tussock sedge.	0.012	Fairway hole #18.
RT1	0.67	Hardwood Swamp				Hardwood swamp wetland. Dominant plant species include American hornbeam, cinnamon fern, green ash, speckled alder and white avens.	NI	None
RT2	0.11	Hardwood Swamp, Forested Swamp				Hardwood swamp wetland. Dominant plant species include blue-joint grass, fowl manna grass, greater bladder sedge, green ash, Japanese barberry, red oak and sugar maple.	NI	None
W15	1.36	Hardwood Swamp				Hardwood swamp wetland. Dominant plant species include bottomland aster, giant goldenrod, green ash, multiflora rose, paper birch, red maple, red raspberry, reed canary grass, showy bush honeysuckle and speckled alder.	NI	None
W16	0.41	Wet Meadow				Wet meadow wetland. Dominant plant species include reed canary grass.	NI	None
W21	0.02	Alder Thicket	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.6	Seasonally flooded basin. Dominant plant species include Japanese barberry and speckled alder.	NI	None
W26	0.05	Wet Meadow				Wet meadow wetland. Dominant plant species include box elder, Canadian goldenrod, giant goldenrod, green ash and reed canary grass.	NI	None
P-202	0.081	Great Lakes ridge and swale Wet Meadow	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.8	Sparsely vegetated but diverse native plant community Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	0.040	Cart path
P-203	0.026	Great Lakes ridge and swale Wet Meadow	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.8	Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	NI	None
P-206	0.006	Interdunal wetland Wet Meadow	*Juncus balticus, Solidago gigantea*	Baltic rush, giant goldenrod	Mean Ci=3.4	Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	NI	None
P-207	0.022	Wet Meadow				Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	NI	None
P-208	0.185	Interdunal wetland Wet Meadow	*Calamagrostis canadensis*	Canada bluejoint grass	Mean Ci=4.3	Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	NI	None
P-210	0.078	Interdunal wetland Wet Meadow	*Juncus balticus, Fragaria virginiana, Lycopus uniflorus,*	Baltic rush, wild strawberry, northern bugleweed, Canada	Mean Ci=4.0	Upland dune area Wet meadow wetland. Dominant vegetation blue-joint grass, Baltic rush, Japanese barberry and shining willow.	NI	None
Totals	**47.949**						**3.693**	