#2013-39
Three Oaks Recreation Area – Cable Wakeboard Park
Project Review for Planning and Zoning Commission

Meeting Date:	August 21, 2013
Zoning Requests:	Conceptual Plan Review for a cable wakeboard park at Three Oaks Recreation Area.
Location:	5517 Northwest Highway
Acreage:	Approximately 475 acres
Existing Zoning:	M- Manufacturing
Surrounding Properties:	North - "Various" Commercial uses South - "LITH" Mining East - "Various" Restaurant, residential, manufacturing West - "Various" Manufacturing
Staff Contact:	Michelle Rentzsch (815-356-3615)

Background: Previously mined for its sand and gravel, the Vulcan Lakes Recreation Area has become a prime location for fishing, boating, swimming, biking, hiking and wildlife viewing. In 2009, a Special Use Permit (SUP) was granted for the recreational area improvements and amenities. The 475-acre recreation area contains two lakes (one at about 300 acres and another at 45 acres) and the cable wakeboard park is proposed for the north lake.

Project Info:
The prior Special Use Permit was granted prior to the adoption of the UDO. The permitted uses table in the UDO does not list this use as a SUP in the M- Manufacturing district. The petition for zoning approval would request a Use Variation for a SUP for a cable wakeboard park in the M-Manufacturing district. At this time, the City-selected cable wakeboard park developers are seeking initial comments on their proposed plans. Please reference the attached narrative, plans, and studies.

Comprehensive Land Use Plan 2020 Vision Summary Review:
One of the main goals with the current 2020 Comprehensive Plan reads: Provide high quality public and semi-public facilities, such as schools, libraries, municipal facilities and private service providers throughout the City to support the diverse and evolving needs of people in the City.

Staff Comments:

Building Division – as part of the zoning and permit approvals, where appropriate, please submit the following:
1) Architectural plans for all buildings and structures
2) Plans for the wakeboard system, including:
    a) Structural plans for the entire system (signed and stamped by an engineer)
    b) Detailed electrical plans
    c) Detailed site plans including accessibility
3) Detailed signage plan for signage on RT 14 and signage within the facility
4) Approvals from Illinois Department of Public Health for the proposed beach and hot tub
5) Approval from the McHenry County Department of Health for the restaurant.

Engineering Division
1) Traffic Study: An amendment to the previous traffic study was completed to include this proposed use. The study found that site traffic increases approximately 20% but the driveways and adjacent intersection provide sufficient capacity without any additional roadway modifications.

2) Parking

a) The drive aisle connecting the new parking lot to the existing parking lot needs to be paved and not connect into the existing limestone path. [TRAFFIC STUDY COMMENT]
b) Add 90-degree parking stalls on one side of this aisle for additional overflow parking.

c) Provide pedestrian crossings across the driveway for the gravel path that leads to the sled hill and Pingree Road. [TRAFFIC STUDY COMMENT]

d) Add wayfinding signage at the first and second intersections to direct guests to and from the wakeboard park parking lot. [TRAFFIC STUDY COMMENT]

e) Suggest including the grading for a much larger "future" parking area in the initial phase to make expansion easier in the future. Could also serve a separate future building by the City (community room, banquet facility, etc) or for another private recreational use.

f) Suggest consideration for LED parking lot and site lighting to complement the water quality best management practices required for the stormwater management.

3) Sanitary Sewer: With the building located lower than the location shown in the feasibilty study, additional design needs to be completed to show whether a gravity sewer is still possible. A separate lift station would add additional cost and maintenance. Also need to confirm the size/capacity of the sanitary force main (4"?).

4) Water Service: An 8" looped water main system for the Three Oaks Recreation Area facility, including this new use, might be necessary. As noted in the proposal document, this could be accomplished along the existing trail alignment to connect to the main that runs along Pingree Road to the east. The service for this facility would need a separate meter. See Fire/Building comments regarding sprinkler system requirements.

5) Other Utilities: Separate meters and service lines for other utilities such as power, natural gas, telephone, internet, etc. would be needed if they are the responsibility of the operator.

6) Cable Tower:

a. The cable tower on the west side of the looped course is in the center of the lake – this will be more difficult to install with details provided in the final design. Was a larger course with the tower(s) located on the western shoreline considered?

b. Stainless steel towers shipped from Germany are noted in the reference materials Powder-coated black equipment might be something to consider for aesthetics if desired.

c. A third-party structural engineer inspection, with experience on this type of tower, may be required due to the specialized nature of this use.

7) Site Amenities:

d. Suggest adding fencing around the wakeboard park areas for security and include power for security cameras. Locations of concern include any access points onto the floating dock system, around the hottub area, and around the firepits.

e. Fencing should be the same specification as the other aluminum fencing used in the facility for ease of maintenance.

f. Any proposed infrastructure items should take long-term maintenance and repairs into consideration along with aesthetics (ie avoid the use of custom hardware such as one-of-a-kind decorative lighting poles or pavers that are special order with long lead times to obtain in an emergency repair).

g. If a community room or other non-wakeboard park use is included in the building for off-season use or City use, consideration for additional parking should be part of this initial design.

h. Signage – refer to Building Division comments regarding new monument signage along Route 14 and Main Street, as well as parameters for any desired advertising/signage on the ramps, towers, docks, or buildings.

i. Lighting – if this facility will operate after dark, lighting for the entire water course (not just at the towers) and associated infrastructure would likely need to be included and noted in the proposal.

j. Wave Analysis – the City's stormwater consultant provided a wave analysis using updated design parameters provided by the petitioner. These calculations show that the maximum wave height generated would be less than the those anticipated due to wind (0.23' versus 0.47'). No additional shoreline protection is recommended by the consultant.

8) Stormwater Management – see stormwater consultant comments under separate memo. Pre-treatment of the runoff from the parking lot with best management practices consistent with the other facilities on-site are needed. Permeable pavement could be considered to minimize drainage facility needs and provide a stormwater BMP.

9) Existing Stormwater Outlet Pipes and Risers: There are several existing outlet pipes, with risers, that project out into the lake along the north shorline. The proposed access ladder/dock systems will need to be positioned to avoid these pipes. The cable line may need to be cantilevered further out into the lake so that riders do not collide with the metal riser or pipe. Buoys may also be needed so swimmers and lifeguards are aware of their location.

Public Works Department
Water - No site utility drawings submitted this date. Narrative indicating a new 8" WM will be extended from existing WM to Pingree Road, and a 6" WM for a fire hydrant. Calculations should be run to make sure the 6" will allow proper fire flows for this location.

Sewer - Page 3 of the Project Narrative states the existing forcemain "should be adequately sized to handle the additional flows from this facility." The following sentence states the pumps and wet well will be evaluated for any needed modifications. The forcemain should be a part of the evaluation as well.

PW Administration - PE and flow discharge calculations will need to be provided as part of the analysis involving the existing lift station and forcemain capacity. There also needs to be supporting information that the facility can be served by a gravity line to the lift station.

Police Department
No Comments

Fire Rescue Department
1) The City's Fire Code is the International Fire Code, 2006 edition (IFC) with City of Crystal Lake amendments. Information may be obtained from the City's web-site. Listed below are some highlights that may affect this project.
2) Apparatus access requirement in IFC Section 503 will need to be evaluated when completed plans are submitted.
3) Aerial apparatus access is required when any portion of a building is greater than 30 feet in height, IFC Appendix D105.

4) Truck turn radius using the Fire Department's specifications may be needed when completed plans are submitted. Details are available from the Engineering Division.
5) Fire hydrants spacing will need to meet the requirements in IFC section 508, Appendix B, and Appendix C.
6) A fire hydrant shall be available within 100 feet from the fire department connection and not closer than 1.5 times the height of the building, IFC 903.3.7.1 as amended.
7) All new buildings, except 1 and 2 family, required an approved manual, automatic, or manual and automatic NFPA 72 fire alarm system, IFC 907.2 as amended.
8) The fire alarm is required to be monitored at the Fire Rescue Communication Center, IFC 903.4.2.1 as amended.
9) A fire protection equipment room for installed controls of fire protection or detection is required, IFC 915.1 as amended.
    A. Exterior access is required, IFC 915.2 as amended.
    B. An approved walk is required to access the room, IFC 915.2.1 as amended.
    C. The minimum size is 6 feet by 8 feet, IFC 915.3
    D. The room is required to have a cabinet 14 incheds high by 14 inches wide by 4.5 inches deep or a 4 inch by 30 inch PVC tube to store fire protection plans, IFC 915.5 as amended.
    E. The alarm room shall have a heater to prevent freezing of the sprinkler system. Heater shall have a thermostat and have electrical switches locked in the on position, IFC 915.7 as amended.
    F. A low temperature alarm connected to the fire alarm to send a supervisory signal if the temperature falls below 40 degrees Fahrenheit, IFC 915.8 as amended.
10) Due to the depth of water, a designated life guard/water rescuer must be on duty at all times and able to use the motorized watercraft to reach the injured wake boarder.
11) Provide the following details on the "Safety Boat";
    A. What type of water craft will be used?
    B. What size engine size and type will be used?
    C. What will happen when the designated "Safety Boat is out of service?
    D. Where will the fuel be stored?

<u>Planning & Economic Development Department</u>

1) Architectural details of the main building, ancillary buildings, tower elements, shade structures in beaches and umbrellas should harmonize with the architectural theme created by the Lake House building at the south lake. Details of these structures should be submitted for review as part of the zoning review. The height of the tower elements along the north shoreline should be reviewed in relation to a planned boardwalk along the south edge of the Route 14 properties to lessen any viewshed conflicts.
2) Details of lighting and sound levels for music/announcers should be submitted for review.
3) Perspective drawings of the towers and wires on the beach area would be helpful. The proposed beach shoreline frontage is roughly comparable to what is found on the south lake.
4) Site signage, including wayfinding signage, will be an important element and should be submitted as part of the zoning review.

<u>Action:</u>

Based on the conceptual plans and information provided, the cable wakeboard park developers are seeking initial comments on the overall concept of a wakeboard park facility for Three Oaks Recreation Area.

2013 39

City of Crystal Lake
Development Application

Office Use Only
File # _____

Project Title: VULKAN CABLE PARK AT THREE OAKS RECREATION AREA

RECEIVED
AUG 12 2013
BY:

Action Requested

___ Annexation	___ Preliminary PUD
___ Comprehensive Plan Amendment	___ Preliminary Plat of Subdivision
X Conceptual PUD Review	___ Rezoning
___ Final PUD	___ Special Use Permit
___ Final PUD Amendment	___ Variation
___ Final Plat of Subdivision	___ Other

Petitioner Information

Name: COPLEY/McGINNIS GROUP LLC
Address: 33 GATES STREET CRYSTAL LAKE, IL
Phone: 815-790-3820
Fax: _____
E-mail: CCOPLEY44@YAHOO.COM

Owner Information (if different)

Name: _____
Address: _____
Phone: _____
Fax: _____
E-mail: _____

Property Information

Project Description: CABLE/WAKEBOARD PARK

Project Address/Location: NORTH LAKE AT THREE OAKS RECREATION AREA

PIN Number(s): _____

Development Team

Please include address, phone, fax and e-mail

Developer: COPLEY/McGINNIS GROUP LLC

Architect: REPHOLZ STUDIO

Attorney: ZANCK, COEN, and WRIGHT

Engineer: CIVIL TECH ENGINEERS

Landscape Architect: HITCHCOCK DESIGN GROUP

Planner: HITCHCOCK DESIGN GROUP

Surveyor: VANDERSTAPPEN, INC

Other:

Signatures

PETITIONER: Print and Sign name ***(if different from owner)*** **Date**

As owner of the property in question, I hereby authorize the seeking of the above requested action.

8/12/13

OWNER: Print and Sign name **Date**

NOTE: If the property is held in trust, the trust officer must sign this petition as owner. In addition, the trust officer must provide a letter that names all beneficiaries of the trust.

Project Narrative

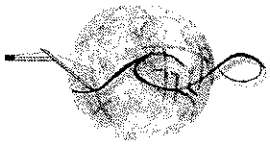
Background:

The following project, *Vulkan Cable Park* is being submitted by the **Copley/McGinnis Group LLC** to the Crystal Lake Planning and Zoning Commission for a PUD - Conceptual Review. The project is the direct result of a response to a Request for Proposal put out by the City of Crystal Lake in January 2013 seeking a private development partner to design, construct, and manage a cable wakeboarding park within the Three Oaks Recreation Area. Responses to the RFP were reviewed by City staff with a recommendation being made to the City Council. In May 2013, the City Council accepted the staff recommendation of the **Copley /McGinnis Group LLC** as the City's development partner and authorized moving forward with the Conceptual Site Plan and Land Use Agreement phases of the project.

Synopsis:

Cable Parks are a fairly new water based "attraction" concept that are beginning to spread quickly across the United States with roughly 20 facilities in operation. *Vulkan Cable Park* is envisioned as a relatively small scale, medium density development to be located along the south shore of the North Lake at the Three Oaks Recreation Area. The primary component of the park, the actual moving cable systems and wakeboard courses are located directly on the North Lake. While the park is primarily designed as an attraction for daily users, it is also being designed to host annual events and competitions to draw broader interest in the sport and to attract people from a wider geographic area. In addition to providing a top quality cable park, the park's design will offer many amenities such as camps, music, food, special events, various other action sports including a FloCurl and a Ropes Course, and viewing areas where families from McHenry County and beyond will come to enjoy a new type water sport.

The goal is for Vulkan Cable Park to be a seamless extension of the existing park where the roadways, pathways, landscaping, and visual aesthetics are extensions of the existing recreational development. The location along the south shore of the lake was chosen to allow the development to utilize much of the roadway and utility infrastructure currently in place on the site but also to create some separation and identity from the existing facilities. We have teamed



with ***The Hitchcock Group*** and ***Civil Tech Engineers*** because of their expertise and their involvement in the existing development and their depth knowledge of the land. We're proposing a phased approach to a wake board park that allows for the flexibility of staged and planned growth and provides opportunities for future amenities.

Copley McGinnis Group, LLC also intends to honor the legacy and history of the site by educating the community through the integration of a small historical display room within the cable park's main entry building. The displays would highlight the heritage of the site and other local Illinois' natural history components. We would engage our friends at the McHenry County Historical Society to help create a dynamic and creative display. Additionally, the overall design aesthetics of the development will subtly emulate agrarian and mining vernacular design concepts and motifs.

Proposed Conceptual Site Plans:

Two conceptual site plans for *Vulkan Cable Park* , prepared by ***The Hitchcock Design Group*** and professional design team, have been included with this submittal. The first plan is an overall site plan titled ***Overall Concept Plan*** that shows the proposed development of the new cable park within the context of the existing amenities at Three Oaks Recreational Area. The overall plan also shows the proposed cableway and course layouts, the starting dock, and the floating dock system. The second plan, titled ***Overall Concept Plan - Enlargement,*** shows a close up view of the proposed wake board park itself, identifying the proposed entry, parking, building locations, pedestrian paths and walkways, and landscaping. The facilities are situated on the southern shore of the north lake to offer close proximity to the lake and wake board activities but far enough from existing facilities to allow us to create effective landscape buffers. The development is positioned to take advantage of the topography of the southern slope to capture fantastic views toward the northwest corner of North Lake. The elevated location offers views to the west and the remainder of the park. The location of the parking minimizes excavation and maximizes the opportunity for shared parking and amenities with existing surrounding amenities. By building with the topography we hope to minimize impact and disturbance to the surrounding landscape, and create a "campus" style atmosphere for the wakeboard park itself.

- **Traffic and Parking Analysis**

Civiltech is one of the approved traffic engineers for the City of Crystal Lake and completed the original traffic study for Three Oaks Recreational Area to determine the impact the park had on the adjacent roadway system. The study included developing a traffic simulation model to analyze traffic during peak hours which helped define the intersection improvements for the park entrances at South Main Street and U.S. Route 14. This model will be revise based on the anticipated traffic generated with the Wakeboard facility to determine the impact on the adjacent roadway system.

- **Site Utility Connections**

Based on ***Civiltech's*** investigation and knowledge of the existing site utilities, the wakeboard facility will require a water service and sanitary sewer service. The Master Plan for the park includes extending an 8-inch watermain from the existing main near the north lake boathouse out to Pingree Road along the emergency access road. We will extend a 6-inch watermain from the 8-inch main to a new fire hydrant located near the Wakeboard building. A 1-inch water service will be extended to the building from this line. The water service will have adequate pressure based on the proposed elevation and the existing water pressures at the swim area and north lake boathouse. A new 6-inch sanitary sewer service will be installed from the Wakeboard building to the existing manhole adjacent to the lift station. The existing forcemain should be adequately sized to handle the additional flows from this facility. We will evaluate the lift station pumps and wetwell capacity to determine if any modification will be needed.

Stormwater will be handled similar to the original development. Using best management practices, parking lot runoff will be directed to infiltration/bioretention areas that will promote infiltration. Culverts will be installed to allow runoff that isn't infiltrated to be directed to an appropriate location. Plantings will be proposed to help promote infiltration around the building and impervious surfaces of the site.

Primary Project Components:

Entry/Parking: The Cable Park will use the current access points to the Three Oaks Recreation Area at Main Street and Route 14 but upon approaching the North Lake there will be an access

road that leads to a parking lot that is separated from the existing parking lot. It will be initially sized for 80 cars, but the overall site plan allows for expansion and other areas are being considered for event parking. The number of initial parking spaces was determined by talking to owners/operators of other cable parks in the United States.

Main Building: Conceptually, the main building will function much the same way as a clubhouse does for a golf course. Based on the topography of the selected site, the building will most likely be a two-story building built into the hill with entrances at both the parking lot level and at a level closer to the water. At the main entry will be a Pro Shop where visitors will pay for the day's activity pass and have an opportunity to purchase sundries and apparel. Off of the main entry there will be a display area that highlights some history of the site as well as upcoming events and competitions. There will be an opportunity to rent equipment for those without their own. There will be locker rooms for changing and for showering as well as restroom facilities. The main building will also include a small kitchen and concessions and indoor dining area overlooking the lake.

The Cable Courses: The park is designed to include three separate cable courses spread out over the eastern two-thirds of the North Lake. The eastern orientation allows for an area of shoreline fishing to be preserved along the western shore and part of the northern shore of the lake. It also moves the towers and support structures for the cable system further away from the main entry drive to the park. Because on the steep topography and dense vegetation along the north and west edges of the lake, the cable park will be substantially hidden from view for those entering the Three Oaks Recreation Area.

There will be (2) two-tower courses flanking either side of the main full loop course which is located near the center of the lake. On the two-tower courses, individual riders, one at a time, complete a "there and back" loop as their ride and then return to the end of the line. If they fall during their loop, there is a floating walkway system that brings them back to the starting dock. One two-tower course has been designated as the "Beginner" course and is located directly adjacent to the beach. The second two-tower course is designated as an intermediate to advanced level course and is tiered from the top, which is located uphill from the lake, to the bottom which is located in the lake. The tiers are man-made water wells located directly below the cable that include obstacles and rails for the riders to be pulled over as the cable descends the slight decline towards the lake. This course is also set up as an individual rider, one at a time, "there and back" concept so the same cable pulls the rider back up the incline and through the same obstacles. If the rider falls, they exit to the walkway system located adjacent to the course.

The main attraction of the park is the full loop system located near the center of the lake. There are 5 towers that support a moving cable suspended about 30' above the water and completes a 360 degree loop. Riders leave the starting dock individually and at spaced intervals and are pulled in the counter clockwise direction around the loop, across the water, and through, around, and over various obstacles and jumps located in the water. As riders fall off they find they locate the floating walkway system and return to the line at the starting dock.

Outdoor Seating/Viewing Areas: As depicted in the site plans, there are several types of outdoor seating/viewing areas included within the park. There is the main deck/patio area that is located directly adjacent to the building which also functions as outdoor dining space and includes a small stage. There is a small beach area which allows spectators to sit closer to the water but the beach is not intended for swimming. Additionally, there is a tiered grassy area located directly in front of the full loop course and adjacent to the tired two-tower course. This area is fairly large and considered to be the primary viewing area for competitions and events. The viewing/seating areas are interconnected with paths and walkways and are surrounded by the same native negation that is found through the existing Three Oaks Recreation Area.

MEMORANDUM

August 16, 2013

TO: Eric Helm – Deputy City Manager
Erik Morimoto – Director of Engineering and Building

FROM: Scott Griffith, PE, CFM

SUBJECT: Three Oaks Recreational Area – Cable Ski Wave Analysis
City of Crystal Lake, IL

As requested, Christopher B. Burke Engineering, Ltd. (CBBEL) has prepared this memorandum is to summarize the potential wave heights for the proposed cable ski facility at the Three Oaks Recreational Area in the City of Crystal Lake. We have completed a wave height calculation according to formulas referenced in U.S. Army Corps of Engineers studies for a ski or wakeboard with the following parameters:

- Maximum draft of 0.5 feet
- Maximum velocity of 38 mph
- Distance to shore of 75 feet
- Length of ski or wakeboard 5 feet

Based on these parameters, the maximum wave height at the shore would be approximately 0.23 ft. This is less than the wave height anticipated due to wind as calculated by Hey & Associates, LLC in the stormwater report for this project, which was 0.47 ft for the North Lake and 0.74 ft for the South Lake. Therefore, no additional shoreline protection is necessary.

JSG
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CRYSTAL LAKE PLANNING AND ZONING COMMISSION
WEDNESDAY, FEBRUARY 4, 2009
HELD AT THE CRYSTAL LAKE CITY COUNCIL CHAMBERS

The meeting was called to order by Vice Chair Greenman at 7:30 p.m. On roll call, members Batastini, Esposito, Jouron, Schofield, and Greenman were present. Members McDonough, Skluzacek and Hayden were absent.

Michelle Rentzsch, Director of Planning and Economic Development, and Latika Bhide, Planner, were present from Staff.

Mr. Greenman stated that this meeting is being televised now as well as being recorded for future playback on the City's cable station.

2009-03 VULCAN LAKES/CITY OF CRYSTAL LAKE – 5117 Northwest Highway – PUBLIC HEARING
Special Use Permit for Commercial Recreation.

Mr. Greenman stated that the sign has been posted. He said the surrounding property owners have been notified and the Certificate of Publication is in the file. Mr. Greenman waived the reading of the legal notice without objection.

Ms. Rentzsch was present to represent the City's petition. Ms. Rentzsch showed a Power Point presentation showing the overall site plan for the northern portion of the property. The property is zoned "M" Manufacturing which allows Commercial Recreation with a Special Use Permit. Entering the site from Route 14, one would travel down the entrance road which leads to the parking field, which will use rain gardens and best management practices. Ms. Rentzsch said the site will have a lake house, boathouse, beaches, islands that will be connected by bridges and boardwalks. There will also be area for kayaks and battery powered boats for rent and the northernmost lake will offer an area for families with small children. There was much discussion at City Council regarding a second access and they looked at several options. The plan shows a second emergency exit from Pingree Road at Three Oaks. It is a walking path but it will double as an emergency entrance.

Ms. Rentzsch said the main entrance on Route 14 will have a right-in, right-out, left-in capacity with the left turns exiting on the roadway south of the bank to take advantage of the traffic signal on Route 14.

Ms. Rentzsch showed color renderings of the proposed lake house. It will be made of natural materials and you will be able to see through it to capture views of the lake. There was much discussion at Council regarding the placement of the buildings as well as options for possible future expansion. Ms. Rentzsch showed a "fly-through" of the project showing all of the amenities. She said a lot of study has been done about slope stabilization on this site and it was found that the slope on the north side of the north lake needed immediate attention for

stabilization.

Robert Switzer, part owner of the property at southwest corner of Route 14 and Pingree Road, gave the background of his business. He is concerned with the berm at the rear of his property. The trees are overgrown and rubbing his building. Mr. Switzer also asked what will be the benefit for his property of this use.

Sylvester Kurwin, real estate broker from Chicago representing Cassidy Tires, asked how the entrance/exit of this request was going to impact their property which is adjacent.

There was no one else in the public who wished to speak on this petition. The public hearing was closed at this time.

Ms. Rentzsch said there will be no impact on the property to the east of the existing entrance. The changes that are planned will be within the existing right of way. There is no signal proposed for this location since there is one to the west as well as one planned for the intersection of Federal and Route 14 which is just east of this entrance. She said the berm behind the properties along Route 14 does need immediate attention. It has been determined that the weight of the berm is causing the slope to destabilize. There are plans in place to remove the existing berm and stabilize the slope. This will allow the lakes to be seen from the properties along Route 14.

Mr. Greenman asked what the PZC's involvement is. Ms. Rentzsch said the entire project and funding has been resolved by the City Council. What is before the PZC is the request for Commercial Recreation for this site. She also stated that any input for this site can be made at this time and forwarded to the Council.

Mr. Jouron asked if the slopes will change. Ms. Rentzsch said the north slope will possibly change because of the stabilization efforts. Mr. Jouron asked if the area will be used in winter. Ms. Rentzsch said it could possibly be used for skating and hiking. Mr. Jouron asked about the road leading west. Ms. Rentzsch said that leads to Main Street. It was anticipated to be one of the main entrances to the site but there could be significant costs with building this roadway. This roadway extension will be shown as one of the options in the bid documents so the City can weigh the costs of this option.

Mr. Jouron said this is very different than what was originally discussed many years ago when the City first acquired the property.

Mr. Esposito said this has been a long time coming. This is a very nice project. He likes the buildings and that we will use BMPs on the site. Mr. Esposito asked about the exit on Pingree Road since the project will be gated. Ms. Rentzsch said this will be for emergency vehicles to enter and exit the site if necessary.

Mrs. Schofield asked about maintenance of the area after it is built. She asked if there is a plan.

This is a beautiful project but there will be a lot to maintain it. Ms. Rentzsch said they visited a similar site in Libertyville and they are self sufficient. Many lessons about what not to do and what to do were learned from that visit. She said the operations and maintenance plan is being developed and reviewed right now. Mrs. Schofield said it is not clear what involvement the PZC has. If this request were not coming from the City there would be more questions asked. There are other aspects of this development that should be looked at and there are many questions to ask. She said maintenance is important part of this plan. Who and how it will be maintained? Mrs. Schofield said she would like to see more information as to the financial plans for this site. Ms. Rentzsch said she doesn't know the details of the economic feasibility of this project. She said the City put together the very best plan for this property and they are looking for zoning approval of their Special Use Permit request. She said the PZC doesn't typically request the financial plans from petitioners before them.

Mr. Jouron asked if Crystal Lake Fest will be held here instead of Main Beach. Ms. Rentzsch said that has not come up.

Mr. Batastini asked about the size of the large beach shown on the plan. Ms. Rentzsch said it is about the same size as Main Beach. The finer beach sand was put there by the prior owner. Mr. Batastini asked about parking. Ms. Rentzsch said there are 300 spaces here and there are 200 at Main Beach. Mr. Batastini said they are only seeing the northern portion of the property. He asked if the trails will go completely around the site. Ms. Rentzsch said that could be in a future phase of the project. The Council wanted to get the most bang for their buck initially so they decided to go with the buildings, parking, etc. first.

Mr. Batastini asked about the liability issues and how to keep people from coming in along Pingree Road. Ms. Rentzsch said that is the Council's decision on how to control the site. Mr. Batastini asked about Rakow Road expansion. Ms. Rentzsch said there is sufficient right of way for the expansion and there won't be any land taking. Also, the County has plans to put up a guardrail.

Mr. Batastini asked about the previous plan they had seen, which showed development within the site. Ms. Rentzsch said there was no interest in that portion of the project at that time. The City wanted to move forward with opening the recreation area. Mr. Batastini said this will make the property on Pingree Road lakefront property. He wondered if the City considered vacating Pingree Road to gain more lakefront property. There are a lot of opportunities in this area. He also asked how the City covers the costs. There is a lot of area that is natural and won't need to be maintained. We need to budget beyond the construction.

Mrs. Schofield asked about the traffic study. Ms. Rentzsch said Civiltech looked at the traffic generation numbers at peak times and determined the Route 14 entrance would be fine.

Mr. Batastini asked if this project could be self-sustaining. Ms. Rentzsch said the project they visited in Libertyville is.

Mr. Greenman asked about scuba diving. Ms. Rentzsch said the City has been contacted by several companies in the area and she is not sure if that will be allowed.

Mr. Greenman said he supports the Commercial Recreation use of this property. He understands the City is doing Phase 1 but would like to see more information. Site control is a huge issue for this site. Mr. Greenman said this is a new service for the City and wants a better understanding of how this will be supported. He would believe that it took the Libertyville facility some time to become self-sustaining.

Mr. Esposito moved to approve the Special Use Permit for Commercial Recreation for Vulcan Lakes located at 5117 Northwest Highway with the following conditions:

1. Approved plans, to reflect staff and advisory board comments, as approved by the City Council:
   A. Application (COCL, dated 1/19/09) including the associated recreational plans.

2. The petitioner shall comply with all of the requirements of the City's codes.

Mr. Jouron seconded the motion. On roll call, all members voted aye. Motion passed.

09-03

Mansion this coming Saturday.

City Council Reports
Councilman Goss stated that he wished to publicly recognize the cooperation of the Crystal Lake, Cary and Fox River Grove Police Departments for their efforts in apprehending a suspect in recent Walgreen's robberies.

Consent Agenda
Councilwoman Brady Mueller moved to approve the Consent Agenda, consisting of Items 9a and b with the addition of Items 10 and 12. Councilman Goss seconded the motion. On roll call, all voted yes. Motion passed.

9a. Approved a request from the Crystal Lake Park District for the issuance of fifteen Class "16" Temporary Liquor Licenses for the Park District's 2009 Summer/Fall Events.

9b. Vulcan Lakes, 5117 Northwest Highway – Approved the Planning and Zoning Commission recommendations and adopted an ordinance granting a Special Use Permit to allow recreational uses as part of the Vulcan Lakes Recreational Area.

10. Crystal Lake Country Club, 721 Country Club Road –Adopted an Ordinance amending Section 329-5-K of the Crystal Lake Code: License Classification, Fees, Class 11 License, to allow the retail sale of alcohol for consumption at locations other than the club quarters.

- *12. Crystal Lake Park District, Veteran Acres – Approved the recommendation of the Planning and Zoning Commission and adopted an ordinance granting a Special Use Permit to allow a 736 square foot restroom building, and variations from the requirements to tie into the municipal sanitary sewer line and extend the main to the far edge of the property.*

County Zoning Request, Resurrection Retreat Center, Inc., 2710 Country Club Road – Conditional Use Permit to allow Homes, Institutions and Specialized Care
Mayor Shepley advised the audience that this matter was under the jurisdiction of McHenry County, and Crystal Lake's decision that evening would be only to object or not object. He added that even if Crystal Lake were to object, it may not have any bearing on the vote by the County Zoning Board of Appeals.

Mayor Shepley asked if anyone in the audience wished to speak on the matter.

Mark Saladin, attorney for Resurrection Retreat Center, asked that the City Council take no action on the matter. He stated that Resurrection Center was seeking a Conditional Use Permit for a faith based continuing care retirement community. He noted that continuing care is very needed for seniors, and best management practice and a comprehensive resource protection plan would be used in developing the property. Mayor Shepley confirmed with Mr. Saladin that his employer, Centegra Health Systems, was not involved in the project, and therefore represented no conflict of interest for the Mayor.

ORDINANCE NO. 6446
FILE NO. 440

AN ORDINANCE GRANTING A SPECIAL USE PERMIT
AT 5117 NORTHWEST HIGHWAY

WHEREAS, pursuant to the terms of a Petition (File #2009-03) before the Crystal Lake Planning and Zoning Commission, the Petitioner has requested the issuance of a Special Use Permit to allow Commercial Recreation for the property located at 5117 Northwest Highway; and

WHEREAS, it is in the best interests of the CITY OF CRYSTAL LAKE that the Special Use Permit be issued as requested in said Petition.

BE IT ORDAINED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF CRYSTAL LAKE, McHENRY COUNTY, ILLINOIS, as follows:

Section I: That a Special Use Permit be issued to allow Commercial Recreation for the property commonly known as 5117 Northwest Highway, Crystal Lake, Illinois.

Section II: Said Special Use is issued with the following conditions:

1. Approved plans, to reflect staff and advisory board comments, as approved by the City Council:
   A. Application (COCL, dated 1/19/09) including the associated recreational plans.

2. The petitioner shall comply with all of the requirements of the City's codes.

Section III: That the City Clerk be and is hereby directed to amend the official zoning map of the City of Crystal Lake and all pertinent records of the City of Crystal Lake to show the issuance of a Special Use Permit in accordance with the provisions of this Ordinance, as provided by law.

Section IV: That this Ordinance shall be in full force and effect from and after its passage and approval as provided by law.

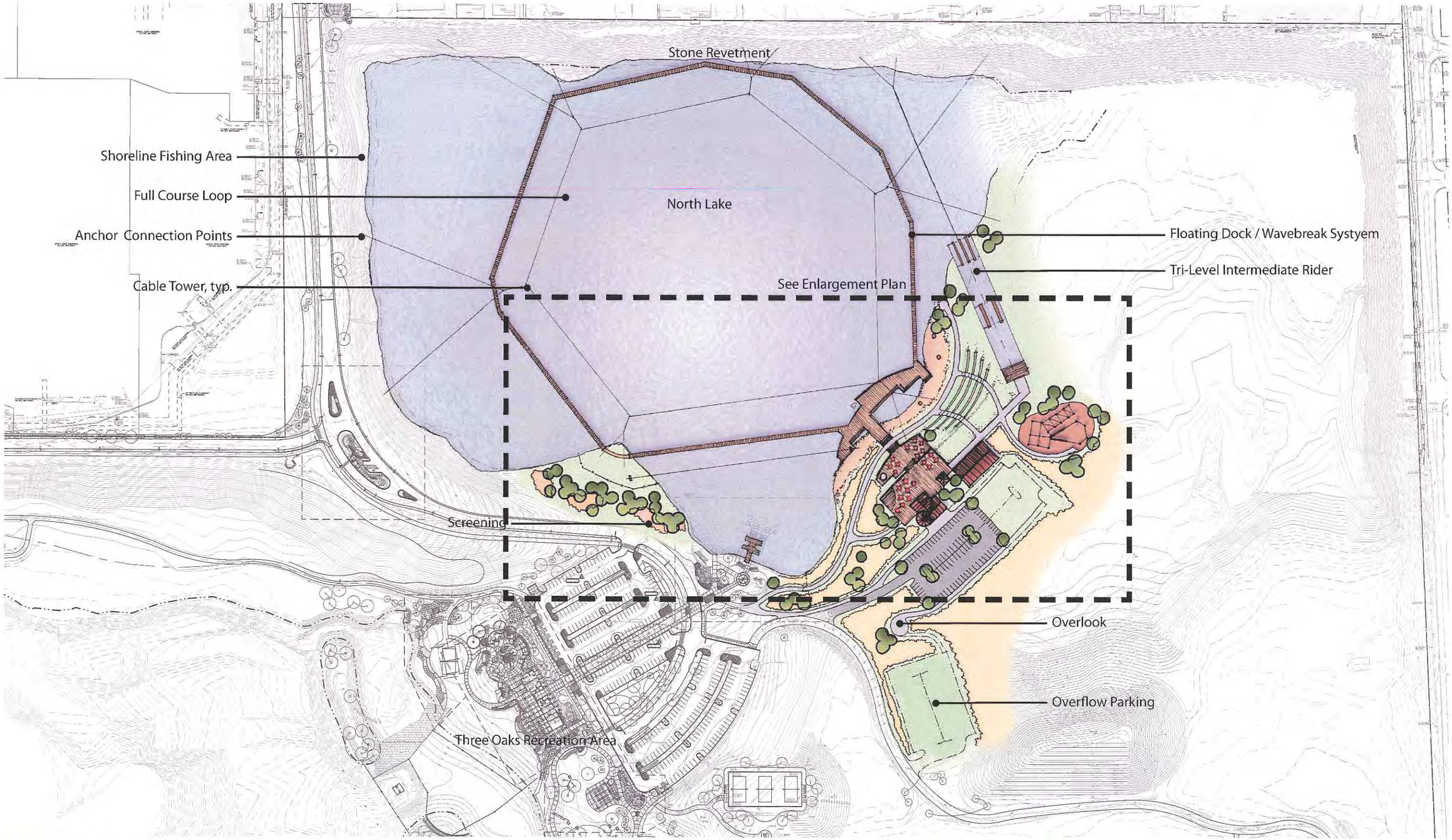
DATED at Crystal Lake, Illinois, this 17th day of February, 2009.

MAYOR

ATTEST:

CITY CLERK

Published in pamphlet form by the authority of the Mayor and City Council of the City of Crystal Lake.



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creating better places

Overall Concept Plan

Vulkan Cable Park at Three Oaks Recreation Area

Crystal Lake, Illinois

RECEIVED
AUG 12 2013
BY:

2013 39

NORTH

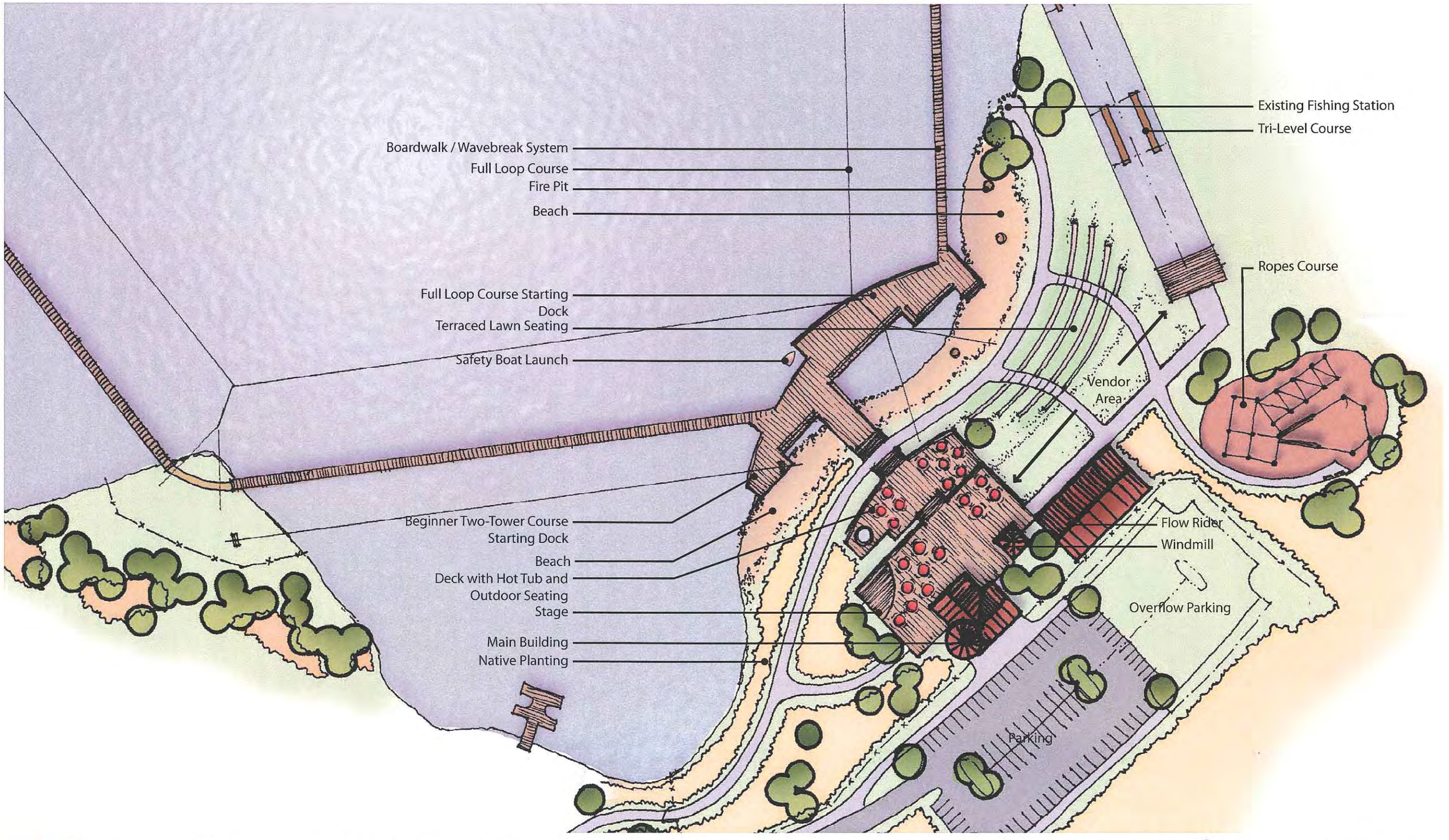
SCALE: 1"=100'

0' 25' 50' 150'

ISSUE DATE: July 31, 2013, 2013
PROJECT NUMBER: 04-1025-001-02-03
All drawings are preliminary and subject to change.

PREPARED FOR:
Copley McGinnis Group, LLC

IN ASSOCIATION WITH:
Civiltech Engineering, Inc.
Repholz Studio
Architecture and Planning



Overall Concept Plan - Enlargement

Vulkan Cable Park at Three Oaks Recreation Area

Crystal Lake, Illinois

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NORTH

SCALE: 1"=100'

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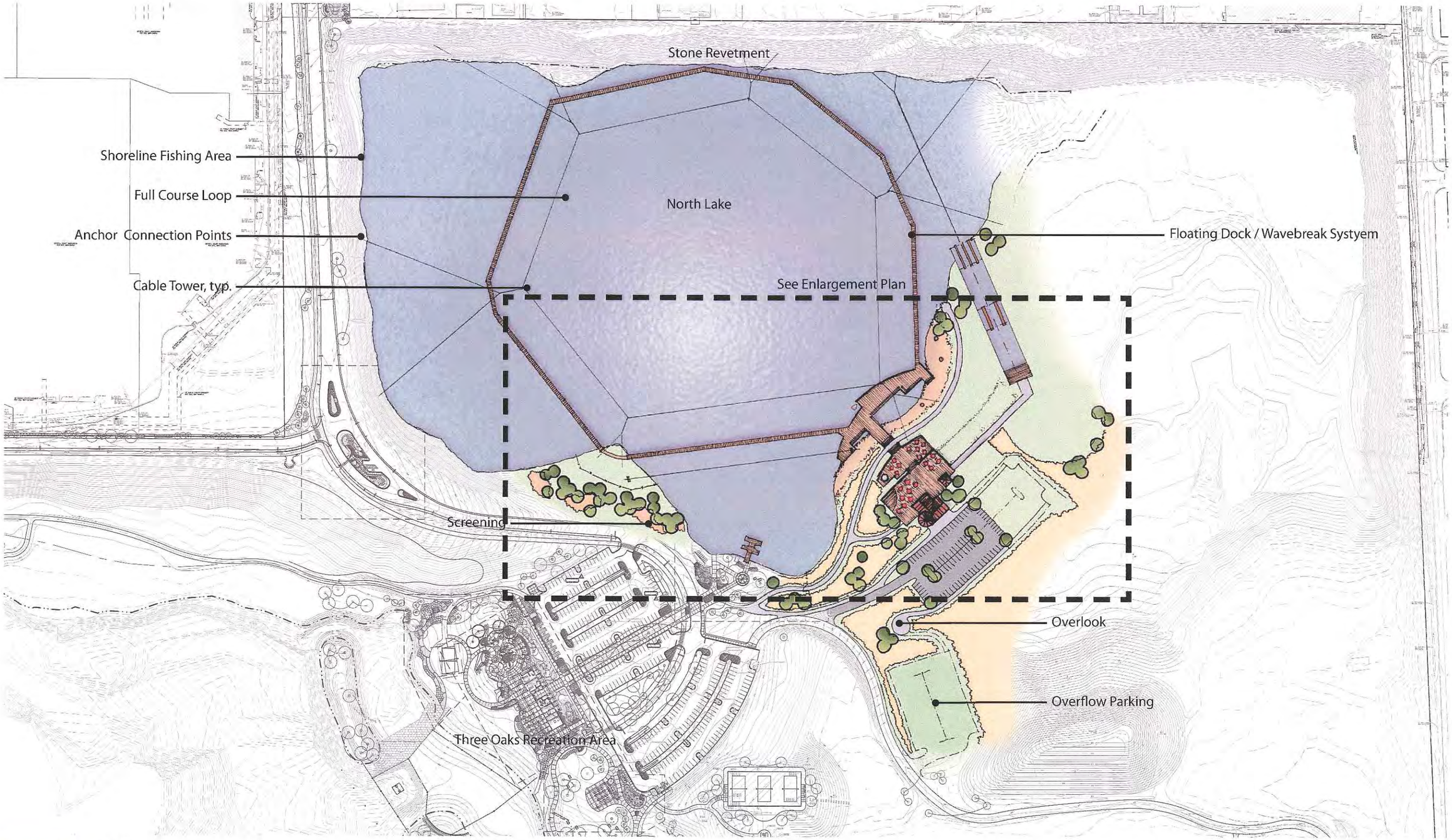

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Phase I Concept Plan

Vulkan Cable Park at Three Oaks Recreation Area

Crystal Lake, Illinois

NORTH

SCALE: 1"=100'

0' 25' 50' 150'

ISSUE DATE: July 31, 2013, 2013
PROJECT NUMBER: 04-1025-001-02-03
All drawings are preliminary and subject to change.

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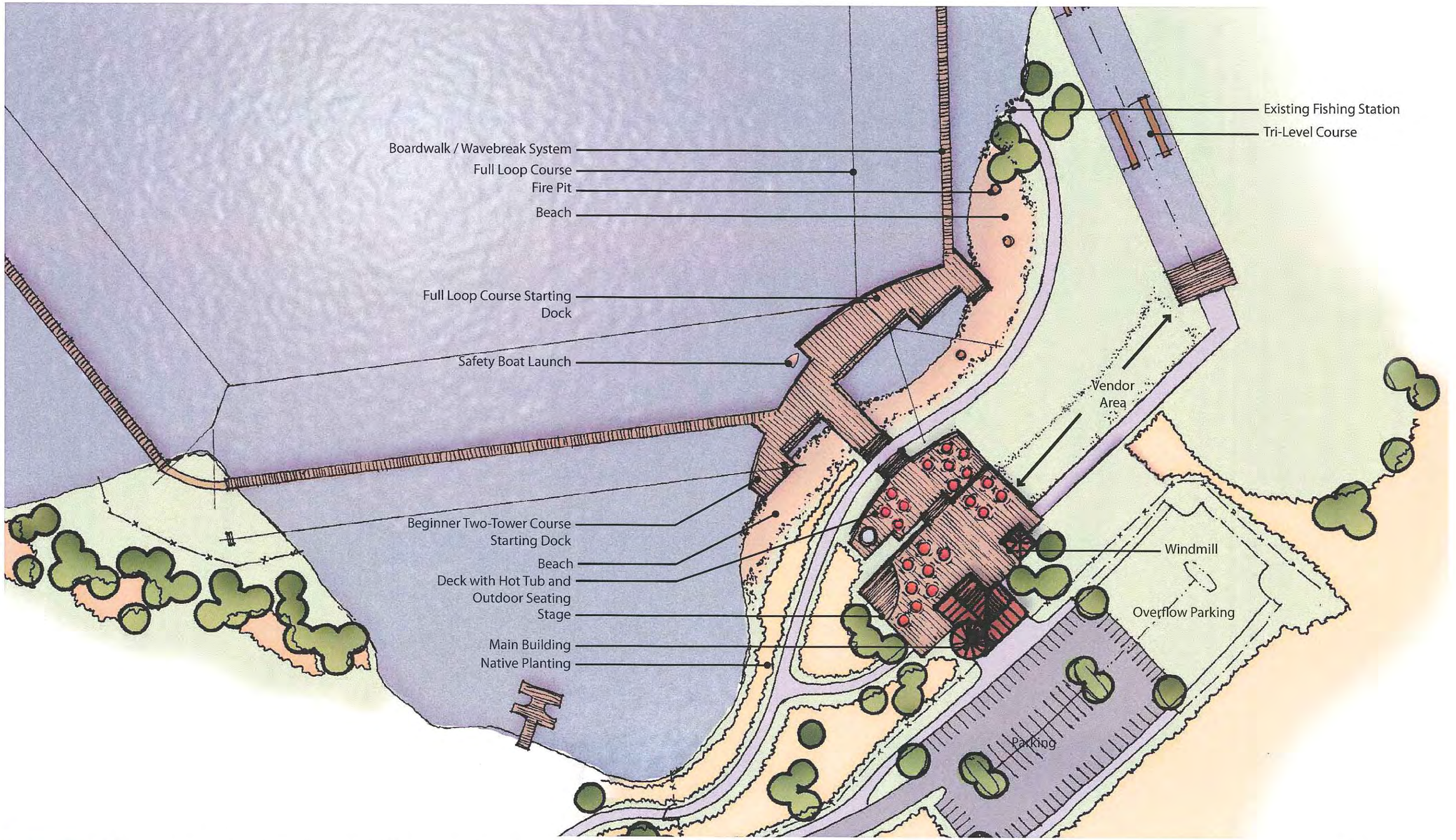

Phase I Concept Plan - Enlargement

Vulkan Cable Park at Three Oaks Recreation Area

Crystal Lake, Illinois

HITCHCOCK DESIGN GROUP
creating better places

NORTH

SCALE: 1"=100'

0' 25' 50' 150'

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IN ASSOCIATION WITH:
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Architecture and Planning

Copley McGinnis Group, LLC

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CIVILTECH

Existing Conditions

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Existing Conditions

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CIVILTECH

Existing Conditions

Crystal Lake Wakeboard Park Feasibility Study

FOR

Three Oaks Recreation Area – North Lake

IN

McHenry County, Illinois

Prepared for:

City of Crystal Lake
100 West Woodstock Street
Crystal Lake, Illinois 60014

Prepared by:

BAXTER & WOODMAN Consulting Engineers

JD

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EXECUTIVE SUMMARY

On June 21, 2012 James DeOtte entered into a contract with Baxter and Woodman (B&W) to assist with development of an overhead cable wakeboarding park on North Lake within the City of Crystal Lake, Illinois, Three Oaks Recreation Area. Since 2009, James DeOtte has completed the design of two wakeboard cable parks in the State of Texas. The purpose of this report is to outline the feasibility of a wakeboard cable park at the Three Oaks Recreation Facility and identify any hurdles facing development.

The Three Oaks Recreation Area features two major bodies of water, referred to within as North Lake and South Lake. The area between the two lakes was developed in 2009-2010 to serve boaters and recreational visitors. A lake house, picnic pavilion, boat house, and point of entry gate house were constructed, along with associated utilities. The City of Crystal Lake has identified the smaller North Lake as a possible location for a wakeboard cable park.

A wakeboard cable park is a concept that has been around since the early 1960's, but has recently gained popularity. The idea is to suspend a motor driven circular cable by a system of towers, and pull a wakeboarder in tow around the track. Over 240 wakeboard cable parks have been constructed worldwide. Two major types of tow systems exist currently, a full size system and a two tower system. In general, the two tower system is designed for beginners and simply runs back and forth from one tower to the other. The full size system consists of 5 to 6 towers arranged in a circular pattern, and features many customizable obstacles and speeds for more advanced riders. Given the local climate, it is expected that peak operation of the cable park would occur from June to September. Several options featuring both systems are being considered at this time, and conceptual layouts are included in the exhibits within.

At this specific location, the existing infrastructure was analyzed to determine the feasibility of placing a wakeboard cable park on North Lake. The site and utility issues are discussed in detail within this report. Franchise utilities including electric, telephone, and gas are all available and will require minimal investment to access. The existing 8 inch water line has capacity to serve the cable park development. While the sanitary sewer force main is large enough, based upon preliminary calculations the twin Flygt pumps at the sanitary sewer lift station appear inadequate to serve peak flows after development. No further storm drain infrastructure will be required in North Lake, but a local runoff collection system will be required for the parking lot expansion.

Site access is available for customers and construction, although it is recommended that a traffic impact analysis be performed to determine the impact of this development on the surrounding area.

The existing soils will also require further investigation for design purposes, but findings are not expected to drastically affect the feasibility of this development.

In summary, this location has the major infrastructure required for this development available on-site, making North Lake a feasible location for a wakeboard cable park.

EXISTING CONDITIONS OF THREE OAKS RECREATION AREA – NORTH LAKE

I. Background of North Lake

a. Background and Origin

The two lakes at the Three Oaks Recreation Area are located in McHenry County, within the City of Crystal Lake, Illinois **(See Exhibit A – Location Map)**. They are generally bound by South Main Street to the west, NW Highway (Highway 14) to the north, Pingree Road to the east, and James R. Rakow Road to the south. The North Lake is the smaller of the two lakes, with a surface area of approximately 36.17 acres, and is the location for the proposed wakeboard cable park. Before development, this land was used as farmland and later as a sand and gravel quarry.

b. Property Extents

The North Lake is encompassed by two parcels of land. Parcel number 19-09-300-023 contains >90% of the lake's volume and the majority of the proposed wakeboard park improvements, while parcel number 19-09-300-009 contains the southernmost portion of the lake. Both parcels of land are currently owned by the City of Crystal Lake. It should be noted that the proposed development will include features on both parcels and it may be in the City's interest to have this area re-platted into one lot before construction.

c. Depth, Size, Shape, and Existing Uses

The North Lake has a surface area of approximately 36.17 acres. Per the study by Hey and Associates in 2008, the lake has a normal water surface elevation of 861.90 feet and a 100-year base flood elevation of 863.96 feet. The lake has a maximum depth of approximately 28 feet with a bottom elevation of 833.00 feet.

The lakes' water levels are known to fluctuate both seasonally and historically. When North Lake was surveyed in 2008, the water surface elevation was recorded at approximately 863.41 feet. A summary of monthly water surface elevation observations from October 2008 to March 2010 shows the water surface varying from a low of 862.57 feet to a high of 865.57 feet **(See Exhibit B – Recorded Water Surface Elevations)**. At the time of this report, the current North Lake water surface elevation was 861.90 feet.

Although the vertical datum used in the study is unknown, it should be noted that the recorded water surface elevations for 2008 through 2010 have maintained a level within -0.24 feet and +0.62 feet of the identified 100-year base flood elevation.

The Three Oaks Recreation Area Project constructed a 24 inch reinforced concrete pipe connecting the North and South lakes. This system was installed to the northwest of the existing building and parking lot and includes a 3'x3' inlet/control structure with stop logs at the North Lake side. This structure can be used to equalize the water surface levels between the lakes, if necessary, with the addition or removal of stop logs within the 3'x3' structure.

Currently, North Lake is utilized as a recreational lake for boaters, fisherman, and water enthusiasts.

d. Water Quality

The City of Crystal Lake has provided results of water quality tests performed on North Lake from May through September 2011. These test monitored pH levels, total suspended solids (TSS), carbonaceous biochemical oxygen demand (CBOD), ammonia levels, phosphorus levels, total coliform levels, fecal coliform levels, chloride levels, zinc levels, secchi disc levels, and the depth at which the samples were taken. This summary is included in **Exhibit C – Recorded Water Quality Data**.

The EPA has set the standard for recreational lakes in the State of Illinois to maintain an average fecal coliform level of under 200 coliform colonies per 100 milliliters and that no more than 10% of the fecal coliform samples may exceed 400 coliform colonies per 100 milliliters. The test results provided by the City of Crystal Lake from 2011 meet these requirements.

e. Jurisdictional Authority

On October 9, 2008, the Chicago District of the United States Army Corps of Engineers responded to a jurisdictional determination inquiry submitted by Hey and Associates, Inc. To quote the response, "This office has determined that there are no waterways, wetlands, or other 'waters of the United States' under Corps of Engineers Jurisdiction at the site." Per this determination, any development on this site will not require acquisition of a Nationwide Permit.

f. FEMA Floodplain Limits

Upon reviewing the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) Digital Flood Insurance Rate Map (DFIRM) number 17111C0335J, with an effective date of November 16, 2006, it

has been determined that both North and South Lake are within the un-shaded Zone X. Un-shaded Zone X represents areas that have been determined to be outside the 0.2% annual flood chance (or 500-year floodplain).

g. Existing Soil Conditions

A geotechnical boring log of Boring Number B-12-02, completed by Patrick Engineering for the Three Oaks Recreation Area 9367.A0-3, was provided for this study **(See Exhibit D – Existing Soil Boring Report)**. Review of this report indicates groundwater at a depth of 2.0 feet. Typical soil conditions are loose fine sand with some gray silt at depths near 20 feet. The exact location of this bore was not specified.

The City of Crystal Lake Engineering Department has advised that soils degrade to the north and east from the existing Three Oaks Recreation Area.

II. Summary of Recent Developments

For the purpose of this study, portions of the construction plans created by Hitchcock Design Group for the Three Oaks Recreation Area were provided by the City of Crystal Lake. These construction plans detail the improvements created around North Lake and between North and South Lake.

Improvements for the Three Oaks Recreation Area included construction of several new buildings, sidewalks, boat docks, streets, public and private infrastructure, a sled hill, landscape improvements, clearing and grubbing, and shoreline planting as a bank stabilization measure.

III. Existing City Infrastructure

a. Access to Site, Existing Drives and Roads

Currently all traffic ingress and egress to the existing Three Oaks Recreation Area is provided off of South Main Street via Three Oaks Recreation Area Drive and off of NW Highway (Highway 14) via Route 14 Access Drive. Traffic entering the parking of the Three Oaks Lakes Recreation Area must pass through a gate house at the intersection of Three Oaks Recreation Area Drive with Route 14 Access Drive.

A 20 foot wide gravel drive traversing east to west was also constructed within the Three Oaks Lake Recreation Area and connects the parking lot with the intersection of Pingree Road and 3 Oaks Road. This gravel drive serves as a maintenance, emergency vehicle access and construction access point to the

Three Oaks Recreation Area **(See Exhibit E – Three Oaks Recreation Area Accessibility Map)**.

b. Existing Water Infrastructure and Pressure

In order to service the Three Oaks Recreation Area Project's domestic water and fire protection demands, an 8 inch water line was designed and constructed. Construction plan show this 8 inch water line begins at a 12 inch ductile iron water main between Three Oaks Recreation Area Drive and the Regency Beauty Institute, then runs through the Three Oaks Recreation Area and along the south edge of the 20 foot gravel drive to complete a loop by tapping into an 8 inch ductile iron water main at the west side of the intersection of Pingree Road and 3 Oaks Road. The City of Crystal Lake believes that the requirement to loop the proposed water line was deferred, and the 8 inch water line may terminate at the Three Oaks Recreation Area. If inspection of the waterline verifies that this loop was not constructed, it would be a requirement of the City of Crystal Lake for this connection to be made per this project.

A fire flow test was performed by the City of Crystal Lake Fire Rescue Department on 6/15/2012 on a fire hydrant located in front of the existing building **(See Exhibit F – Fire Flow Test Results)**. A static pressure of 80 pounds per square inch (psi), a residual pressure of 43 psi, and a flow rate of 2980 gallons per minute (GPM) were recorded on the 8 inch main.

The existing water supply demand to the Three Oaks Recreational Area was calculated utilizing the published Illinois Plumbing Code (www.ilga.gov/commission/jcar/admincode/007/00700890sections.html) **(See Exhibit G1 – Water Demand Calculations)**. The total existing fixture count was found to be 261.25 units, which resulted in an existing water demand of 106 GPM.

In addition to the existing buildings, the Three Oaks Recreation Area also contains a splash pad. Meter reading were provided by the City of Crystal Lake that show the splash pad uses approximately 11,000 gallons per day, or approximately 23 GPM.

Total existing water demand of 129 GPM is far less than the available 2980 GPM.

c. Existing Sanitary Sewer Infrastructure and Capacity

In order to service the Three Oaks Recreation Area Project's sanitary sewer demands, a 4-inch sanitary sewer force main with tracer wire was installed from the lift station near the northeast boat dock on South Lake, to a sanitary sewer manhole at the intersection of Route 14 Access Drive with NW Highway

(Highway 14). The effluent from the Three Oaks Recreation Area is conveyed as gravity flow within an 8-inch sanitary sewer main to the lift station.

The existing sanitary sewer demand for the Three Oaks Recreational Area was calculated utilizing the published Illinois Plumbing Code (www.ilga.gov/commission/jcar/admincode/007/00700890sections.html) **(See Exhibit G2 – Sanitary Sewer Demand Calculations)**. This fixture unit count reflects a maximum existing design flow of approximately 172.4 gallons per minute.

The construction plans call for a duplex lift station that houses two Flygt Model MP-3127-LT Pumps. The pumps were designed to pump effluent from an 856 foot elevation to an 894.49 foot elevation, ascending 38.49 feet (static head). Based upon bends, fittings, and pipe lengths, the total friction head for the pump design was calculated to be approximately 22.46 feet. Hence, the total dynamic head for the system was calculated to be 60.95 feet. Since the force main is tied into a gravity flow system at the outfall, there is no additional pressure on the force main system.

To determine pump capacity during a peak event, the Flygt pump curve for pump model MP-3127-LT was utilized **(See Exhibits H1-H5 – Flygt Pump Model MP-3127-LT Specifications)**. With a total dynamic head of 60.95 feet, the curve indicates a max pumping capacity of approximately 178 gallons per minute.

In speaking with Rick Valent, the Superintendent of Sewer and Lifts with the City of Crystal Lake, it was noted that a different pump model than specified on the construction plans was selected for installation. A flow meter was also installed during the Three Oaks Recreation Area construction which has identified that the existing wet well has a current capacity of 119 to120 gallons per minute.

d. Existing Storm Drain Infrastructure

The Three Oaks Recreation Area Project constructed a 24 inch reinforced concrete pipe to balance water surface levels, as required, between the two lakes. This system was installed to the northwest of the existing building and parking lot and includes a 3'x3' inlet/control structure with stop logs at the North Lake side.

Within the Recreation Area parking lot, a conveyance system was constructed featuring a series of water quality ponds before ultimately discharging into North Lake. This system was installed in accordance with the City of Crystal Lake standards for storm water runoff water quality.

e. Electric Infrastructure

Jose Roldan III (847.608.2382) was contacted with ComEd and provided a load sheet for the proposed improvements **(See Exhibit I – ComEd Conceptual Load Sheet)**. He provided information stating that the existing on-site transformer is a 112KVA 277/480V.

f. Gas Infrastructure

The maps showing the existing gas infrastructure around the Three Oaks Recreational Area were requested from Nicor by emailing gasmaps@aglresource.com. A 2 inch polyethylene gas service currently services the existing on-site buildings. The maps provided were marked confidential and are excluded from this report.

g. Telephone Infrastructure

Rob Schwerdtfeger (847-759-5065) with AT&T was contacted to locate the existing underground telephone infrastructure currently provided to the Three Oaks Recreation Area. Maps were provided showing that the existing Three Oaks Recreation Area is serviced from Pingree Road along the north side of the gravel construction drive.

GENERAL PROPOSED IMPROVEMENTS

I. Background on a Cable Wakeboard Park

a. General Information

The first wakeboard cable park concept was designed around 1962 to pull wakeboarders by an electric overhead cable tow system approximately 40 feet above the water. The overhead cable is traditionally suspended in the air by a series of 2 to 6 towers surrounding the riding path. The overhead cable travels at a constant velocity, and with today's technology can be sped up to over 30 miles per hour, or slowed down to under 16 miles per hour to help beginners learn. Floating obstacles are placed along the path as well, similar to objects at a skateboard park.

Traditionally, the only way to wakeboard was to own a boat, or have an acquaintance that owned a boat; an expensive proposition. With the invention of cable wakeboarding, and the construction of over 240 wakeboard cable parks across the world, the sport of wakeboarding has been made extremely affordable and available to the general population. Of the over 240 wakeboard cable parks constructed, over 100 are in Europe and Africa, with 60 residing in Germany alone, and many others are in Asia and

Australia. Currently there are approximately 15 wakeboard cable parks operating the United States, with most operating in the southern states of Texas, Oklahoma, North Carolina, and Florida. The closest cable wakeboard facilities to Crystal Lake are Aacadia Wake Parx in McHenry, Illinois which has a single two tower system; The Liquid Edge lake in Farmer City, Illinois which has a single two tower system; Placid Wake Park in Allendale, Michigan which has a single two tower system and a boat lake; Wake Nation in Fairfield, Ohio which has a counterclockwise full size system and a single two tower system;

Cable wakeboard parks are clean, efficient, quiet, and overall very environmentally friendly. They eliminate the water pollution that can be caused by boats and typically cost less than $15 a day in electricity to operate.

Two different types of wakeboard cable park systems will be discussed in this feasibility study; a full size system and a two tower system.

FULL SIZE

A full size system will consist of 5 or 6 towers that support the overhead tow cable. These systems will tow the riders around a closed loop. A full size system is capable of customization as well. Obstacles can be inserted and removed, and the tow speed can be throttled. This keeps expert riders challenged with high speed, difficult obstacles, while still allowing beginners to enjoy a slightly less rigorous course at a slower speed. To use a skiing analogy, the full course can be customized to run as a challenging "black diamond" run, or as a simpler "blue" run.

Once a rider falls or lets go of the tow rope on the full size system they will remove the wakeboard bindings from their feet and swim towards the designated exits. Since the tow ropes on the main system are typically spaced 200 feet or greater apart, the riders on the full size system still in tow have adequate time to avoid the fallen rider. Once the rider exits the lake, they walk back to the starting dock.

TWO TOWER

A two tower system consists of 2 towers that support the overhead tow cable at each end. These systems tow the rider in a type of back and forth figure eight motion. These two tower systems can range from several hundred feet in length to close to seven hundred feet in length. The two tower system is normally utilized as a training tool to help new and younger riders learn the basics of wakeboarding before exposing them to the full size system.

When a rider falls or lets go of the tow rope on the two tower system, the operator has the ability to bring the tow rope back to the fallen rider and pull him from a deep water start to back on top of the water and wakeboarding again.

b. Typical Capacity Regulations

Typically the capacity design of a wakeboard cable park is similar to that of a golf course. There is a maximum number of people that a wakeboard park or a golf course can support before reaching capacity and having to turn participants away.

The full size system typically carries 6 to 8 riders at one time and will support 40-50 riders in queue, depending on the speed of the cable and the average rider skill level. The two tower system will only carry 1 rider at a time, but can support 10 riders every 2 hours, or around 60 riders per 8 hour day, depending on the speed of the cable and the average rider skill level. A lap limit of 4-5 times around may be desirable once the park gains in popularity.

Many of the wakeboard cable parks comparable in size to the proposed improvements at North Lake are averaging 125-200 riders per day during the summer months. While many of the extreme wakeboarding enthusiasts start riding as soon as the water and air temperature add to over 100 degrees, the peak season for many cable parks with comparable climates to those of Crystal Lake will be June through September.

Many wakeboard park facilities will limit the number of laps a skilled rider is allowed to ride during peak hours by releasing the tow cable, forcing the rider back through the line.

Wakeboarding is a very physically demanding sport. Riders that typically wakeboard 2 to 3 times per week are generally not able to ride more for than 2 hours.

c. Safety

Typical to many other active sports, safety of the riders and the participants is a key factor when designing a wakeboard cable park. Although the speed of the overhead cable ranges from 16 to 30 miles per hour, wakeboarders are able to sharply cut and increase their speeds to 45 plus miles per hour. At these speeds, experienced riders are able to propel themselves into the air upwards of 25 feet over the water without the aid of a ramp or obstacle. Experience with these systems and the sport of wakeboarding in general should be taken into effect when designing a cable layout.

The most significant safety factor for all recreational watersports, including cable wakeboarding, is the risk of drowning. Although many wakeboard cable park employees are required to be CPR and first aid certified, a lifeguard is not typically on duty. To minimize the risk of drowning, all wakeboard cable park participants should be required to wear a Certified Coast Guard Type III

Personal Flotation Device. The on-site Pro Shop typically rents these out if the participants do not provide their own life jacket.

The second most common safety hazard is the possibility of the wakeboarder hitting their head on the water, an obstacle, or another rider's board. To minimize the risk of a head injury, all wakeboarders should be required to wear a properly fitted helmet. These are typically available to rent from the Pro Shop as well.

All of the wakeboard cable parks around the nation also require every participant to sign a liability waiver before participating in any wakeboard cable park activities. A waiver from an existing wakeboard cable park can be referenced in **Exhibit J – Typical Liability Waiver**.

The lake depth also plays an important role in the safety of all wakeboard participants. Although it is considered safe to wakeboard in depths as shallow as 4 feet, most wakeboard cable parks are designed to be 6 feet deep at minimum.

Typically wakeboard cable parks around the world do not require any sort of trial run to test or confirm a rider's ability. Unlike snow skiing, it is not possible to lose control and gain speed in the process. It takes quite a bit of wakeboard skill to leave the starting dock and get up to speed on top of the water. Typically the cable systems are run at a constant speed, although some facilities around the nation will slow the speed of the system down to accommodate a group of beginners for a certain amount of time in the day.

d. Water Quality

For the purpose of this study, and from our knowledge of the existing recreational usage of the lake, we have assumed that North Lake meets or exceeds the water quality standards for recreational waters set forth by the Environmental Protection Agency (EPA) for Region 5.

Due to the recreational usage of the lake as a wakeboard cable park, the City of Crystal Lake should regulate all new development that discharges stormwater runoff directly into the lake. It is advisable for future developments within the watershed to include innovative storm water runoff quality best management practices in their site designs. Storm water discharge is currently regulated by the City of Crystal Lake and an extensive BMP system was installed with the project at the top of the slope behind the Route 14 developments to pre-treat that discharge before entering the pipes that enter the North Lake.

The operators of the cable park should test the lake on a monthly basis at minimum to ensure that North Lake meets or exceeds water quality standards.

Historically, the installation of a wakeboard cable park helps to improve water quality. Due to the constant turbulence and activity, increased dissolved oxygen levels are often found.

e. Lake Water Surface Levels

From the recorded information provided for this study, the Lakes maintain a fairly level water surface elevation. For the purpose of designing and operating a wakeboard cable park, slight seasonal fluctuations in the water surface level by several feet do not present any detrimental effects.

In the event of an extreme drought and a severe drop in the water surface elevation of North Lake, it might be necessary for the cable park to adjust the length of their tow ropes, or temporarily close for business until water levels have risen to a safer level.

f. Floating Dock & Wavebreak Systems

The floating dock and wavebreak system serves three main functions, to eliminate and absorb wave action that is generated behind wakeboarders in tow, to serve as a pedestrian access path for fallen riders to return to the starting dock, and to provide emergency access to an injured rider. For the purposes of this study, the floating docks and wavebreak systems have been located to prevent participants from exiting the lake onto unsafe and unstable ground conditions. Besides the basic functionality of these dock systems, safety should also be a driving factor in the selection of a floating dock and wavebreak system. Several alternatives for dock materials are available for construction and are listed below.

WOODEN DOCK

The existing boat docks at the Three Oaks Recreation Area are a type of wooden dock that is typically built on an aluminum frame utilizing a type of foam filled flotation. Although these types of docks are the cheapest to build and are fully customizable, a typical wakeboarder or swimmer is not capable of climbing out at any point along the dock due to the typical height being 13 to 20 inches above the water surface elevation. To solve this problem, the wooden docks can be integrated with an HDPE dock approximately every 100 feet.

Wooden docks are typically low maintenance, requiring replacement of the decking every 20-25 years and replacement of the float and frames after 40+

years. These docks also have the highest safety risk, due to their hard, sharp edges, height above the water, and potential for exposed screws and nails.

EZ DOCK

The EZ Dock system consists of multiple pre-manufactured plastic dock pieces that fit together similar to a jigsaw puzzle. The dock sections contain no fillers or foams for flotation. Their unique design forms chambers that displace water and trap air for buoyancy. As with a wooden dock, EZ Docks typically sit 13 inches above the water and are very difficult to climb onto from the water. Per our research, we are not aware of any wakeboard cable parks utilizing an EZ Dock to serve as a floating dock and wavebreak system.

EZ Docks are typically low maintenance, requiring replacement every 25-30 years, but present a high safety risk because of their sharp edges and height above the water.

SESITEC HDPE DOCK SYSTEM

These docks are specifically built to function as a floating dock and wavebreak system for a cable wakeboard park. These docks have no exposed edges and due to their parabolic design, rest below the water surface elevation along each outer edge **(See Exhibit K – HDPE Floating Dock / Wavebreak System)**. This design allows wakeboarders and swimmers to easily exit the water onto the docks.

Sesitec docks are very low maintenance, requiring replacement every 35-40 years. More importantly, they feature the lowest safety risk with no exposed edges or fasteners, and rest below the water surface at the edges.

g. Permitting

A cable wakeboarding park appears to fall within the "amusement" category, requiring special State Licensing and Inspection. Currently, neither of the wakeboard parks within the State of Illinois are registered under the Department of Labors Carnival and Amusement Rides Safety Act.

The definition of "Amusement Ride" in the Carnival and Amusement Rides Safety Act states, "mechanized device or combination of devices, including electrical equipment which is an integral part of the device or devices, which carries passengers along, around, or over a fixed or restricted course for the primary purpose of giving its passengers amusement, pleasure, thrills, or excitement".

h. Maintenance

Typical maintenance on a wakeboard cable park is very minimal. The majority of the maintenance will be required within the first few months of installation as the overhead cables stretch from use and require frequent tightening. Although the entire cable system, including the towers, anchors, obstacles, and floating dock system, is designed to be left in place in the winter when the lake freezes, it will prolong the life of many of the floating HDPE obstacles and docks to remove them when the park is closed for the winter.

II. Site and Utility Considerations

a. Soil and Structure Locations

For the purposes of this study, a building location and wakeboard cable park improvements were conceptually located. It will be necessary to perform additional geotechnical borings for all buildings, cable anchor and cable tower locations prior to detailed site design. Results of these tests may require that features be relocated or modified from their conceptual planned locations as identified in this study.

b. Access/Capacity Issues

It should be noted that it was not part of this study to perform a Traffic Impact Analysis. Previously a traffic study was performed, though it is advised that the City of Crystal Lake authorize an addendum to this study. This addendum should focus on the potential on-site and off-site improvements needed to sustain the additional traffic/trips generated as a result of this wakeboard cable park, the expanded parking lot for overflow from the main lot, and other future or ancillary uses of the building during the off-season. Additionally, there is concern that the single manned entry point may be overwhelmed by the added traffic loading. Options to address these concerns should be included in the addendum to the existing traffic study.

c. Water System Capacity Considerations

The findings from the fire flow test indicate that capacity within the existing on-site 8 inch water line is sufficient to utilize for this proposed development.

d. Sanitary Sewer Capacity Considerations

Based upon anticipated fixture counts, the proposed wakeboard cable park will add approximately 69.6 GPM to the existing 172.4 GPM (gallons per minute) demand, resulting in a required peak pump capacity of 242 GPM. This exceeds the maximum current pump capacity of 178 GPM and would indicate

the existing duplex pump system is not capable of handling the additional sewer demand for the proposed improvements.

The design phase for the wakeboard cable park development will need to include an analysis and recommendations for upsizing the existing pump system and/or the existing wet well, or installing a new pump system and wet well.

e. Storm Drain Information

No additional storm drain infrastructure will be required because of the cable tow system installation. However, a local runoff collection system will be required in the proposed parking lot area. This system should conform to City of Crystal Lake standards and feature appropriate filtration and BMP features.

f. Electric Considerations

Each full size system requires a three phase 480 volt source on a 100 amp breaker. Each two tower system requires a three phase 480 volt source on a 70 amp breaker. These motor load requirements were generated from previous projects. Joe Roldan III (847.608.2382) with ComEd stated that if the transformer needs to be upsized due to a load deficiency, they will change it out at no charge to the City.

The City of Crystal Lake has requested that a separate electrical meter be installed with the proposed wakeboard cable park development. The City has also requested that several sustainability options are coordinated during design including both solar and wind power alternatives.

g. Gas Considerations

Gas infrastructure is in place and can be extended within conduit to the proposed Pro Shop. This is expected to be a minor cost item.

h. Telephone Considerations

Telephone infrastructure is in place and can be extended within conduit to the proposed Pro Shop. This is expected to be a minor cost item.

III. Cable System Manufacturers and Contact Information

There are currently two wakeboard cable manufacturers worldwide that provide both the full size system and the two tower system. Both of these companies are located and manufacture these systems in Germany.

Sesitec (www.sesitec.de) – Sesitec was founded in 1992 by Chistian von Lerchenfeld. Since then Sesitec has planned and constructed more than 30 cable parks while continuously improving their engineering. The company prides themselves on offering both in-house engineering design of the cable manufacturing as well as professional advice regarding planning and constructing entire parks.

Rixen Cableways (www.rixen-seilbahnen.de) – Rixen Cableways was founded in 1961 by Bruno Rixen. Since then Rixen Cableways has built numerous cable parks around the world.

IV. Anchor and Tower Design Alternatives

A typical tower for a full size system is approximately 40-feet above the normal water surface elevation. This tower is supported vertically by the ground and horizontally by guy wires attached to engineered anchors. There are three types of towers utilized in each full size six tower system. The tower at the starting dock will serve as the motor tower which controls the speed of the entire overhead cable system **(See Exhibit L1 – Motor Tower Details)**. Typically the second tower after leaving the starting dock is used as a counterweight tower. This tower serves as a tensioner for the overhead cable system and keeps the system on track while riders are resisting it **(See Exhibit L2 – Counterweight Tower Details)**. The other four towers are identical and serve as guides where the cable changes directions **(See Exhibit L3 – Typical Tower Details)**. Photographs of full size system towers installed around the country are included in **Exhibit M – Typical Full Size Cable Photos.**

A typical tower for a two tower system is approximately 20 feet above the normal water surface elevation. This tower is supported vertically by the ground and horizontally by a guy wire attached to an engineered anchor **(See Exhibit L4 – Two Tower System Typical Tower Details)**. Photographs of two tower system towers installed around the country are included in **Exhibit N – Typical Two Tower System Photos**.

There are many design considerations listed below that need to be planned for by the specific site requirements of each development.

a. Vertical Clearances

During the engineering planning and design phase it is important that all pedestrian and vehicular paths have proper vertical clearance between the ground elevation and the elevation of the overhead guy wires. Many anchors will need to be raised vertically to provide clearance for pedestrian traffic, vehicular traffic, or emergency vehicular traffic.

b. Paint Requirements and Specifications

The wakeboard cable towers and equipment are delivered to the site from Germany as stainless steel without a finish. Many of the existing vertical pole supports at the Three Oaks Recreation area are painted black. In order to help match the existing improvements, it is advisable that all of the stainless equipment is primed and painted a darker color.

During the design phase for the wakeboard park improvements, the engineer should specify preparation and coating requirements for painting non-ferrous metal. It should also be noted that scarifying and priming/painting of the towers may be easier to achieve in a shop as opposed to attempting this in the field during construction.

c. Tower Cleat Design

The full size cable towers are manufactured in Germany with a type of cleated base design to hold the base of the tower in place without an additional base support system **(See Exhibit O – Typical Full Size Tower Cleat System).**

d. Anchor Design Alternatives

Wakeboard cable park towers are supported by engineered anchors. Typically there are two types of anchors, a ground anchor and a water anchor. The ground anchors are installed above the normal water surface elevation and utilize soil stability to resist the forces from the tower. The water anchors are installed below the normal water surface elevation and utilize weight to resist buoyancy and the forces from the tower.

Historically ground anchor designs have been above ground concrete block systems with a metal pipe extruding from the center **(See Exhibit P1, Typical Land Anchors Option #1).** While this is a structurally appropriate design, it is not aesthetically pleasing. Due to recent public/private wakeboard cable park development partnerships, this design has evolved to feature a less obtrusive and more visually pleasing anchor, where the primary support structure is housed underground and the exposed portion is painted **(See Exhibit P1, Typical Constructed Land Anchors Option #2).**

Water anchor designs have been installed in cable parks all over the world. These anchors utilize pre-formed concrete blocks that are stacked and attached to a tower by means of a guy wire. These anchors are then lowered onto the bottom of the lake to support the forces from the tower where a ground anchor is not possible **(See Exhibit P2 – Typical Constructed Water Anchors)**.

To further enhance the beautification of the North Lake area, trees, shrubs, and other native vegetation should be planted around the exposed structural components. These landscaping effects will provide natural camouflage for the manmade structures and help to integrate the cable tow system into the Three Oaks Recreation Area.

V. Obstacles

Obstacles are installed at a wakeboard cable park to help increase rider interest and attract more sponsors to the wake park. It is recommended for safety and sustainability that a wakeboard cable park development utilizes a type of plastic welded HDPE obstacle. These obstacles feature air proof welded polyethylene boxes and a styropor core to create stability within the obstacle. These types of obstacles are welded in such a way to ensure maximum endurance and sustainability to water, ice, and sun, and gentle protection for wakeboard participants. These types of obstacles should also utilize a tongue and groove system to ensure a clean, seamless connection without any visible screws, making these obstacles the safest in the industry. Various common obstacles can be seen in **Exhibit Q – Typical Wakeboard Obstacles**.

VI. Pro Shop

The proposed Wakeboard Pro Shop's general location is shown on the Cable Layout Alternatives, Options 1-3. As an approximately 5,000 square foot building, the Pro Shop provides area for the sales of wakeboard cable passes, boards, helmets, life jackets, wetsuits, clothing, and apparel, and features restrooms and shower/changing facilities, seating, employee offices, and a small restaurant with commercial kitchen. An interior layout of a previously used wakeboard pro-shop building has been attached in **Exhibit R – Typical Pro-Shop Building Interior Floorplan**.

The exterior of the Pro Shop should be designed to match the material type and color of the existing buildings at the Three Oaks Recreation Area. Integrating the building within the existing architectural style of the area is important. Placement of the building is vital as well; proximity to the starting dock and beginner system, and an elevated view of all activities are all desirable.

During the design phase, it is recommended that the City of Crystal Lake coordinate closely with the building architect to incorporate future uses or expansions into the pro-shop building design. The pro-shop building should be designed for alternate uses with minimal alterations in case the wakeboard park is discontinued and converted to another amenity in the future.

During the study phase of this project the City has expressed their interest in the development of a restaurant that would service the entire Three Oaks Recreation

Area. The architect should also coordinate with the City of Crystal Lake regarding their vision and intentions to expand the pro-shop into a dining restaurant.

Per the City of Crystal Lake, any building that will host members of the public will be required to comply with the International Fire Code and all City amendments.

VII. Landscaping, Aesthetics and Beautification

The landscaping, aesthetics and beautification of the proposed wakeboard cable park should be a driving factor during design. The proposed improvements should be designed and located in such a way that they match with the existing Three Oaks Recreation Area improvements and produce the minimal amount of visual pollution. This should be done by painting, screening and landscaping any prominent vertical features.

Many of the proposed vertical features such as the wakeboard anchors, towers, buildings, and electric housings should be screened by means of landscaping with natural vegetation. The existing Three Oaks Recreation Area project utilized natural landscaping to screen many of their vertical features, such as the transformer and sanitary sewer lift station, and should be used as a template for design **(See Exhibit S1 – Typical Landscape Screening)**.

Other wakeboard parks have utilized landscaping, hardscaping, and planting of natural vegetation to improve the aesthetics of the wakeboard cable park improvements. Several photographs of these measures have been included in **Exhibit S2-S4 – Typical Landscape Screening**.

VIII. Conceptual Grading

An as-built survey was not performed upon the completion of construction of the Three Oaks Recreation Area. An on the ground site investigation of the area has confirmed that the pre-construction topographical survey provided is not representative of current topography. During the site visit, it was noted that the location coordinated with the City of Crystal Lake for the proposed parking lots and building is a level area. Without a substantially accurate contour map of current conditions, it is not feasible at this point to design a conceptual grading plan. For the purposes of this study, along with the anticipation that some earthwork will be required for these improvements, the earthwork volumes from the conceptual grading plans submitted in the preliminary report were used.

IX. Construction Phasing Alternatives

It may be advantageous for the City of Crystal Lake to develop the proposed cable wakeboard park in phases. One possibility that may be considered during

design is to construct one full size cable system with a pair of two tower systems until the park has built up a customer base that can support another full size system.

X. Development Recommendations

The design of a cable wakeboard park requires not only the knowledge of water sports and wakeboarding in general, but the detailed knowledge and background of the components of a cable wakeboarding system and how they are installed and operate.

The City of Crystal Lake will require outside inspections during all aspects of construction of the cable park improvements. In order to overcome the extensive training and aid the City of Crystal Lake in expediting the design and construction of these developments on a fast paced schedule, it is advisable that the City utilize companies with experience designing previous wakeboard cable parks.

Listed below are several of the consultants that have been extensively involved in the design of previous wakeboard cable parks. All of these firms are familiar and proficient with the design and construction of a wakeboard cable park.

Mechanical, Electrical and Plumbing (MEP)
Adam Nemati, P.E., LEED AP
MEP Consulting Engineers
Currently Registered in the State of Illinois

Structural Engineering
David Hartmann, P.E.
Frank W. Neal and Associates, Inc.
Currently Registered in the State of Illinois

Land Planning and Civil Engineering
Sam Hanna, P.E., SIT, CFM
James DeOtte Engineering, Inc.
Registering in the State of Illinois

With an expressed goal of opening the park before next summer, a schedule has been included in **Exhibit X – Proposed Development Schedule**. This schedule is based upon a testing date of April 8, 2013.

RECOMMENDED ACTION ITEMS FOR THE CITY OF CRYSTAL LAKE

1. City of Crystal Lake to meet to determine and define the extents of public and private development. James DeOtte's recommendation is that a developer is brought in to design and install the wakeboard cable park components, while the

City hires consultants and a contractor to design and install the rest of the improvements.

2. City to meet and decide on type of contracts to issue for development. Options could include a single design-build contract to one contractor, or multiple contracts including architectural, engineering, developer, and contractor.

3. City to develop RFQ's (Request for Qualifications) for each contract intended to be awarded.

4. City to advertise RFQ, review SOQ's (Statement of Qualifications), and select consultants.

5. City to negotiate contracts with consultants.

6. City to authorize design notice to proceed.

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	GENERAL LOCATION MAP		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
ENGINEER:	PROJECT NO.		EXHIBIT NO. A
	DRAWING NUMBER	SHEET NO.	

RECORDED WATER SURFACE ELEVATION

Date	North Lake Measured Water Surface Elevation	Date	North Lake Measured Water Surface Elevation
10/16/2008	864.07	6/19/2009	865.32
10/23/2008	863.97	6/26/2009	865.57
10/29/2008	863.87	7/2/2009	865.52
11/5/2008	863.82	7/10/2009	865.47
11/12/2008	863.72	7/17/2009	865.37
11/19/2008	863.62	7/24/2009	865.37
11/26/2008	863.52	7/30/2009	865.22
12/4/2008	863.47	8/4/2009	865.17
12/11/2008	863.57	8/21/2009	864.87
12/18/2008	863.77	8/28/2009	864.77
12/29/2008	863.57	9/3/2009	864.47
1/8/2009	863.47	9/11/2009	864.02
1/22/2009	863.77	9/18/2009	863.62
1/27/2009	863.57	9/25/2009	863.47
2/3/2009	863.67	10/1/2009	862.92
2/13/2009	863.42	10/9/2009	862.77
2/20/2009	863.42	10/16/2009	862.57
2/26/2009	863.42	10/23/2009	862.62
3/6/2009	863.57	11/6/2009	863.22
3/13/2009	863.87	11/13/2009	863.62
3/18/2009	863.87	11/20/2009	863.87
3/25/2009	863.97	11/25/2009	864.07
4/3/2009	864.12	12/11/2009	864.37
4/8/2009	864.17	12/18/2009	864.27
4/17/2009	864.07	12/29/2009	864.67
4/24/2009	864.27	1/12/2010	864.67
5/1/2009	864.52	1/25/2010	864.47
5/8/2009	864.67	2/5/2010	864.57
5/14/2009	864.77	2/11/2010	864.72
5/22/2009	864.72	2/19/2010	864.72
5/29/2009	864.87	2/26/2010	864.77
6/4/2009	864.92	3/2/2010	864.62
6/12/2009	865.02	3/11/2010	864.07

YEARLY AVERAGE WATER SURFACE ELEVATION

Year	Average Water Surface Elevation
2008	863.72
2009	864.20
2010	864.58
Total	864.17

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

RECORDED WATER SURFACE ELEVATIONS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
SOL. NO.
DATE: 27 Jul 12
PROJECT NO.
EXHIBIT NO. B
ENGINEER:
DRAWING NUMBER
SHEET NO.

SAMPLE ID/ LOCATION		DATE COLLECTED	pH	TSS	CBOD	AMMONIA - N	T. PHOSPHORUS	TOTAL COLIF.	FECAL COLIF.	CHLORIDE	ZINC	Secchi Disc	Total Depth
			su	mg/l	mg/l	mg/l	mg/l	(+ or -)	Col./100ml	mg/l	mg/l	level(in)	ft
TN 1	May	05/26/11		2.4	<2.0	<0.050	<0.015	(+)	3		<0.01	76.00	42.00
TN 2		05/26/11		3.0	<2.0	<0.050	<0.015	(+)	3		<0.01	99.00	25.00
TN 3		05/26/11		3.2	<2.0	<0.050	<0.015	(+)	2		<0.01	89.00	30.00
TN 1													
TN 2													
TN 3													
TN 1	June	06/14/11	8.4	2.8	<2.0	<0.050	0.015	(+)	2	315	<0.01	155.00	40.00
TN 2		06/14/11	8.5	3.0	<2.0	<0.050	<0.015	(+)	4	420	<0.01	160.00	27.00
TN 3		06/14/11	8.3	2.6	<2.0	<0.050	0.015	(+)	3	340	<0.01	153.00	31.00
TN 1													
TN 2													
TN 3													
TN 1	July	07/20/11										158.00	40.00
TN 2		07/20/11										188.00	27.50
TN 3		07/20/11										180.00	30.00
TN 1		07/25/11	8.2	3.2		<0.050	<0.015	(+)	15	355	<0.01	93.00	40.00
TN 2		07/25/11	8.3	3.4		<0.050	<0.015	(+)	19	345	<0.01	87.00	28.00
TN 3		07/25/11	8.3	2.6		<0.050	0.019	(+)	13	325	<0.01	91.00	28.50
TN 1	August	08/30/11	8.2	1.6		<0.050	<0.015	(+)	3	360	<0.01	230.00	41.00
TN 2		08/30/11	8.2	2.0		<0.050	<0.015	(+)	0	330	<0.01	202.00	27.00
TN 3		08/30/11	8.2	2.4		<0.050	0.110	(+)	0	350	<0.01	225.00	30.00
TN 1													
TN 2													
TN 3													
TN 1	September	09/22/11	8.3	3.6	<2.0	0.065	<0.015	(+)	0	300	<0.01	77.00	41.00
TN 2		09/22/11	8.2	3.6	<2.0	0.057	0.026	(-)	0	450	<0.01	80.00	26.00
TN 3		09/22/11	8.3	3.6	<2.0	<0.050	<0.015	(+)	0	425	<0.01	79.00	29.00
TN 1													
TN 2													
TN 3													

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

RECORDED WATER QUALITY DATA

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

SOL. NO.

DATE: 27 Jul 12

PROJECT NO.

EXHIBIT NO. C

ENGINEER:

DRAWING NUMBER

SHEET NO.

PATRICK ENGINEERING INC.

BORING NUMBER **B-12-02** SHEET **1** OF **1**
CLIENT **City of Crystal Lake Municipal Offices**
PROJECT & NO. **Vulcan Lakes Recreation Project 9367.A0-3**
LOCATION **Vulcan Lakes, IL**

LOGGED BY **MPG**
GROUND ELEVATION **To be surveyed**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL–LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) (1 2 3 4 5)	NOTES & TEST RESULTS
	0.0		Light brown fine sand, little to some silt, very loose SM	AU-1 0.0-1.0			
				SS-2 1.0-2.5 18" R	2 1 1		N=2
	2.0		▽ Saturated at 2.0'				
				SS-3 3.5-5.0 2" R	W O H		
				SS-4 6.0-7.5 0" R	W O H		
				SS-5 8.5-10.0 2" R	W O H		
				SS-6 11.0-12.5 18" R	0 1 1		N=2
			Some gray silt				
				SS-7 13.5-15.0 8" R	W O H		
				SS-8 18.5-20.0 18" R	W O H		14" Blowing Sand
	20.0		End of Boring at 20.0'				

DRILLING CONTRACTOR **Patrick Drilling**
DRILLING METHOD **3 1/4" I.D. HSA**
DRILLING EQUIPMENT **CME-75 ATV**
DRILLING STARTED **09/30/02** ENDED **09/30/02**

REMARKS
Borehole immediately backfilled with cuttings upon completion

WATER LEVEL (ft.)
▽ **2.0** During Drilling
▼
▼

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
EXISTING SOIL BORING REPORT
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. D

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

THREE OAKS RECREATION AREA ACCESSIBILITY MAP

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. E

Crystal Lake Fire Rescue Department

Water Supply Analysis

Location: TORA

Date: 6/15/12 **Time:** _____

Inside diameter of flow hydrant butt: ____ inches **Number of outlets flowing:** ____

Static pressure: 80 psi

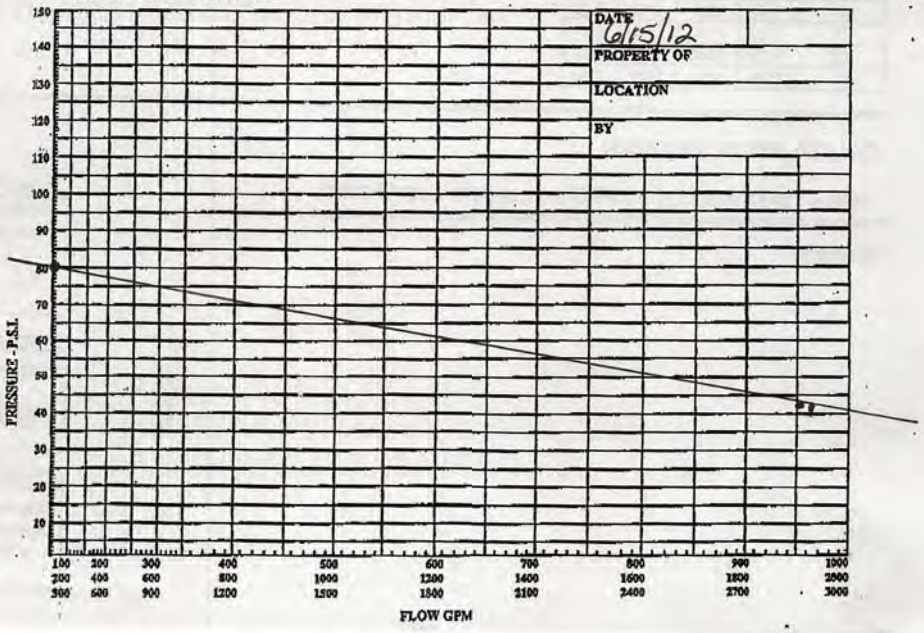
Residual pressure: 43 psi

Pitot pressure: 30 psi

GPM (from chart): 2980 gpm **Total flow (est.):** _____ gallons

Witnesses and notes:

WATER SUPPLY GRAPH



SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

FIRE FLOW TEST RESULTS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

SOL. NO.

DATE: 27 Jul 12

PROJECT NO.

EXHIBIT NO. F

ENGINEER:

DRAWING NUMBER

SHEET NO.

Three Oaks Existing Water Supply Demand

Fixture	# of Fixtures	Occupancy	Load Values in Water (Supply Fixture Units)	Total Supply Fixture Units
Drinking Fountain	5	Public	0.25	1.25
Urinal	3	Public	10	30
Shower	12	Public	4	48
Water Closet	13	Public	10	130
Kitchen Sink	4	Public	4	16
Service Sink	2	Public	3	6
Lavatory	9	Public	2	18
Outdoor Shower	3	Public	4	12
			Total Fixture Units	**261.25**
			Demand (Gallons per Minute)	**106**

Three Oaks Conceptual Water Supply Demand

Fixture	# of Fixtures	Occupancy	Load Values in Water (Supply Fixture Units)	Total Supply Fixture Units
Drinking Fountain	2	Public	0.25	0.5
Urinal	2	Public	10	20
Shower	-	Public	4	-
Water Closet	7	Public	10	70
Kitchen Sink	1	Public	4	4
Service Sink	0	Public	3	0
Lavatory	5	Public	2	10
Outdoor Shower	-	Public	4	-
			Total Fixture Units	**104.5**
			Demand (Gallons per Minute)	**72.5**

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

WATER DEMAND CALCULATIONS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. G1

Three Oaks Existing Sanitary Sewer Demand

Fixture	# of Fixtures	Occupancy	Load Values in Water (Supply Fixture Units)	Total Supply Fixture Units
Drinking Fountain	5	Public	0.5	2.5
Urinal	3	Public	8	24
Shower	12	Public	3	36
Water Closet	13	Public	8	104
Kitchen Sink	4	Public	4	16
Service Sink	2	Public	3	6
Lavatory	9	Public	2	18
Outdoor Shower	3	Public	3	9
			Total Fixture Units	**215.5**
			Demand (Gallons per Minute)	**172.4**

Three Oaks Conceptual Sanitary Sewer Demand

Fixture	# of Fixtures	Occupancy	Load Values in Water (Supply Fixture Units)	Total Supply Fixture Units
Drinking Fountain	2	Public	0.5	1
Urinal	2	Public	8	16
Shower	-	Public	3	-
Water Closet	7	Public	8	56
Kitchen Sink	1	Public	4	4
Service Sink	0	Public	3	0
Lavatory	5	Public	2	10
Outdoor Shower	-	Public	3	-
			Total Fixture Units	**87**
			Demand (Gallons per Minute)	**69.6**

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

SANITARY SEWER DEMAND CALCULATIONS

CRYSTAL LAKE, IL.

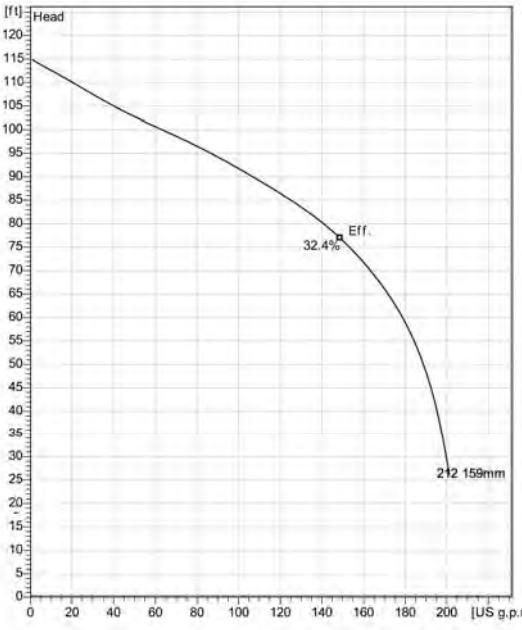
SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. G2

xylem
Let's Solve Water

MP 3127 LT 3~ 212

Technical specification

FLYGT



Curve according to: ISO 9906 grade 2 annex 1 or 2

Note: Picture might not correspond to the current configuration.

General
Semi-open multi-channel impellers with integral grinder cutter in single volute casing for liquids containing solids and fibres.

Impeller

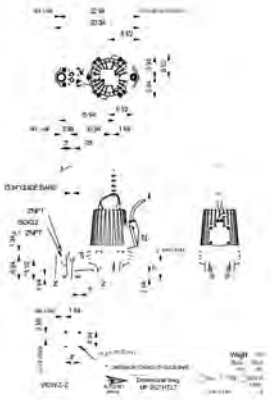
Impeller material	Grey cast iron
Outlet width	1 15/16 inch
Inlet diameter	85 mm
Impeller diameter	159 mm
Number of blades	6

Motor

Motor #	M3127.170 21-11-2AL-W 11hp
Stator variant	
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	11 hp
Rated current	26 A
Starting current	229 A
Rated speed	3510 rpm
Power factor	
1/1 Load	0.92
3/4 Load	0.90
1/2 Load	0.84
Efficiency	
1/1 Load	84.5 %
3/4 Load	84.5 %
1/2 Load	82.0 %

Configuration

Installation: P - Semi permanent, Wet



Project	Project ID	Created by	Created on	Last update
			2012-07-20	

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
FLYGT PUMP MODEL MP-3127-LT SPECIFICATIONS
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. H1

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Let's Solve Water

MP 3127 LT 3~ 212

FLYGT

Performance curve

Pump

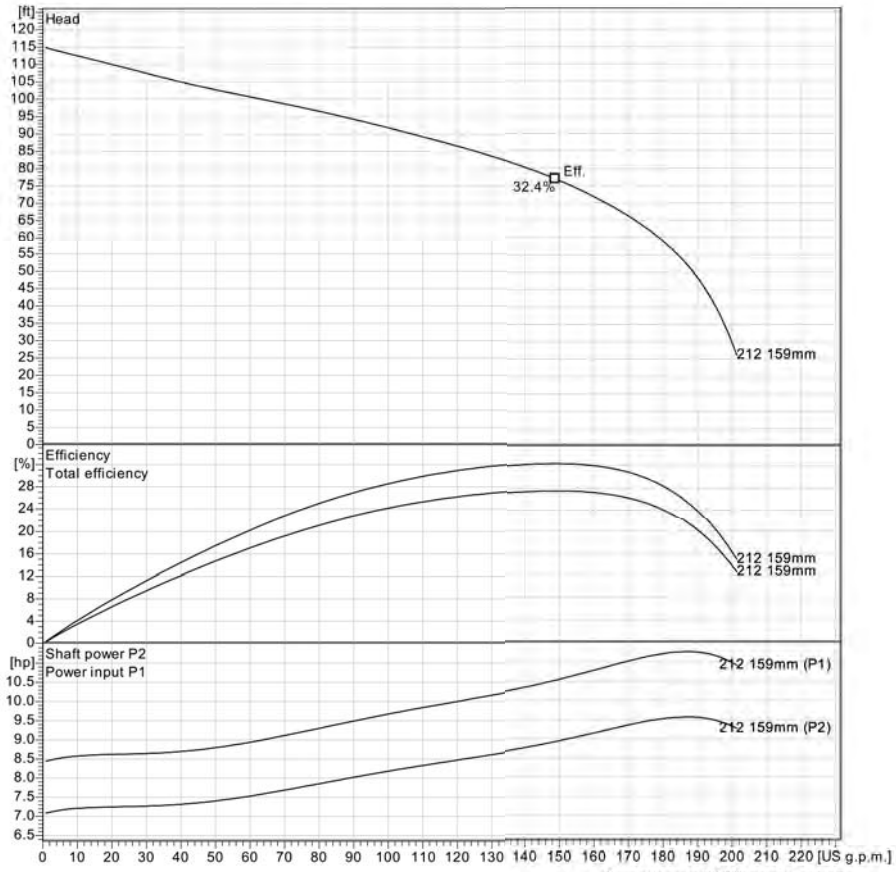
Outlet width	1 15/16 inch
Inlet diameter	85 mm
Impeller diameter	6¼"
Number of blades	6

Motor

Motor #	M3127.170 21-11-2AL-W 11hp
Stator variant	
Frequency	60 Hz
Rated voltage	230 V
Number of poles	2
Phases	3~
Rated power	11 hp
Rated current	26 A
Starting current	229 A
Rated speed	3510 rpm

Power factor	
1/1 Load	0.92
3/4 Load	0.90
1/2 Load	0.84

Efficiency	
1/1 Load	84.5 %
3/4 Load	84.5 %
1/2 Load	82.0 %



Curve according to: ISO 9906 grade 2 annex 1 or 2

Project	Project ID	Created by	Created on	Last update
			2012-07-20	

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

FLYGT PUMP MODEL MP-3127-LT SPECIFICATIONS

CRYSTAL LAKE, IL.

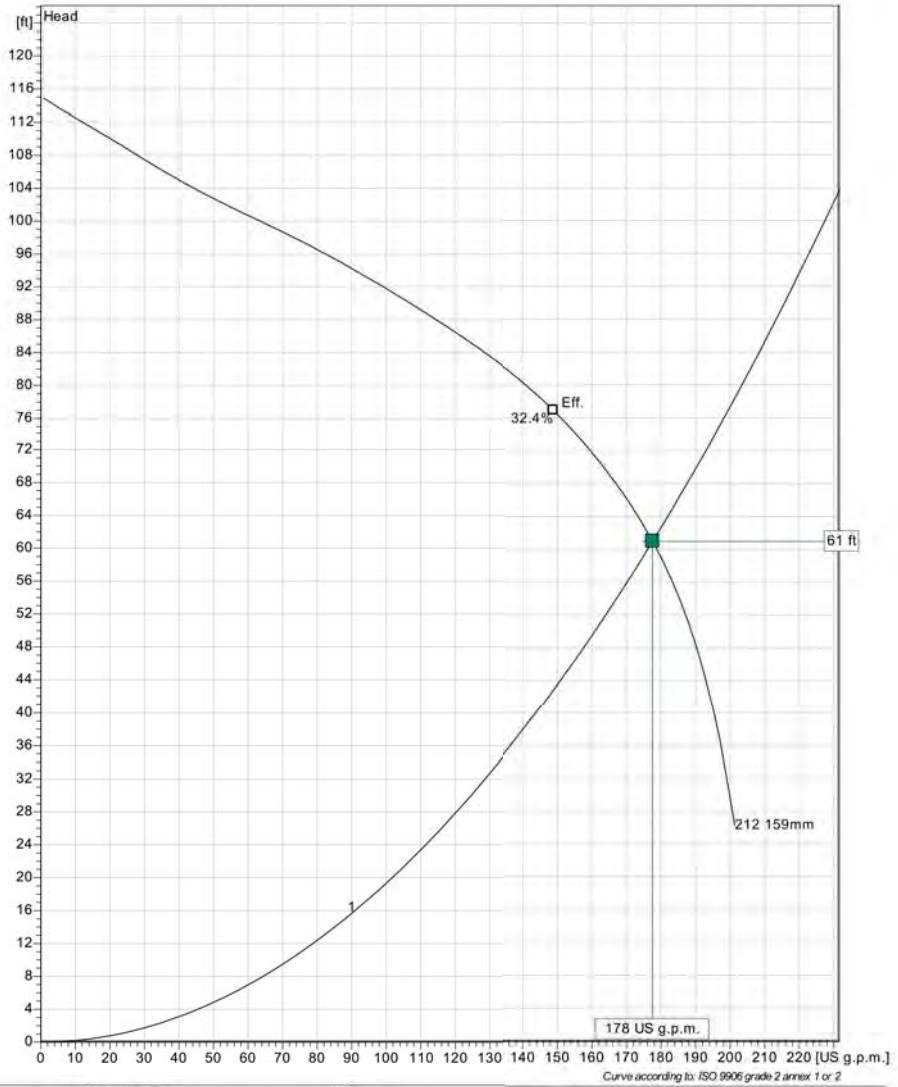
SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. H2

xylem
Let's Solve Water

MP 3127 LT 3~ 212

Duty Analysis

FLYGT



	Individual pump			Total					
Pumps running /System	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	178 US g.p.m.	61 ft	9.49 hp	178 US g.p.m.	61 ft	9.49 hp	29.1 %	783 kWh/US MG	

Project	Project ID	Created by	Created on	Last update
			2012-07-20	

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

FLYGT PUMP MODEL MP-3127-LT SPECIFICATIONS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. H3

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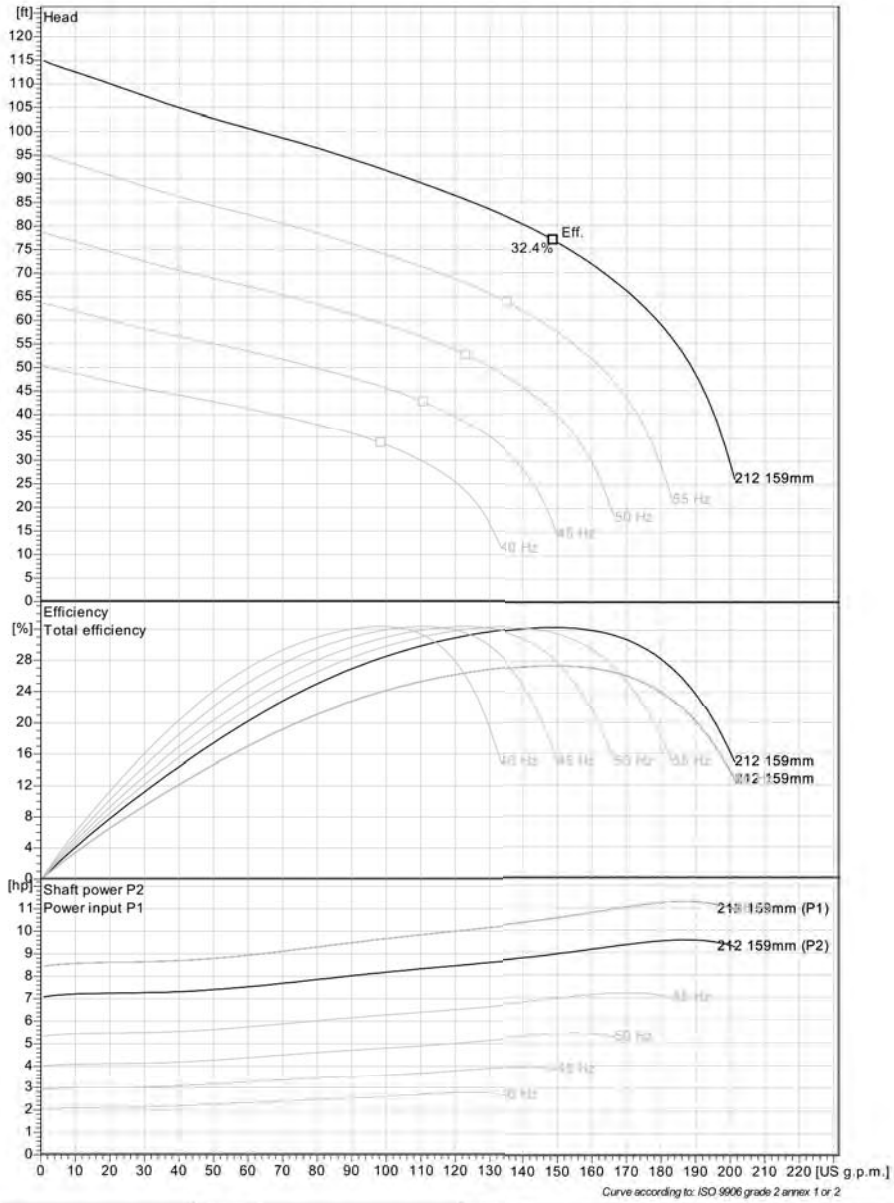
Let's Solve Water

MP 3127 LT 3~ 212

VFD Curve

FLYGT



Curve according to: ISO 9906 grade 2 annex 1 or 2

Project	Project ID	Created by	Created on	Last update
			2012-07-20	

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

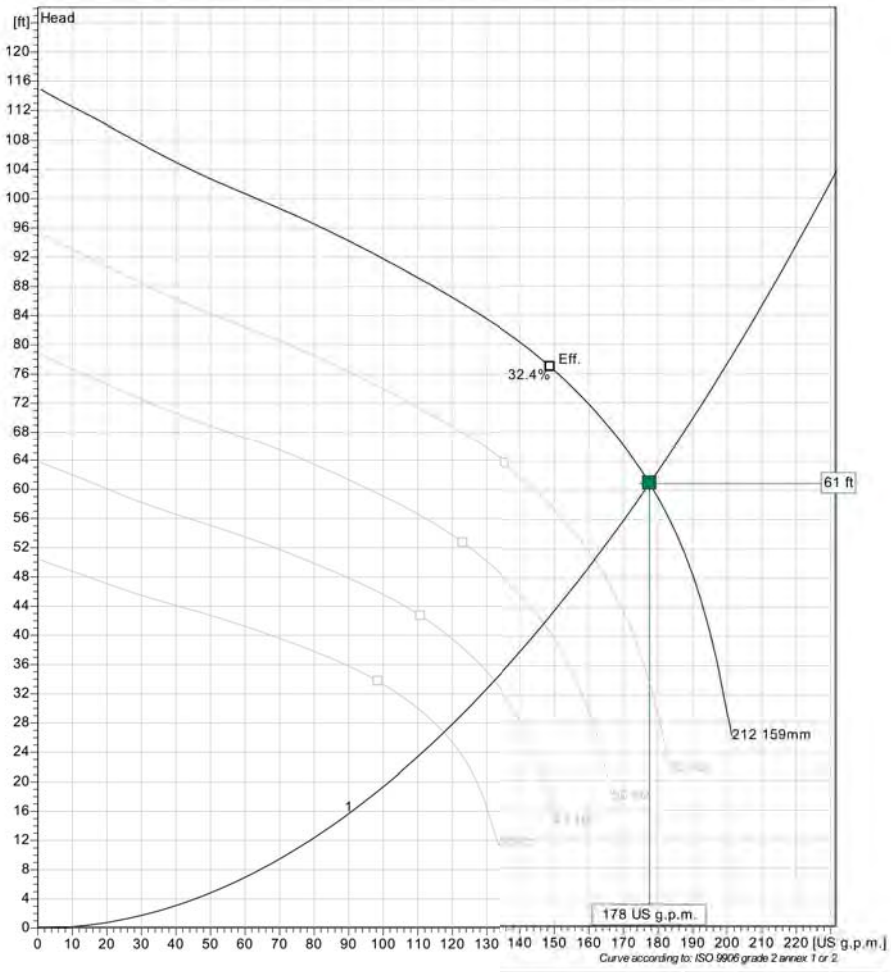
DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	FLYGT PUMP MODEL MP-3127-LT SPECIFICATIONS		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. H4
ENGINEER:	DRAWING NUMBER	SHEET NO.	

xylem
Let's Solve Water

MP 3127 LT 3~ 212

VFD Analysis

FLYGT



Pumps running /System	Individual pump Frequency	Flow	Head	Shaft power	Total Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	60 Hz	178 US g.p.m.	61 ft	9.49 hp	178 US g.p.m.	61 ft	9.49 hp	29.1 %	783 kWh/US MG	
1	55 Hz	162 US g.p.m.	50.5 ft	7.16 hp	162 US g.p.m.	50.5 ft	7.16 hp	29.1 %	655 kWh/US MG	
1	50 Hz	147 US g.p.m.	41.7 ft	5.38 hp	147 US g.p.m.	41.7 ft	5.38 hp	29.1 %	555 kWh/US MG	
1	45 Hz	132 US g.p.m.	33.8 ft	3.92 hp	132 US g.p.m.	33.8 ft	3.92 hp	29.1 %	469 kWh/US MG	
1	40 Hz	118 US g.p.m.	26.7 ft	2.75 hp	118 US g.p.m.	26.7 ft	2.75 hp	29.1 %	398 kWh/US MG	

Project	Project ID	Created by	Created on	Last update
			2012-07-20	

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

FLYGT PUMP MODEL MP-3127-LT SPECIFICATIONS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. H5

ComEd
An Exelon Company

Service and Meter Application
Switch and Load Information Sheet

Please complete a separate sheet for each switch – existing or new:

Project Name: Wakeboard Cable Park at the Three Oaks Recreation Area
Site Address: 5517 Northwest Highway, Crystal Lake, IL
Switch Name and Location:

Service Voltage (check one):

- ☐ 120/240V 1-phase, 3-wire
- ☐ 120/240V 3-phase, 4-wire
- ☐ 120/208V 3-phase, 4-wire
- ☐ Other:
- ☐ 277/480V 3-phase, 4-wire
- ☒ 480V 3-phase 3-wire (B-phase Grounded)
- ☐ 480V 3-phase 3-wire (Ungrounded – requires ground detection equip.)

☐ 4kV ☐ 12kV ☐ 34kV 3-phase, 3-wire
☐ 4kV ☐ 12kV ☐ 3-phase, 4-wire

Other Items (check all that apply):

- ☒ New Construction 5,000+ Sq. Ft.
- ☐ Building Addition Sq. Ft.
- ☐ Relocating Existing Service Entrance
- ☐ Hi-Rise/ Vault Service
- ☒ Underground Service
- ☐ Overhead Service
- ☐ Commercial – No. of units Sq. Ft.
- ☐ Residential – No. of units Sq. Ft.

Date of Ground Breaking (est.):
Date to Energize:
Date to Final Grade (est.):
Hours of Operation Per Day: ☐ 8 ☐ 12 ☒ 16 ☐ 24

Switch Size (amps): (If switchgear is 1,200 Amps or larger, customer must submit drawings for ComEd approval)
Switch Rating (percentage):
Secondary Conductors: Sets of /C ☐ CU or ☐ AL
(Number) (No. of conductors) (Size) (Type)

Total Connected Load Information:

(KW or HP)	Description:	Connected Load:	
		1-phase	3-phase
Lighting:	Restaurant / Retail		480V
VAC:			
Receptacle:			
Process Heat:			
Water Heat:			
Space Heat:			
Motors*:	Electric Motors		
Welders**:			480V
TOTAL LOAD:			

*Motor Load Detail included above:

Description	Quantity	Size (HP)	Efficiency Rating	Phase / Voltage	Nema Code	Starts Per Hr. or Day	Starting Amps	Use
Motor	2	25		3			100	
Motor	2	10		3			30	

**Welder Detail included above:

Description	Quantity	Size (kVA)	Type	Max. Inst. Demand	P.F. at Peak	Welds Per Minute	Cycles Per Weld	Hours Per Day Use

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

COMED CONCEPTUAL LOAD SHEET

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. 1

Revision 1.10.12

COMPANY NAME - RELEASE, INDEMNIFICATION AND HOLD HARMLESS

The activities at _____ are dangerous and may result in injuries or death. This legal document affects your legal rights. Do not sign or initial this legal document unless you fully understand all provisions herein.

***Participant** (or Parent/Guardian if rider is under 18): _____*

***Home Phone:** _____ **Mobile Phone:** _____*

***Home Address:** _____*

***City:**_____ **State:**____ **Zip Code:** _____ **Driver's License**_____*

***Date of Birth:** _____ **Gender:** ___ **Email:**_____*

***Emergency Contacts-Name:** _____ **Emergency Phone Number:** _____*

***Health Insurance Carrier:** _____ **Policy #** _____*

Complete Only If Participant is Under 18:

Participant Name: _____ ***Mobile Phone:*** _____

Home Address (if different):_____

City: _____ ***State:*** _____ ***Zip Code:*** _____

Date of Birth: _____ ***Age:*** _____ ***Gender:*** _____ ***Driver's License #*** _____

Email: _____ ***School:*** _____

Activities Prohibited by Parent (list here):_____

***Medical Release:** I authorize the _____ and its staff to provide or obtain necessary emergency medical attention for me or my minor child who I have signed on their behalf in the event of sickness or injury. I realize and fully understand that my family insurance policy will be responsible for any accident or medical claim. Should I, my minor child, or any member of my family require special medical treatment, prescriptions or hospital care, I am fully responsible for all expenses. I acknowledge that I have sufficient health, liability, accident and personal liability insurance to cover any bodily injury or property damage to myself or another party while participating in activities. If I do not have such insurance then I certify that I am personally capable of paying or any and all expenses or liability. I acknowledge that I am in good physical and mental health and am not suffering from any disease, condition or disability that would affect my participation of others in the offered activities.*

***Transportation.** I hereby give consent for myself and/or my minor child to be transported and supervised by _____ to and from any activities, field trips or other functions as needed.*

SIGN ON BACK PAGE

***Watersport/Water Activities.** I hereby consent for myself/minor child to participate in all water activities that might be offered. These activities may include but not limited to*

_____ **By initialing here, I acknowledge that I have read and fully understand all the information on this page.**

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL LIABILITY WAIVER

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

SOL. NO.

DATE: 27 Jul 12

PROJECT NO.

EXHIBIT NO. J1

ENGINEER:

DRAWING NUMBER

SHEET NO.

wakeboarding, boating, tubing, swimming, waterskiing, knee boarding, floating, playing in or near the water or lake. Staff has my permission to assist my child in the application of a sunscreen. I acknowledge that I and/or my child is a confirmed swimmer.

***Participant Contract:** I agree to abide by the rules and regulations set forth by _____. I have read and understand the rules required for participation in all activities. I understand that _____ has the right to revoke privileges and or terminate my participation without compensation or refund of fees paid in the event my conduct is inappropriate or detrimental to other campers or participants. I agree that any photographic or video images of my (or my child's) participation is allowed without any compensation for such use.*

***Acknowledgement of Risk and Release of Liability** I understand and acknowledge that participation in all activities I or my child may engage in may have certain anticipated and unanticipated risks. These risks could result in injury, physical or mental damage, illness, disease or death. I understand and acknowledge that the risks, known and unknown, identified and/or unidentified, anticipated or unanticipated may result in injury, death, illness, disease or physical or mental damage to myself or minor child (who I am signing on their behalf) as well as to my property or the property of others. My (or my child's) participation is entirely voluntary and I agree, covenant and promise to accept and assume all responsibilities and risk for injury, illness, disease or death to myself or others arising from my participation in these activities.*

Specific Acknowledgement of Risk and Release of Liability From Bacteria and Amoeba

The risks associated with the activities include, but are not limited to illness or death from any and all types of bacteria and my (or my child's) participation is entirely voluntary and I agree, covenant and promise to accept and assume all responsibilities and risk for injury, illness, disease or death to myself or others arising from my participation in these activities. I also understand that bacteria may cause illness or death and certain types of bacteria or amoeba such as naegleria fowleri can lead to meningitis and has caused deaths to participants at other cable parks in the USA. Notwithstanding this knowledge, my (or my child's) participation is at our own risk for injury, illness or death. We also acknowledge that _____ has made nose clips available at no cost to prevent the naegleria fowleri infection.

*** _____ Initial Here: I have read and understood the preceding paragraphs.***

My signature below indicates that I have read and fully understand all the information listed in this document and agree to be bound by its terms. If I am the parent or guardian of the participant I agree to be bound by the terms and conditions of this agreement and will be responsible for the actions of the participant. I agree that I am freely and voluntarily signing these documents.

Participant's Name: _____

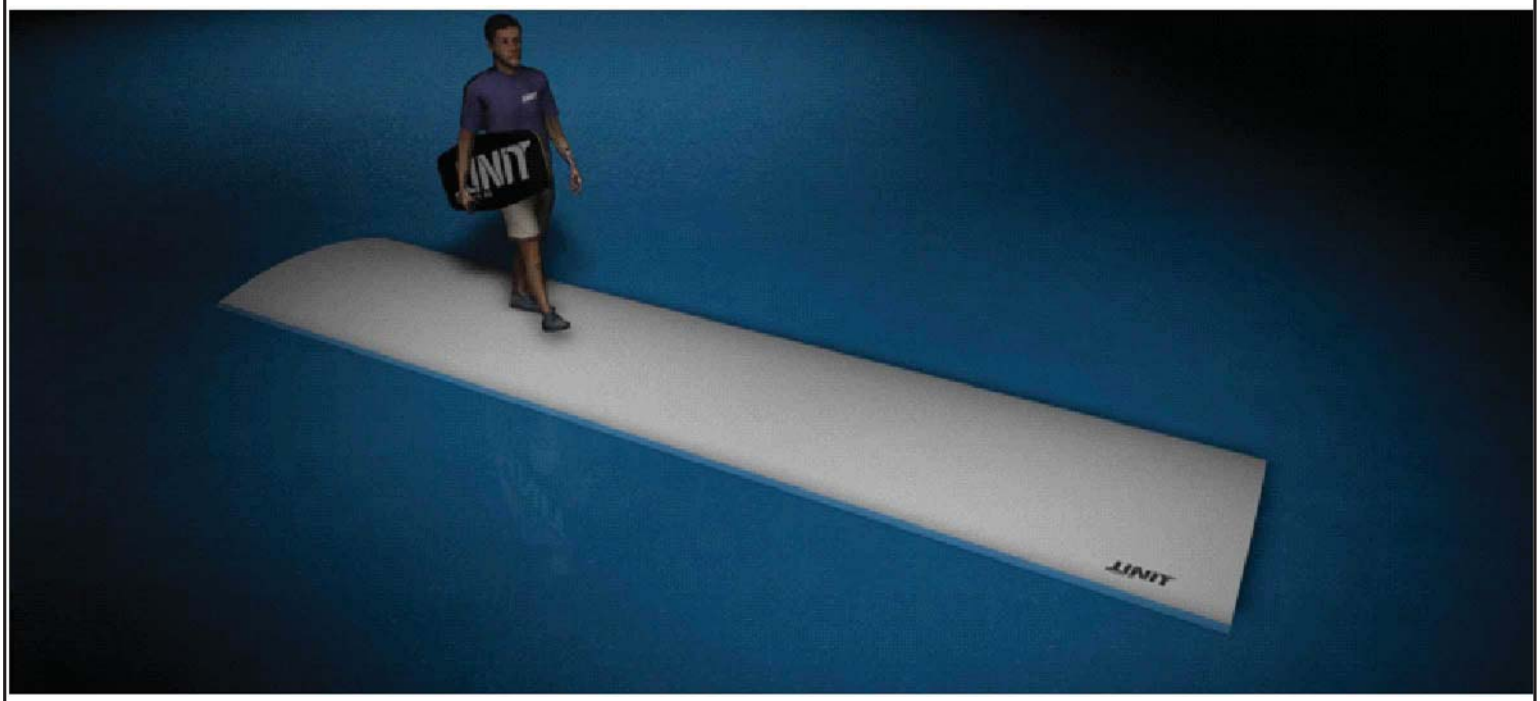
X _____
Participant's Signature ***Date***

X _____
Parent or Guardian Signature (if rider is under 18) ***Date***

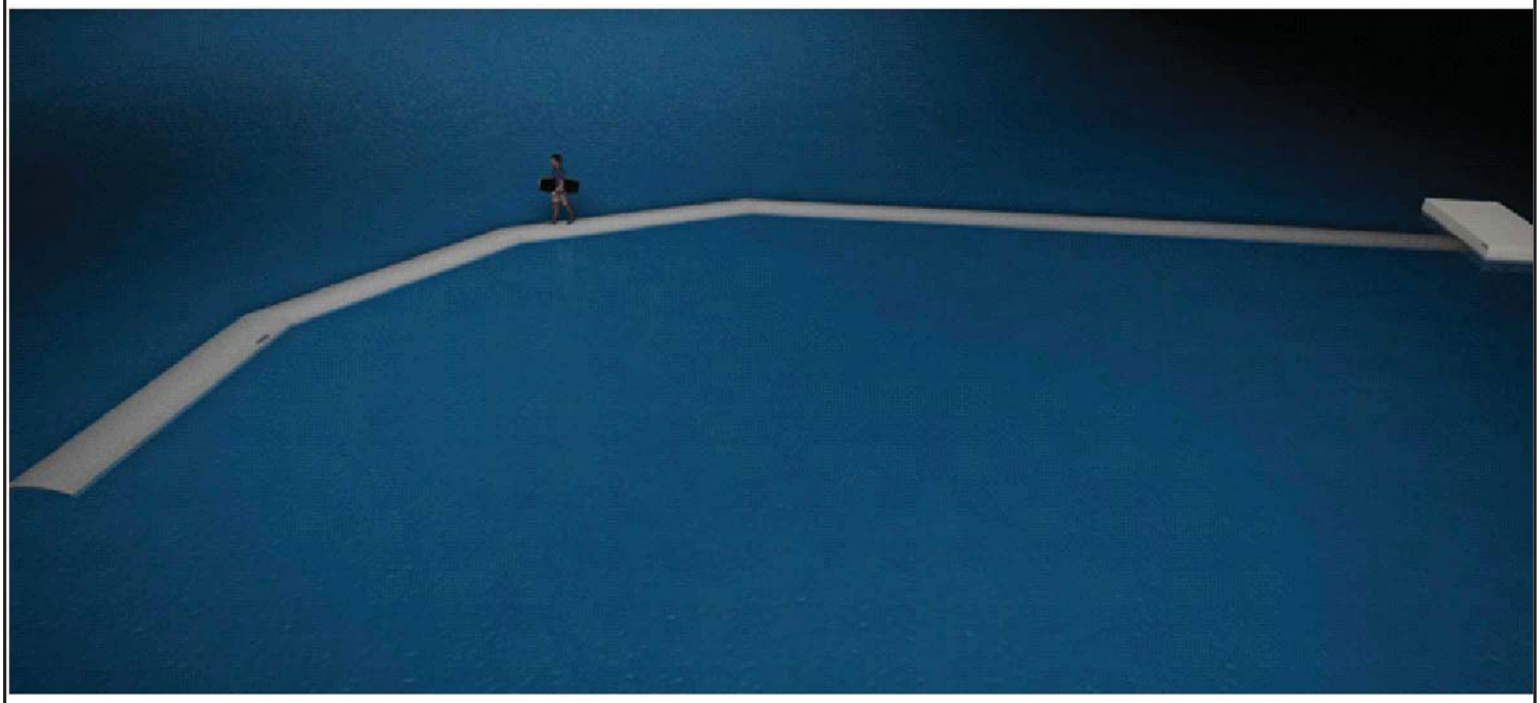
SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	TYPICAL LIABILITY WAIVER		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. J2
ENGINEER:	DRAWING NUMBER	SHEET NO.	

TYPICAL HDPE FLOATING DOCK / WAVEBREAK SYSTEM



TYPICAL HDPE FLOATING DOCK / WAVEBREAK SYSTEM



SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

HDPE FLOATING DOCK / WAVEBREAK SYSTEM

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

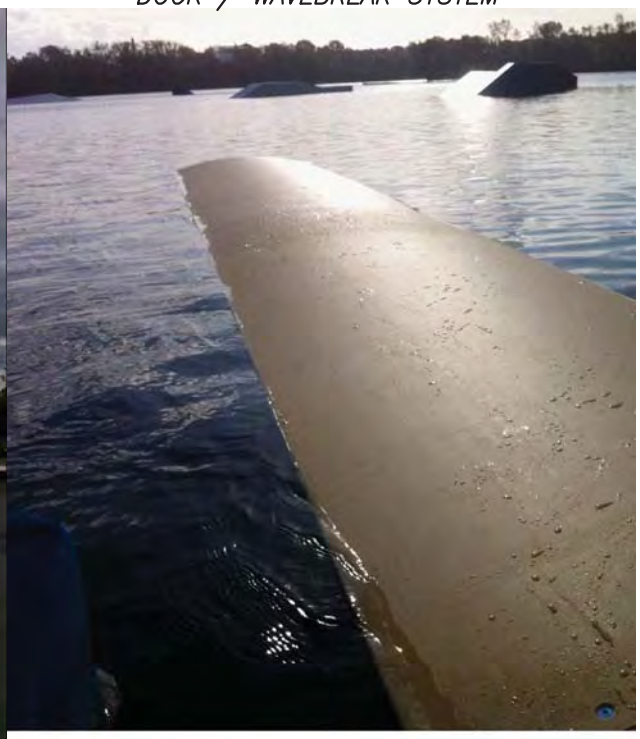
DATE: 27 Jul 12

EXHIBIT NO. K1

TYPICAL HDPE FLOATING DOCK / WAVEBREAK SYSTEM

TYPICAL WOOD DOCK WITH HDPE FLOATING DOCK LAKE EXIT

TYPICAL HDPE FLOATING DOCK / WAVEBREAK SYSTEM



SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

HDPE FLOATING DOCK / WAVEBREAK SYSTEM

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

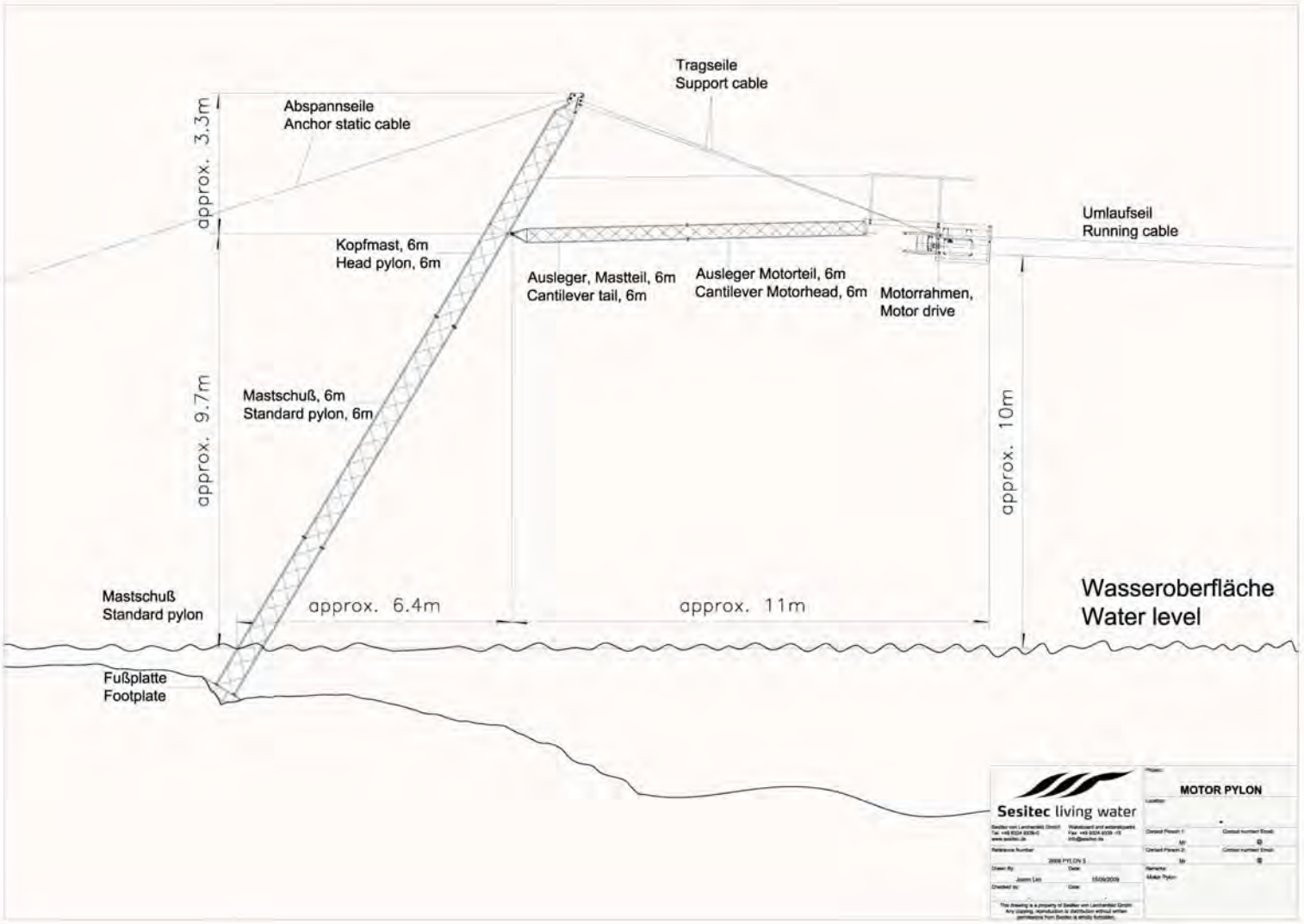
DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. K2

MOTOR TOWER DETAILS

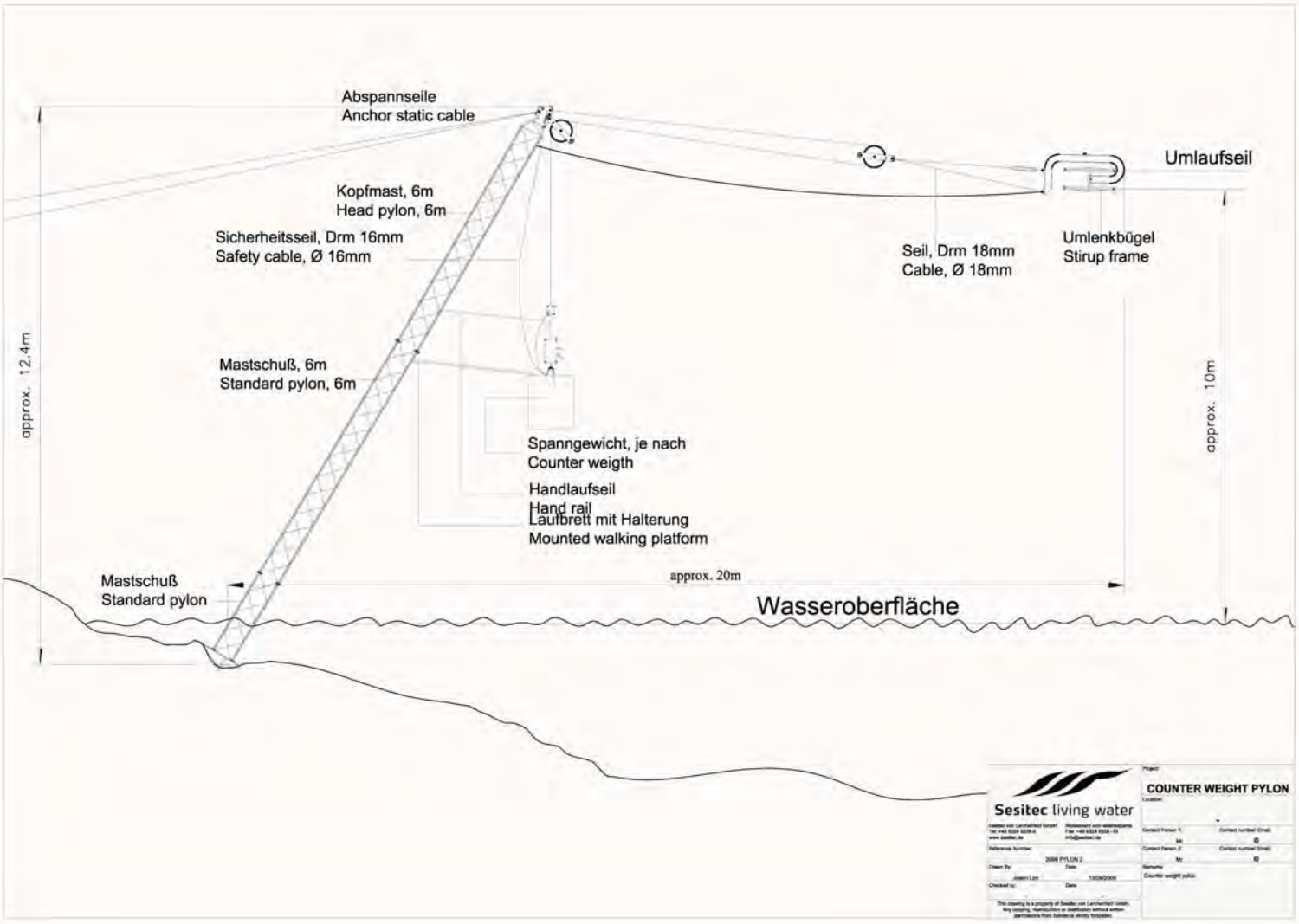


SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA
DRAWN BY: SCH	WAKEBOARD TOWER DETAILS – MOTOR TOWER
REVIEWED BY: JED	CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. L1
ENGINEER:	DRAWING NUMBER	SHEET NO.	

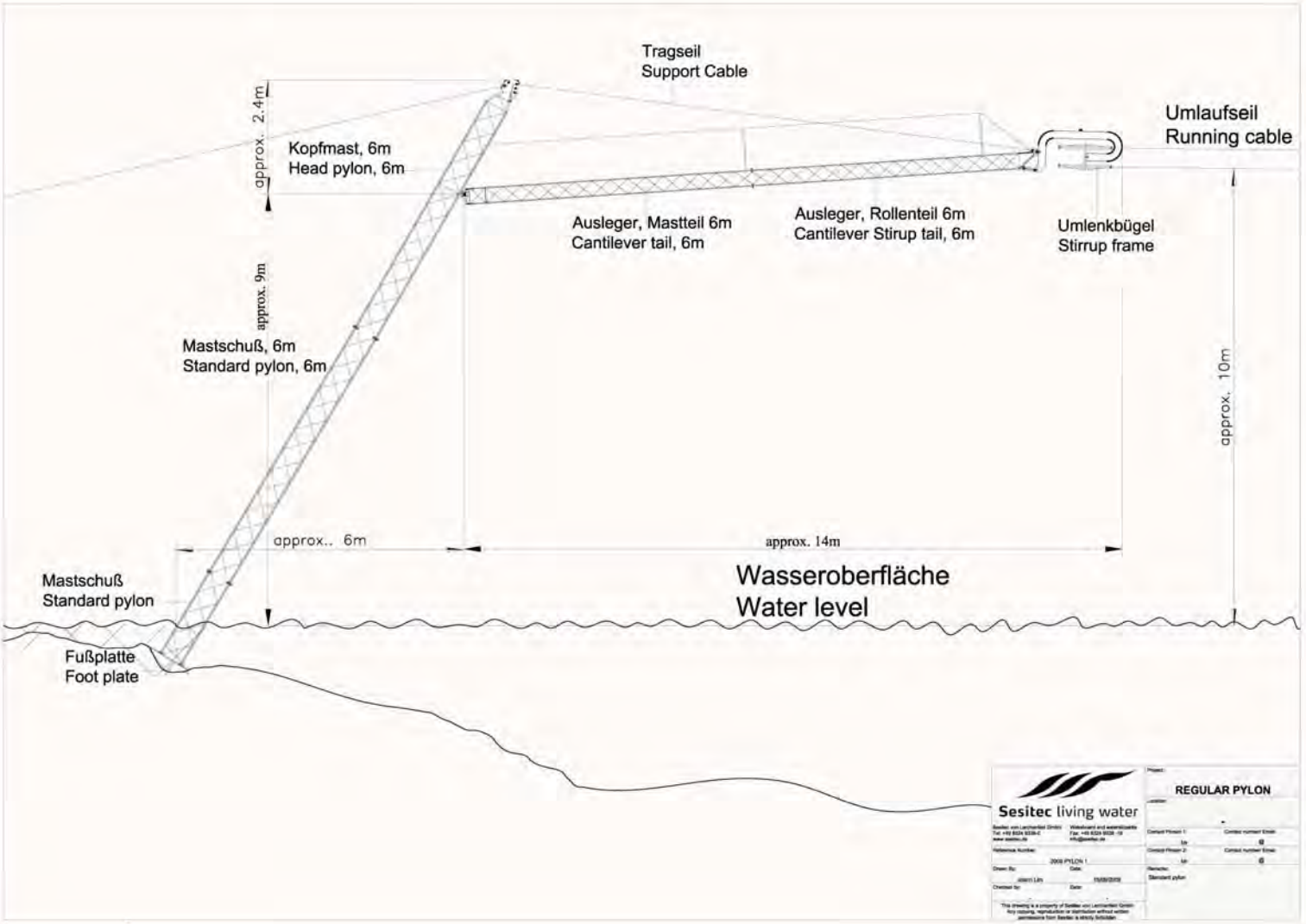
COUNTERWEIGHT TOWER DETIALS



SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA WAKEBOARD TOWER DETAILS – COUNTERWEIGHT TOWER CRYSTAL LAKE, IL.		
DRAWN BY: SCH			
REVIEWED BY: JED			
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
ENGINEER:	PROJECT NO.		EXHIBIT NO. L2
	DRAWING NUMBER	SHEET NO.	

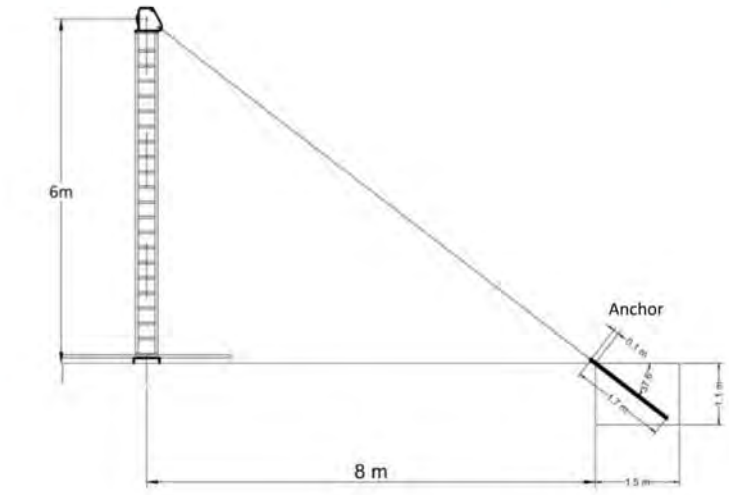
TYPICAL TOWER DETIALS

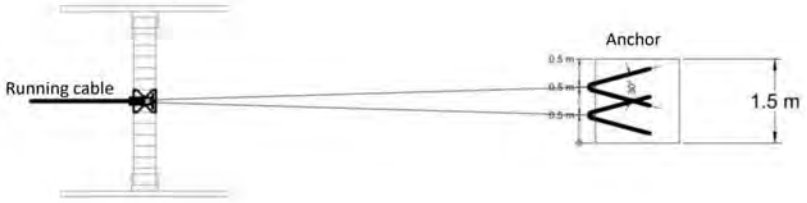


SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	WAKEBOARD TOWER DETAILS – TYPICAL TOWER		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. L3
ENGINEER:	DRAWING NUMBER	SHEET NO.	

In the diagram below, you will find the measurement you need for the casting of the anchor.





SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
WAKEBOARD TOWER DETAILS – TWO TOWER SYSTEM TYPICAL TOWER
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. L4

TYPICAL TOWER – PRE–PAINT AND INSTALLATION

TYPICAL TOWER – PRE–INSTALLATION PAINTED

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL FULL SIZE CABLE SYSTEM PHOTOS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. M1

TYPICAL FULL SIZE CABLE SYSTEM INSTALLED TOWERS

TYPICAL FULL SIZE CABLE SYSTEM INSTALLED TOWERS

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL FULL SIZE CABLE SYSTEM PHOTOS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. M2

TYPICAL FULL SIZE CABLE SYSTEM INSTALLED TOWERS

TYPICAL FULL SIZE CABLE SYSTEM INSTALLED TOWERS

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL FULL SIZE CABLE SYSTEM PHOTOS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. M3

TYPICAL TOWER – NON PAINTED

TYPICAL TOWER – PAINTED

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL TWO TOWER CABLE SYSTEM PHOTOS

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. N

TYPICAL TOWER – BASE PLATE CLEATS

TYPICAL TOWER – BASE PLATE INSTALLED

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL FULL SIZE TOWER CLEAT SYSTEM

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. 0

LAND ANCHOR OPTION #1

LAND ANCHOR OPTION #2 – PRE–PAINT

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL CONSTRUCTED LAND ANCHOR

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. P1

TYPICAL WATER ANCHOR FORMS

TYPICAL WATER ANCHOR INSTALLATION

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	TYPICAL CONSTRUCTED WATER ANCHOR		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. P2
ENGINEER:	DRAWING NUMBER	SHEET NO.	

TYPICAL PIPE OBSTACLE

TYPICAL SLIDER OBSTACLE

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL WAKEBOARD OBSTACLES

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. Q1

TYPICAL RAMP OBSTACLE

TYPICAL HALF-PIPE OBSTACLE

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL WAKEBOARD OBSTACLES

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

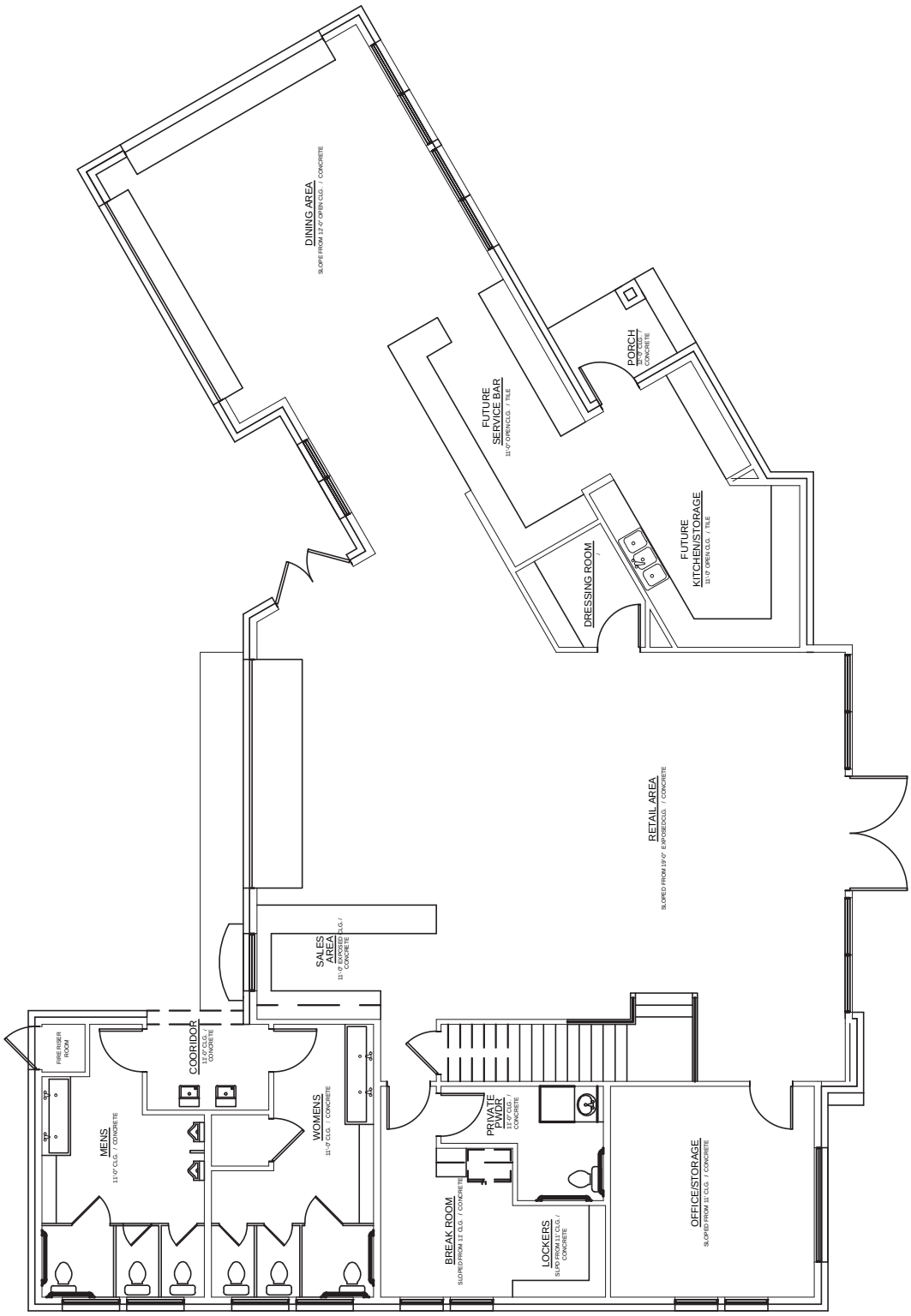
PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. Q2



SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL PRO-SHOP BUILDING INTERIOR FLOORPLAN

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. R

SANITARY SEWER LIFT STATION LANDSCAPE SCREENING

TRANSFORMER LANDSCAPE SCREENING

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL LANDSCAPE SCREENING

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. S1

BERMED VIEWING AREA WITH LANDSCAPING

LANDSCAPING AROUND TOWER ANCHOR

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL LANDSCAPE SCREENING

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. S2

LANDSCAPING AROUND TOWER ANCHORS

LANDSCAPING AND NATURAL VEGETATION AROUND TOWER ANCHOR

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

TYPICAL LANDSCAPE SCREENING

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Jul 12

EXHIBIT NO. S3

LANDSCAPING AND HARDSCAPE AROUND PRO-SHOP/RESTAURANT

LANDSCAPING AND NATURAL VEGETATION AROUND PRO-SHOP

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH	WAKEBOARD PARK FEASIBILITY STUDY THREE OAKS RECREATION AREA		
DRAWN BY: SCH	TYPICAL LANDSCAPE SCREENING		
REVIEWED BY: JED	CRYSTAL LAKE, IL.		
SUBMITTED BY: JDEI	SOL. NO.	DATE: 27 Jul 12	
	PROJECT NO.		EXHIBIT NO. S4
ENGINEER:	DRAWING NUMBER	SHEET NO.	

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

199'
234'
315'
296'
519'
603'
534'
491'
650'
182'
246'
266'
186'

COUNTER–CLOCKWISE FULL SIZE SYSTEM

CLOCKWISE FULL SIZE SYSTEM

INTERMEDIATE LEVEL TWO–TOWER SYSTEM

EXISTING WATER SURFACE

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

DUAL STARTING DOCK

PROPOSED DECK AREA

PROPOSED RENTAL BUILDING

EXISTING PEDESTRIAN GRAVEL TRAIL
PROPOSED ASPHALT TRAIL

ELECTRIC HOUSING

STARTING DOCK

473'

STARTING DOCK

PAVILLION

PROPOSED BEACH AREA

PROPOSED BEACH AREA

PROPOSED BEACH AREA

PAVILLION

EXISTING VEHICULAR ACCESS

EX. 3'x3' STORM DRAIN FLOW CONTROL STRUCTURE TO BE RELOCATED

EXISTING BOAT DOCK

ASPHALT SIDEWALK IMPROVEMENTS

OPTIONAL PRO–SHOP AND RESTAURANT BUILDING LOCATION

CONCRETE SIDEWALK IMPROVEMENTS

CONCRETE SIDEWALK IMPROVEMENTS

PROPOSED DECK AREA

BEGINNER LEVEL TWO–TOWER SYSTEM

PROPOSED PRO–SHOP AND RESTAURANT BUILDING

EXISTING PARKING LOT

DUMPSTER LOCATION

OPTIONAL PRO–SHOP AND RESTAURANT BUILDING LOCATION

PROPOSED CONCRETE SIDEWALK FOR ADA ACCESS

112 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING PARKING LOT

SLED HILL

950 L.F. ASPHALT ROAD IMPROVEMENTS

OPTIONAL PRO–SHOP AND RESTAURANT BUILDING LOCATION

108 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING GRAVEL MAINTENANCE DRIVE

EXISTING SANITARY SEWER LIFT STATION

PINOREE ROAD

100 0 100 200

GRAPHIC SCALE IN FEET
1" = 200'

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
CONCEPTUAL SITE PLAN – OPTION #1
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Aug 12
EXHIBIT NO. T1

EXHIBIT T2

ENGINEERING OPINION OF PROBABLE COST - SITE PLAN OPTION #1

PAY ITEM	QTY	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
1	2	EA	Full Size Cable System - Delivered and Installed	334,337.00	$668,674.00
2	2	EA	Two Tower Cable System - Delivered and Installed	34,000.00	$68,000.00
3	6,474	LF	Floating Access Docks / Wavebreaks	100.00	$647,400.00
4	750	LF	Custom Starting Dock	300.00	$225,000.00
5	13,478	SY	Asphalt Paving for Roads and Parking Lots	25.00	$336,950.00
6	319	SY	Concrete Sidewalk Improvements	54.00	$17,226.00
7	39,000	CY	Earthwork	5.00	$195,000.00
8	5,000	SF	Pro Shop Building	200.00	$1,000,000.00
9	810	SF	Rental Building	75.00	$60,750.00
10	2	EA	Rental Pavillion - 20'x20'	15,000.00	$30,000.00
11	250	LF	2" Water Improvements	52.00	$13,000.00
12	925	LF	6" Sanitary Sewer Improvements	92.00	$85,100.00
13	685	LF	18" Storm Drain Improvements	98.00	$67,130.00
14	1,839	LF	Electric Service and Conduits	18.15	$33,377.85
15	1	EA	Gas and Telephone Service Extension	10,000.00	$10,000.00
16	1	EA	Landscaping*	250,000.00	$250,000.00
17	3,132	CY	Beach Area @ 3.0 Foot Depth	36.00	$112,752.00
18	32	EA	Typical Anchors	5,000.00	$160,000.00
19	22	EA	Typical Obstacles	15,000.00	$330,000.00
				Sub-Total	**4,310,359.85**
				20% Cont	**862,071.97**
				A/E & Inspection	**431,035.99**
				Total	**5,603,467.81**

*** Note -** Landscaping should include seeding/planting disturbed areas with natrual vegetation or turf grasses, and planting of trees or bushes for screening

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
ENGINEERING OPINION OF PROBABLE COST
SITE PLAN OPTION #1
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. T2

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

BEGINNER LEVEL TWO-TOWER SYSTEM

INTERMEDIATE LEVEL TWO-TOWER SYSTEM

COUNTER-CLOCKWISE FULL SIZE SYSTEM

PAVILLION

ELECTRIC HOUSING

STARTING DOCK

PROPOSED BEACH AREA

CLOCKWISE FULL SIZE SYSTEM

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

DUAL STARTING DOCK

EXISTING WATER SURFACE

STARTING DOCK

PAVILLION

EXISTING PEDESTRIAN GRAVEL TRAIL
PROPOSED ASPHALT TRAIL

PROPOSED DECK AREA

PROPOSED RENTAL BUILDING

PROPOSED BEACH AREA

ELECTRIC HOUSING

ASPHALT SIDEWALK IMPROVEMENTS

PROPOSED BEACH AREA

PROPOSED BEACH AREA

ASPHALT SIDEWALK IMPROVEMENTS

EXISTING VEHICULAR ACCESS

EX. 3'x3' STORM DRAIN FLOW CONTROL STRUCTURE TO REMAIN

EXISTING BOAT DOCK

PROPOSED DECK AREA

OPTIONAL PRO-SHOP AND RESTAURANT BUILDING LOCATION

CONCRETE SIDEWALK IMPROVEMENTS

CONCRETE SIDEWALK IMPROVEMENTS

PROPOSED PRO-SHOP AND RESTAURANT BUILDING

EXISTING PARKING LOT

DUMPSTER LOCATION

OPTIONAL PRO-SHOP AND RESTAURANT BUILDING LOCATION

PROPOSED CONCRETE SIDEWALK FOR ADA ACCESS

SLED HILL

112 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING PARKING LOT

950 L.F. ASPHALT ROAD IMPROVEMENTS

OPTIONAL PRO-SHOP AND RESTAURANT BUILDING LOCATION

108 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING GRAVEL MAINTENANCE DRIVE

EXISTING SANITARY SEWER LIFT STATION

PINGREE ROAD

100 0 100 200

GRAPHIC SCALE IN FEET
1" = 200'

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

CONCEPTUAL SITE PLAN – OPTION #2

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Aug 12

EXHIBIT NO. U1

EXHIBIT U2

ENGINEERING OPINION OF PROBABLE COST - SITE PLAN OPTION #2

PAY ITEM	QTY	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
1	2	EA	Full Size Cable System - Delivered and Installed	334,337.00	$668,674.00
2	2	EA	Two Tower Cable System - Delivered and Installed	34,000.00	$68,000.00
3	4,504	LF	Floating Access Docks / Wavebreaks	100.00	$450,400.00
4	860	LF	Custom Starting Dock	300.00	$258,000.00
5	14,429	SY	Asphalt Paving for Roads and Parking Lots	25.00	$360,725.00
6	319	SY	Concrete Sidewalk Improvements	54.00	$17,226.00
7	39,000	CY	Earthwork	5.00	$195,000.00
8	5,000	SF	Pro Shop Building	200.00	$1,000,000.00
9	810	SF	Rental Building	75.00	$60,750.00
10	2	EA	Rental Pavillion - 20'x20'	15,000.00	$30,000.00
11	250	LF	2" Water Improvements	52.00	$13,000.00
12	925	LF	6" Sanitary Sewer Improvements	92.00	$85,100.00
13	685	LF	18" Storm Drain Improvements	98.00	$67,130.00
14	3,154	LF	Electric Service and Conduits	18.15	$57,245.10
15	1	EA	Gas and Telephone Service Extension	10,000.00	$10,000.00
16	1	EA	Landscaping*	250,000.00	$250,000.00
17	4,425	CY	Beach Area @ 3.0 Foot Depth	36.00	$159,300.00
18	31	EA	Typical Anchors	5,000.00	$155,000.00
19	22	EA	Typical Obstacles	15,000.00	$330,000.00
				Sub-Total	**4,235,550.10**
				20% Cont	**847,110.02**
				A/E & Inspection	**423,555.01**
				Total	**5,506,215.13**

*** Note** - Landscaping should include seeding/planting disturbed areas with natrual vegetation or turf grasses, and planting of trees or bushes for screening

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
ENGINEERING OPINION OF PROBABLE COST
SITE PLAN OPTION #2
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. U2

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

905'

215'

215'

146'

145'

CLOCKWISE FULL SIZE SYSTEM

1052'

FLOATING ACCESS DOCKS / WAVEBREAK SYSTEM (TYPICAL)

EXISTING WATER SURFACE

INTERMEDIATE LEVEL TWO-TOWER SYSTEM

700'

ELECTRIC HOUSING

PROPOSED DECK AREA

PROPOSED RENTAL BUILDING

STARTING DOCK

PAVILLION

INTERMEDIATE LEVEL TWO-TOWER SYSTEM

PROPOSED BEACH AREA

ELECTRIC HOUSING

STARTING DOCK

PAVILLION

ASPHALT SIDEWALK IMPROVEMENTS

BEGINEER LEVEL TWO-TOWER SYSTEM

473'

PROPOSED BEACH AREA

ELECTRIC HOUSING

STARTING DOCK

PAVILLION

EXISTING VEHICULAR ACCESS

EX. 3'x3' STORM DRAIN FLOW CONTROL STRUCTURE TO REMAIN

EXISTING BOAT DOCK

PROPOSED DECK AREA

PROPOSED PRO-SHOP AND RESTAURANT BUILDING

CONCRETE SIDEWALK IMPROVEMENTS

DUMPSTER LOCATION

EXISTING PARKING LOT

OPTIONAL PRO-SHOP AND RESTAURANT BUILDING LOCATION

PROPOSED CONCRETE SIDEWALK FOR ADA ACCESS

112 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING PARKING LOT

SLED HILL

950 L.F. ASPHALT ROAD IMPROVEMENTS

OPTIONAL PRO-SHOP AND RESTAURANT BUILDING LOCATION

108 SPACE ASPHALT PARKING LOT

BMP WATER QUALITY AREA

EXISTING GRAVEL MAINTENANCE DRIVE

PINGREE ROAD

100 0 100 200

GRAPHIC SCALE IN FEET
1" = 200'

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA

CONCEPTUAL SITE PLAN – OPTION #3

CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

SHEET NO.

DATE: 27 Aug 12

EXHIBIT NO. V1

EXHIBIT V2

ENGINEERING OPINION OF PROBABLE COST - SITE PLAN OPTION #3

PAY ITEM	QTY	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
1	1	EA	Full Size Cable System - Delivered and Installed	334,337.00	$334,337.00
2	3	EA	Two Tower Cable System - Delivered and Installed	34,000.00	$102,000.00
3	7,104	LF	Floating Access Docks / Wavebreaks	100.00	$710,400.00
4	0	LF	Custom Starting Dock	300.00	$0.00
5	13,272	SY	Asphalt Paving for Roads and Parking Lots	25.00	$331,800.00
6	319	SY	Concrete Sidewalk Improvements	54.00	$17,226.00
7	39,000	CY	Earthwork	5.00	$195,000.00
8	5,000	SF	Pro Shop Building	200.00	$1,000,000.00
9	810	SF	Rental Building	75.00	$60,750.00
10	3	EA	Rental Pavillion - 20'x20'	15,000.00	$45,000.00
11	250	LF	2" Water Improvements	52.00	$13,000.00
12	925	LF	6" Sanitary Sewer Improvements	92.00	$85,100.00
13	685	LF	18" Storm Drain Improvements	98.00	$67,130.00
14	2,200	LF	Electric Service and Conduits	18.15	$39,930.00
15	1	EA	Gas and Telephone Service Extension	10,000.00	$10,000.00
16	1	EA	Landscaping*	250,000.00	$250,000.00
17	1,536	CY	Beach Area @ 3.0 Foot Depth	36.00	$55,296.00
18	20	EA	Typical Anchors	5,000.00	$100,000.00
19	22	EA	Typical Obstacles	15,000.00	$330,000.00
				Sub-Total	**3,746,969.00**
				20% Cont	**749,393.80**
				A/E & Inspection	**374,696.90**
				Total	**4,871,059.70**

*** Note** - Landscaping should include seeding/planting disturbed areas with natrual vegetation or turf grasses, and planting of trees or bushes for screening

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH
DRAWN BY: SCH
REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
ENGINEERING OPINION OF PROBABLE COST
SITE PLAN OPTION #3
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI
ENGINEER:
SOL. NO.
PROJECT NO.
DRAWING NUMBER
SHEET NO.
DATE: 27 Jul 12
EXHIBIT NO. V2

Proposed Storm Drain

Proposed Water

Existing Gas Main

Existing 8" Water

Existing Sanitary Sewer Force Main

Existing 8" Water

Proposed Sanitary Sewer

Existing AT&T Telephone Service

Proposed Storm Drain

Existing 8" Water

Existing Sanitary Sewer Gravity Main

Existing Sanitary Sewer Lift Station

50 0 50 100

GRAPHIC SCALE IN FEET
1" = 100'

SYM.	D.O. NO.	ACTION	DATE	DESCRIPTION OF REVISION

DESIGNED BY: SCH

DRAWN BY: SCH

REVIEWED BY: JED

WAKEBOARD PARK FEASIBILITY STUDY
THREE OAKS RECREATION AREA
EXISTING AND CONCEPTUAL UTILITY IMPROVEMENTS
CRYSTAL LAKE, IL.

SUBMITTED BY: JDEI

ENGINEER:

SOL. NO.

PROJECT NO.

DRAWING NUMBER

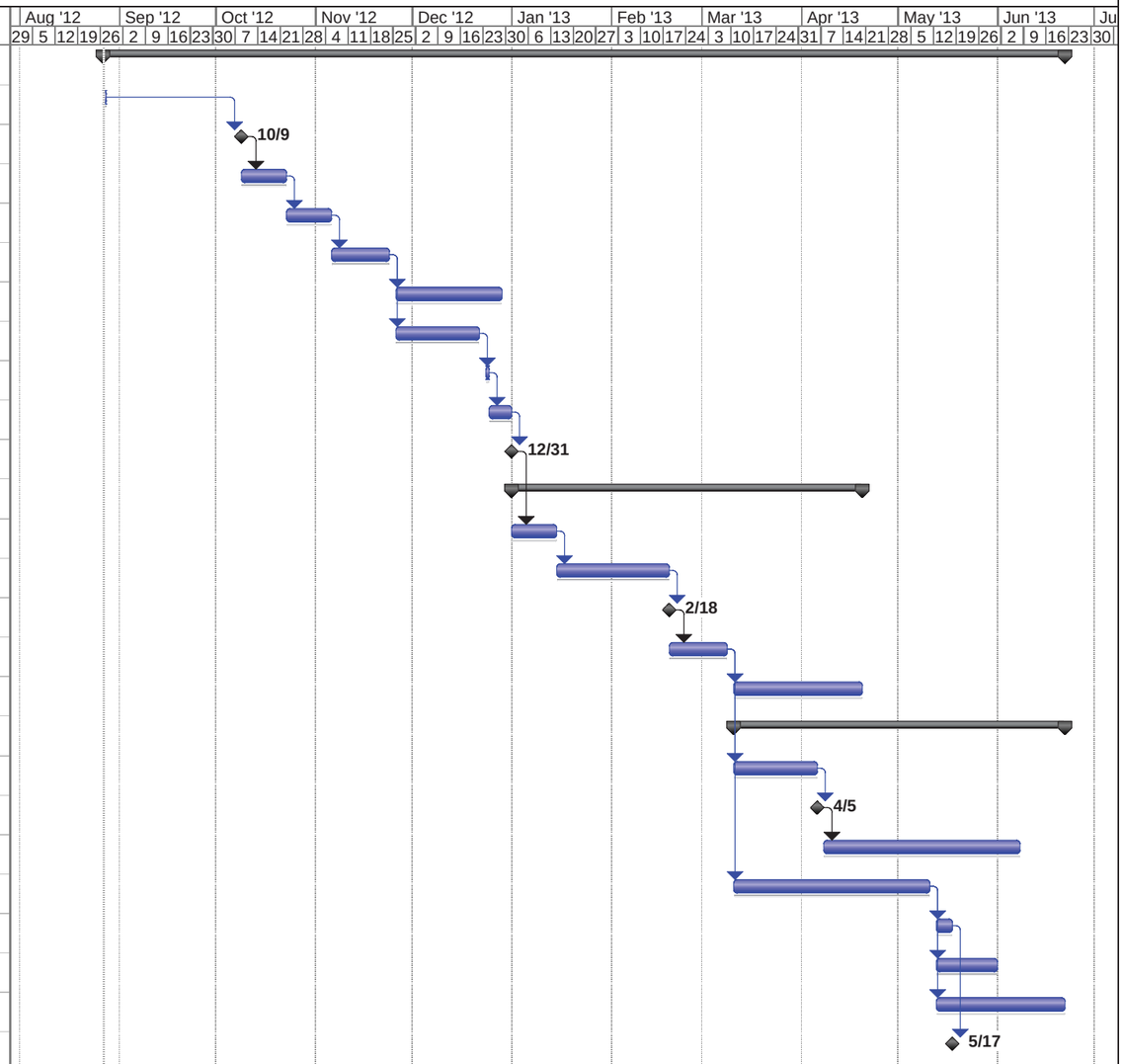
SHEET NO.

DATE: 27 Aug 12

EXHIBIT NO. W

Exhibit X
Crystal Lake Wakeboard Park
Proposed Development Schedule

ID	Task Name	Duration	Start	Finish	Physical % Complete	Predecessors
1	**Crystal Lake Wakeboard Park Proposed Development Schedule**	**215 days**	**Mon 8/27/12**	**Fri 6/21/13**	**0%**	
2	Final Feasibility Study Submittal	1 day	Mon 8/27/12	Mon 8/27/12	0%	
3	Submit Final Feasibility Study to City Council	0 days	Tue 10/9/12	Tue 10/9/12	0%	2
4	Develop Design-Build RFQ for Engineer, Architect, Developer and Contractor	10 days	Tue 10/9/12	Mon 10/22/12	0%	3
5	Advertise RFQ	10 days	Tue 10/23/12	Mon 11/5/12	0%	4
6	Review SOQ and Select Engineer, Architect, Developer and Contractor	14 days	Tue 11/6/12	Fri 11/23/12	0%	5
7	Begin Land Survey	25 days	Mon 11/26/12	Fri 12/28/12	0%	6
8	Negotiate Contracts with Engineer, Architect, Developer and Contractor	20 days	Mon 11/26/12	Fri 12/21/12	0%	6
9	Submit Contracts to City Council	1 day	Mon 12/24/12	Mon 12/24/12	0%	8
10	Circulate Contracts for Signatures	5 days	Tue 12/25/12	Mon 12/31/12	0%	9
11	Issue Design Notice to Proceed	0 days	Mon 12/31/12	Mon 12/31/12	0%	10
12	**Preliminary Design**	**79 days**	**Tue 1/1/13**	**Fri 4/19/13**	**0%**	
13	Geotechnical Investigation	10 days	Tue 1/1/13	Mon 1/14/13	0%	11
14	Develop Preliminary Design Package	25 days	Tue 1/15/13	Mon 2/18/13	0%	13
15	Submit Preliminary Plans and Specificiations	0 days	Mon 2/18/13	Mon 2/18/13	0%	14
16	City Review	14 days	Tue 2/19/13	Fri 3/8/13	0%	15
17	Begin Earthwork, Paving and Utility Construction	30 days	Mon 3/11/13	Fri 4/19/13	0%	16
18	**Final Design**	**75 days**	**Mon 3/11/13**	**Fri 6/21/13**	**0%**	
19	Develop Final Design Package	20 days	Mon 3/11/13	Fri 4/5/13	0%	16
20	Submit Final Design Plans and Specifications	0 days	Fri 4/5/13	Fri 4/5/13	0%	19
21	Begin Building Construction	45 days	Mon 4/8/13	Fri 6/7/13	0%	20
22	Begin Cable and Dock Installation	45 days	Mon 3/11/13	Fri 5/10/13	0%	16
23	Testing Cable System	5 days	Mon 5/13/13	Fri 5/17/13	0%	22
24	Obstacle Installation	15 days	Mon 5/13/13	Fri 5/31/13	0%	22
25	Landscaping Improvements	30 days	Mon 5/13/13	Fri 6/21/13	0%	22
26	Open for Business	0 days	Fri 5/17/13	Fri 5/17/13	0%	23



Project: Proposed Development Schec
Date: Mon 8/27/12

Task — Progress — Summary — External Tasks — Deadline
Split — Milestone — Project Summary — External Milestone

MEMORANDUM

February 26, 2013

TO: Erik Morimoto, PE – City Engineer
Abigail Wilgreen, PE – Assistant City Engineer

FROM: Darren T. Olson, PE, CFM, D.WRE
Scott Griffith, PE, CFM

SUBJECT: Vulkan Lakes Wakeboard Park
Stormwater, Floodplain and Wetlands Stormwater Cursory Review
(CBBEL Project 08-364)

This memorandum summarizes the stormwater, floodplain and wetland review for the subject project. The following items were reviewed:

- Vulkan Cable Park Conceptual Plan prepared by Hitchcock Design Group.
- Cursory Review Comments prepared by the City of Crystal Lake, dated February 12, 2013.
- Excerpts of the Developer Submittal, prepared by Copley McGinnis Group, LLC

A review of the above items was completed with respect to the City of Crystal Lake Stormwater Management Ordinance (CLSO). The following cursory review comments were developed based on our knowledge of the CLSO and the site history:

1. The proposed development will be classified as an intermediate development under the CLSO.

2. Detention accounting exercise should be performed to determine the amount of required storage for the proposed development.

3. The proposed shore improvements may result in fill to the lake. Compensatory storage calculations may be necessary.

4. Additional shoreline protection may be necessary to prevent future erosion associated with waves.

5. The proposed parking lot and structures associated with the development are located at the base of an existing hill. Additional drainage systems may be necessary to convey flow safely around the structure and parking lot.

6. Please clarify how stormwater runoff from the parking lot will be pretreated prior to infiltration or discharge to the lake. A pre-treatment and stormwater management system similar to the Three Oaks Recreation Area plan should be developed for the site.

7. A maintenance plan should be developed for this area that address long term maintenance of the stormwater management system and addresses management of pollutants such as oils from the tow system.

8. The finished floor of the buildings will be required to be elevated to the Flood Protection Elevation (FPE).

jsg
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