

STATE OF NORTH CAROLINA
COUNTY OF MOORE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
17 CVS

STATE OF NORTH CAROLINA, *ex rel.*,)
MICHAEL REGAN, SECRETARY)
NORTH CAROLINA DEPARTMENT OF)
ENVIRONMENTAL QUALITY,)
DIVISION OF ENERGY, MINERAL &)
LAND RESOURCES,)
Plaintiff,)
v.)
WOODLAKE CC CORPORATION,)
Defendant.)

**COMPLAINT AND MOTION
FOR PRELIMINARY AND
PERMANENT INJUNCTIVE RELIEF**

The State of North Carolina, complaining of the Defendants alleges and says:

PARTIES

1. The Plaintiff is the sovereign State of North Carolina. This action is being brought on the relation of Michael Regan, Secretary of the North Carolina Department of Environmental Quality (“DEQ”), the State agency established pursuant to N.C. Gen. Stat. § 143B-279.1, *et seq.*, and vested with the statutory authority to enforce the State’s environmental laws, including the Dam Safety Law of 1967, N.C. Gen. Stat. § 143-215.23, *et seq.* (“Act”). The Division of Energy, Mineral and Land Resources (“DEMLR”) is a division within DEQ and all actions taken by DEMLR are necessarily actions of the Plaintiff. The Environmental Management Commission (“EMC”) is an agency of the State established pursuant to the

provisions of N.C. Gen. Stat. § 143B-282, *et seq.*

2. Defendant, Woodlake CC Corporation (hereinafter collectively known as “Defendant”) is a corporation incorporated under the laws of the State of North Carolina doing business in Moore County. National Corporate Research, Ltd. is the registered agent for Defendant in North Carolina whose office is situated at 212 South Tryon Street, Suite 1000, Charlotte, Mecklenburg County. Defendant owns Woodlake Dam located at the intersection of Lobelia Road (SR 690) and McGill Road (SR 2017) Moore County.

JURISDICTION

3. Pursuant to N.C. Gen. Stat. §§ 1-493 and 143-215.36(c), jurisdiction for injunctive relief to restrain the violation of the Act, the rules promulgated thereunder, or an order issued thereunder, for “corrective action, and for such other or further relief in the premises” rests in the Superior Court of the county in which the violation has occurred. N.C. Gen. Stat. § 143-215.36 (2016).

VENUE

4. Moore County, North Carolina is the proper venue because the violations that are the subject of this action for injunctive relief have occurred and are occurring in Moore County. N.C. Gen. Stat. § 143-215.36(c).

GENERAL ALLEGATIONS

Applicable Laws and Regulations

5. The Secretary of DEQ is authorized to institute an enforcement action for injunctive relief to restrain violation of the Act, the rules promulgated thereunder, or an order issued thereunder. N.C. Gen. Stat. § 143-215.36. The Act also authorizes the Secretary to obtain corrective action or “such other or further relief” as the Court deems proper. Id.

6. The purpose of the Act is to “provide for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of dams; to prevent injuries to persons, damage to downstream property and loss of reservoir storage; and to ensure maintenance of minimum stream flows of adequate quantity and quality below dams.” N.C. Gen. Stat. § 143-215.24.

7. If a DEMLR inspection reveals “that any dam is not sufficiently strong, is not maintained in good repair or operating condition, is dangerous to life or property, or does not satisfy minimum stream flow requirements,” the Act authorizes the EMC to “issue an order directing the owner or owners of the dam to make at his or her expense maintenance, alterations, repairs, reconstruction, change in construction or location, or removal as may be deemed necessary by the Commission within a time limited by the order, not less than 90 days from the date of issuance of each order.” N.C. Gen. Stat. § 143-215.32(b). The authority to issue such orders has been delegated by the EMC to the Director of the Division of Energy, Mineral and Land Resources of DEQ, Mr. Tracy E. Davis (“Director”). 15A N.C. Admin. Code 2K.0221.

8. In order to obtain a preliminary injunction to enforce the Act, the State is not required to show actual injury. Rather, it must show only that the violative acts or practices adversely affect the public interest. *See State ex rel. Edmisten v. Challenge, Inc.*, 54 N.C. App. 513, 284 S.E.2d 333 (1981); *State ex rel. Morgan v. Dare To Be Great, Inc.*, 15 N.C. App. 275, 189 S.E.2d 802 (1972).

Factual Allegations

9. Upon information and belief, Defendant owns Woodlake Dam (“Dam”) in Moore County, North Carolina, located approximately 2,450 feet northwest of the intersection of Lobelia Road (SR 690) and McGill Road (SR 2017) in Moore County. The Dam is

approximately twenty-three (23) feet high and has an impoundment capacity of approximately 10,000 acre-feet at the top of the Dam. According to the Moore County Register of Deeds, the deed to the properties on which the Dam is located can be found in Deed Book 4496, Page 287, identified as the Woodlake County Club, also known as the “BHF Collateral”. A copy of the deed showing Defendant’s ownership of the Dam is attached hereto and incorporated herein by reference as Exhibit A.

10. The Dam is classified as “high hazard” because failure of the Dam could pose a threat to human life and property downstream. A breach of the Dam will likely cause serious damage to downstream single-family residences at 3862 Lobelia Road and 1484, 1492, and 1494 McGill Road, as well as State Road 690 (Lobelia Road) and State Road 2017 (McGill Road). State Road 690 is a public roadway with a traffic count of approximately 4,000 vehicles per day. State Road 2017 is a public roadway with a traffic count of approximately 330 vehicles per day. **The Emergency Action Plan which was submitted by Geosyntec Consultants of NC, PC “Geosyntec” to DEMLR indicated that there are at least 551 structures, including both business and residential structures, that could potentially be inundated by a breach of the subject dam.**¹ Representative photographs depicting the Dam in its current state are attached hereto and incorporated herein by reference as Exhibit B. A copy of the Dam Safety Order (“DSO”) issued by DEMLR on November 17, 2016, is attached hereto and incorporated herein by reference as Exhibit C.

11. The Dam has a long history of regulatory enforcement actions. A Notice of Deficiency (“NOD”) was issued to the then owners as early as 1996. DEMLR conducted various

¹ N.C. Gen. Stat. § 143-215.31(a1)(6) provides that “Information included in an Emergency Action Plan that constitutes public security information, as provided in G.S. 132-1.7, shall be maintained as confidential information and shall not be subject to disclosure under the Public Records Act.” Therefore, a copy of the EAP has not been included with this complaint.

inspections at the Dam between 1997 and 2000, identifying such deficiencies as the following:

- a. Joints in the concrete spillway were deteriorating;
- b. Upstream wave erosion was damaging the front slope of the Dam;
- c. Riprap in the exit channel was washing out;
- d. 15 to 18 boils² were observed in the spillway near the joint between the sloped and horizontal section of the concrete on the downstream side;
- e. Seepage was noted coming from under the 4-inch PVC seepage drainage system.

As a result of these inspections, repair work was conducted on the Dam in 1998 and 1999 and eventually an approval to impound was issued by DEMLR on July 9, 1999, indicating that the repair work completed was in conformance with the approved plans and specifications pursuant to the Dam Safety Act. A copy of the Approval to Impound letter is attached hereto and incorporated herein by reference as Exhibit D.

12. DEMLR performed inspections at the Dam between 2000 and 2008. No NODs or DSOs were issued during this time period.

13. On February 12, 2009, an NOD was issued to the then owners, Woodlake Country Club, due to the following deficiencies identified at the Dam:

- a. Cracks in the concrete spillway;
- b. Areas of concern in the drains;
- c. Spalling³ of concrete in the spillway;
- d. The bottom drain not operating properly; and
- e. Various other maintenance related items.

A copy of the NOD is attached hereto and incorporated herein by reference as Exhibit E.

14. A repair plan for the noted deficiencies was submitted and an approval to repair the deficiencies was issued by DEMLR on January 8, 2010. However, the approval letter also noted additional deficiencies which required repair, including repair of the concrete spillway and

² A boil is a swirling turbulent upheaval of water occurring downstream of a dam. It occurs when water is flowing under the spillway structure and pushing soil material within the dam to the water surface.

³ Spalling is fragmentation or degradation of concrete where reinforcing bars are corroding from within and splitting the concrete causing areas to fall away.

replacement of the spillway walkway and lift gates. Revised design plans were submitted to DEMLR dated January 17, 2011 and DEMLR sent a follow-up revision request letter on March 10, 2011. Copies of the letters are attached hereto and incorporated herein by reference as Exhibit F.

15. DEMLR performed inspections at the Dam in February 2011 and February 2012 and, by letter, reminded the then owners of the Dam that it was still under NOD and requested a status update for anticipated repair plans. Copies of the letters are attached hereto and incorporated herein by reference as Exhibit G.

16. DEMLR issued two additional NODs on March 13, 2013 and April 22, 2014, noting the same deficiencies as those identified in the 2009 NOD as well as the following additional deficiencies:

- a. Void under spillway;
- b. Void along wing wall;
- c. Void right of center at the bottom of the spillway;
- d. Sheet piling decayed;
- e. Voids around sheet piling;
- f. Seepage noted on the downstream slope
- g. Obstruction of drop inlet; and
- h. Other maintenance items.

Copies of the NODs are attached hereto and incorporated herein by reference as Exhibit H.

17. A repair plan dated August 22, 2014 was received by DEMLR on September 5, 2014, addressing some but not all of the deficiencies in the Dam and also proposing that repairs would take place in a structured timeline, with final as-built drawings submitted by April 30, 2016. A copy of the submittal letter is attached hereto and incorporated herein by reference as Exhibit I.

18. On September 19, 2014, the then owners of the Dam, Woodlake Partners, LLC, filed a Chapter 11 petition for bankruptcy in the U.S. Bankruptcy Court for the Middle District of North Carolina. (In re: Woodlake Partner, LLC., Case No.: 14-81035 (Bankr. M.D. N.C.))

19. After DEMLR issued a revision request letter on October 6, 2014, a new repair plan was submitted on December 4, 2014. This new repair plan included a multi-phase construction approach, with repairs to be completed by May 1, 2017. A copy of the letter transmitted as part of the repair plan is attached hereto and incorporated herein by reference as Exhibit J.

20. DEMLR issued a DSO to Woodlake Partners, LLC, on December 15, 2014, requiring that within 91 days, plans and schedule for repairing or breaching the Dam be developed. A copy of the DSO is attached hereto and incorporated herein by reference as Exhibit K.

21. Repair plans were submitted to DEMLR on January 28, 2015, indicating that the bankruptcy court had approved continuation of work on Woodlake Dam. On May 15, 2015, DEMLR issued an Approval to Repair for phase 1 of the repairs to Dam. A copy of the Approval to Repair letter is attached hereto and incorporated herein by reference as Exhibit L.

22. A DSO was issued by DEMLR to the Dam's new owners after bankruptcy, identified as Defendant Woodlake CC Corp., on July 27, 2015, requiring that, within 91 days, the approved plans be initiated or plans for breaching the dam be developed. A copy of the DSO is attached hereto and incorporated herein by reference as Exhibit M.

23. Prior to repair of the Dam, on or about October 10, 2016, Hurricane Matthew struck the Moore County area. During the evening of October 10, 2016, DEMLR received notification from a nearby property owner regarding concern for the integrity of the Dam. Within

several hours of notification, DEMLR and representatives of Defendant activated the Emergency Action Plan for the Dam and determined that a large portion of the middle section of the concrete spillway had collapsed. They determined that the Dam had the potential for imminent and catastrophic failure. The water level in the reservoir was determined to be approximately 6-inches short of overtopping the Dam. Emergency measures were taken, including opening the gates of the Dam to activate the emergency spillways, and installation of large pumps, to decrease the water level in the reservoir. Subsequently, due to the failing structural integrity of the middle section of the concrete spillway, the middle gates of the Dam were closed and sand bags were placed to support closure of the middle gates by the National Guard. Based on the Dam's potential imminent failure and as part of the implementation of the EAP, inhabitants of communities downstream from the Dam were evacuated by local Emergency Management personnel. Over a period of approximately 36 hours, Defendant and DEMLR determined that the water level in the reservoir was dropping. Within approximately 72 hours from initial notification, it was determined that the emergency actions taken to reduce the water level in the reservoir had significantly reduced the potential for a catastrophic failure of the Dam. Even with this reduction, the Dam was determined to still be structurally unsound.

24. During an on-site inspection on October 12, 2016, DEMLR noted deficiencies at the Dam, including these major structural problems:

- a. The middle section of the concrete spillway on the downstream side had collapsed;
- b. Erosion under the collapsed spillway section had occurred;
- c. The seepage drainage system had been damaged;
- d. The downstream spillway walls had been overtopped and soil erosion had occurred from behind the walls; and
- e. Most of the gates were not completely functional and were damaged.

25. On October 28, 2016, Defendant's engineer, Geosyntec, submitted interim

conceptual design plans for repair to address the damage at the Dam from Hurricane Matthew. A copy of the transmittal letter is attached hereto and incorporated herein by reference as Exhibit N.

26. On November 2, 2016, DEMLR issued an approval to complete interim emergency repairs. A copy of the letter is attached hereto and incorporated herein by reference as Exhibit O.

27. On November 8, 2016, Geosyntec submitted the design package for bidding of the interim remedy to DEMLR. A copy of the letter is attached hereto and incorporated herein by reference as Exhibit P.

28. On November 17, 2016, a third DSO was issued to the Defendant. The DSO identified the following deficiencies that threatened its structural integrity:

- a. During Hurricane Matthew, a large portion of the concrete spillway system collapsed on the Dam, damaged the underdrain system, and washed out a large portion of the downstream embankment of the Dam.
- b. Boils were noted downstream of the Dam while the reservoir was draining and since the reservoir has been drained, large amounts of sand and other types of soil have been found on the downstream side of the Dam which seems to indicate that undermining of the soil under the concrete spillway has occurred.
- c. Several cracks were noted in the concrete of the principal spillway of the Dam. Areas of concern are located along the right side (as viewed facing downstream) subsurface drain outlets. All joints in the principal spillway are in need of maintenance or repair. In addition, large areas of spalling concrete are present at the entrance and outfall of the spillway.
- d. A void [in the concrete spillway] of unknown size is present at the bottom of the principal spillway. Unsuccessful attempts have been made to stabilize these voids with concrete debris deposited at the end of the spillway.
- e. Voids are present along the right side (as viewed facing downstream) wing wall as well as at the subsurface drain outlet locations.
- f. Seepage was noted at various locations on the downstream slope of the Dam.
- g. Independent Hydrologic and Hydraulic engineering modeling was completed by DEMLR staff that indicate that it is possible for the spillway to be activated during a 4.75 inch in 6-hour rain event even with the reservoir completely drained and with both bottom drains fully open. Since October 2015, there have been at least 3 storm events that have exceeded this rainfall

amount and duration in the area. Should another one of these types of storm events occur before the dam is temporarily breached, the spillway could be activated and the flow of water could continue to damage the spillway to a point that a breach of the dam could occur at or near full pool which could cause major destruction to downstream property and potential loss of life.

- h. The Dam is currently hydraulically deficient under applicable regulatory requirements and could potentially overtop during the regulatory design storm event. The Dam is capable of passing and/or storing 9.14 inches of rainfall in a 6-hour period without overtopping the Dam in a pre-hurricane condition (reservoir being at normal pool before the storm event) based on the Independent Hydrologic and Hydraulic analyses performed by DEMLR staff. The regulatory minimum spillway design storm for a large high hazard dam in Moore County is a $\frac{3}{4}$ PMP (22.9 inches of rainfall) described in 15A NCAC 2K.0205(a).

The DSO ordered Defendant that:

- a. The reservoir surface elevation shall be immediately drawn down to a maximum plan elevation of 211 feet and maintained at or below that elevation until repair, alteration, reconstruction or breaching is accomplished pursuant to plans and specifications developed by a licensed engineer and approved by Tracy E. Davis, PE, CPM, Director, Division of Energy, Mineral, and Land Resources. Any devices necessary to control erosion and prevent discharge of sediment shall be installed in the interim. Re-impoundment will also require the issuance of a Certificate of Approval to Impound after a design for a new permanent spillway has been submitted to and approved by DEMLR, said spillway has been constructed under the supervision of a North Carolina licensed professional engineer, and as-builts of said construction have been certified by a North Carolina licensed professional engineer and approved by DEMLR.
- b. Woodlake CC Corp. shall by December 5, 2016 complete final design of the interim emergency remedy or emergency plans for temporary breaching the Dam and submit such design to DEMLR in accordance with 15A NCAC 2K.0302(b), AND
- c. Woodlake CC Corp. shall by December 8, 2016 initiate the construction of the emergency remedy or emergency temporary breach in accordance with 15A NCAC 2K.0302(b) and said construction shall be completed by March 1, 2017. All construction or breach activities at the Dam shall be conducted in a manner that will preclude the washing of sediment downstream.

The DSO was delivered to Defendant's registered agent, National Corporate Research, Ltd., on November 25, 2016. A copy of the DSO has been previously submitted and is presented as Exhibit C. A copy of the certified mail receipt for the DSO is attached hereto and incorporated

herein by reference as Exhibit Q.

29. On December 6, 2016, DEMLR notified Defendant and Defendant's engineer's that plans for the final submittal of the final design of the interim emergency remedy for the Dam had not yet been submitted, as required by the November 17, 2016 DSO. A copy of the email is attached hereto and incorporated herein by reference as Exhibit R.

30. On December 9, 2016, DEMLR notified Defendant and Defendant engineer's that plans for the final submittal of the final design of the interim emergency remedy for the Dam had not yet been submitted, nor had construction begun on interim emergency remedy, as required by the November 17, 2016 DSO. A copy of the email is attached hereto and incorporated herein by reference as Exhibit S.

31. On December 20, 2016, DEMLR received notification that Geosyntec, Defendant's engineer-of-record for the Dam, had terminated their contract with the Defendant due to non-payment. A copy of the letter is attached hereto and incorporated herein by reference as Exhibit T.

32. Since December 20, 2016, DEMLR has been in communication with Defendant's representative regarding emergency repair or breaching of the Dam and compliance with the November 17, 2016 DSO. Currently, DEMLR is not aware of any plan or intention by the Defendant to perform emergency repair or breach of the Dam.

FIRST CLAIM FOR RELIEF

1. The allegations contained in Paragraphs 9 through 32 are incorporated into this claim for relief as if fully set forth herein.

2. As of the filing of this complaint, Defendants have failed to correct the violations stated in the DSO at the Dam. Defendants remain in violation of the Act and associated regulations.

3. Defendants' failure to correct the violations observed in the State's inspections and described in the Dam Safety Order constitutes continuing violations of the Act. If left uncorrected there is a substantial possibility that the Dam will fail, risking damage to life and property and endangering public safety downstream.

4. The State is entitled to preliminary and permanent injunctive relief against Defendants to abate the violations set forth in this complaint pursuant to N.C. Gen. Stat. § 143-215.36.

PRAYER FOR RELIEF

WHEREFORE, the Plaintiff, State of North Carolina, prays that the Court grant to it the following relief:

1. That this verified complaint be used as an affidavit upon which to base all orders of the Court.

2. That the Court preliminarily, and upon final judgment permanently, enter a prohibitory and/or mandatory injunction:

- a. Requiring Defendant to immediately draw down the reservoir surface elevation to a maximum plan elevation of 211 feet and maintain it at or below that elevation until repair, alteration, reconstruction or breaching is accomplished pursuant to plans and specifications developed by a licensed engineer and approved by DEMLR. Any devices necessary to control erosion and prevent discharge of sediment shall be installed in the interim. Re-

impoundment will also require the issuance of a Certificate of Approval to Impound after a design for a new permanent spillways has been submitted to and approved by DEMLR, said spillway has been constructed under the supervision of a North Carolina licensed professional engineer, and as-builts of said construction have been certified by a North Carolina licensed professional engineer and approved by DEMLR.

- b. Requiring Defendant to, within 15 days of issuance of an Order, notify DEMLR whether it will implement one of the two existing Approved Breach Plans or it shall submit a new Breach Plan for review and approval by the same date.
- c. Requiring Defendant within 20 day of issuance of an Order to begin providing DEMLR with weekly status updates to include, water elevation reports; progress on obtaining a contractor; meeting dates to include bid, preconstruction and construction meetings; and breach work status updates.
- d. Requiring Defendant to, by 60 days after issuance of an Order, initiate the construction of the interim emergency remedy or emergency temporary breach in accordance with 15A NCAC 2K.0302(b) and said construction shall be completed by 105 days after issuance of an Order and “As-Built” drawings shall be submitted to DEMLR by 135 days after issuance of an Order. All construction or breach activities at this dam shall be conducted in a manner that will preclude the washing of sediment downstream. AND
- e. Should Defendant not complete this work by the deadlines specified herein, DEMLR will execute its power under N.C. Gen. Stat. § 143-215-32.(c).

3. That the Court's order provide that the preliminary and permanent injunctions shall be enforceable by and through the contempt powers of this Court pursuant to Chapter 5A of the North Carolina General Statutes.

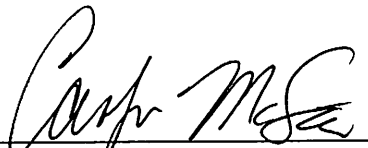
4. That this Court retain jurisdiction over this matter for such further orders as may be required to insure full compliance with the State's dam safety laws.

5. That the Defendant be taxed with the cost of this action.

6. Such other and further relief as the Court deems just and proper.

Respectfully submitted this the 27th day of January, 2017.

JOSH STEIN
Attorney General



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ATTORNEY FOR PLAINTIFF

FOR REGISTRATION REGISTER OF DEEDS

Judy D. Martin

Moore County, NC

May 29, 2015 08:04:44 AM

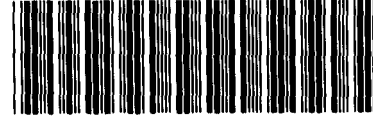
Book 4496 Page 287-295

FEE: \$26.00

INSTRUMENT # 2015006725

HM
EXHIBIT

A



INSTRUMENT # 2015006725

**NORTH CAROLINA
SPECIAL WARRANTY DEED**

Excise Tax: \$ None, Per Order

Recording Time, Book and Page

Tax Map No.

Parcel Identifier No.

Mail after recording to:

Grantee

Brian D Davis

Parker Poe

PO Box 389

This instrument was prepared by: John A. Northen, Northen Blue, LLP

Raleigh, NC 27602-0389

THIS DEED made this 1st day of May, 2015 by and between**GRANTOR: Woodlake Partners, LLC**

Mailing Address: c/o Richard M. Hutson, II, Hutson Law Office, PO Drawer 2252-A, Durham, NC 27702

GRANTEE: Woodlake CC Corp.

Mailing Address: 150 Woodlake Blvd., Vass, NC 28394

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in Little River Township, Moore County, North Carolina, and more particularly described as follows:

Being all of the real property known and generally described as Woodlake Country Club and vested in the Grantor, excluding however (i) Lot 509, Section 5, Woodlake Country Club, (ii) the Danker Collateral, (iii) the Hennings Collateral, (iv) the Violet Collateral, and (v) the Violet Alpha Collateral. See **Exhibit A**, attached and incorporated herein by reference, for legal description of property conveyed (the "BHF Collateral").

See **Exhibit B**, attached and incorporated herein by reference, for the Sale Approval Order entered by the U.S. Bankruptcy Court for the Middle District of North Carolina, pursuant to which:

1. The property described in Exhibit A is transferred and conveyed subject to (i) Moore County ad valorem taxes for 2014 and 2015, (ii) Property Owners Association dues for 2015, if applicable, and (iii) all valid and subsisting restrictions, reservations, covenants, conditions, rights of ways and easements properly of record.

2. Any and all other liens, claims or interests attached to the Property were transferred to the sale proceeds with the same priority, validity, force and effect as existed with respect to the Property immediately prior to Closing, and such claims, liens or encumbrances of record shall have no further legal force or effect, including but not limited to the following:

- a. Judgment in favor of Paul Davis and Agnes Gioconda, filed September 12, 2012 in Case No. 11 CVS 1290, Superior Court of Moore County, N.C.
- b. Deed of Trust in favor of BHF Bank, filed June 4, 2001 at Book 1768, Page 495, as modified by Modification Deed of Trust filed January 30, 2007 at Book 3169, Page 407, Moore County Registry.
- c. Deed of Trust in favor of M.M. Warburg & Co., filed March 18, 2005 at Book 2760, Page 51, Moore County Registry.
- d. Deed of Trust in favor of Mel Danker and Jacqueline Danker, filed November 16, 1998 at Book 1444, Page 210, Moore County Registry.
- e. Deed of Trust in favor of Grover F. Hennings, et al, filed August 31, 2005 at Book 2880, Page 69, Moore County Registry.
- f. Deed of Trust in favor of First Bank, filed October 24, 1996 at Book 1216, Page 276, amended by Substitution of Collateral filed February 6, 2004 at Book 2490, Page 274, Moore County Registry.
- g. Deed of Trust in favor of First Bank, filed October 12, 2007 at Book 3314, Page 64, Moore County Registry.
- h. Notice of Claim of Lien for Unpaid Association Dues filed April 18, 2012 at File 12/132, Clerk of Superior Court, Moore County, N.C.
- i. Judgment in favor of Palmer Course Design Company, filed July 1, 2013 in Case No. 13 CVS 758, Superior Court of Moore County, N.C.

3. Pursuant to the Confirmed Plan no revenue stamps or transfer tax shall be assessed or imposed on this sale or the deed conveying the Property to the Purchaser.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor has done nothing to impair such title as Grantor received, and that Grantor will warrant and defend the title against the lawful claims of all persons claiming by, under or through Grantor, except for the exceptions herein stated.

IN WITNESS WHEREOF, the Grantor has caused this Deed to be executed by its duly authorized officer, the day and year first above written.

Woodlake Partners, LLC

By: Richard M. Hutson II (SEAL)
Richard M. Hutson, II
Chief Restructuring Officer

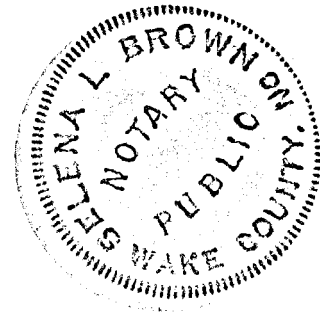
NORTH CAROLINA Durham COUNTY

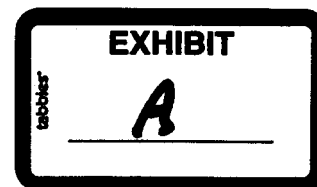
I, certify that the following person personally appeared before me this day, each acknowledging to me that he voluntarily signed the foregoing document for the purpose stated therein and in the capacity indicated: Richard M. Hutson, II, Chief Restructuring Officer for Woodlake Partners, LLC, Grantor. Witness my hand and official stamp or seal, this 29 day April, 2015.

My Commission Expires: 10/24/18

Selena L Brown
Notary Public

Print Notary Name: Selena L. Brown





All properties described in the following conveyances:

Deed Book 474 Page 900; Deed Book 482 Page 36 (as potentially corrected by Deed Book 525 Page 437); Deed Book 536 Page 162; Deed Book 541 Page 273; Deed Book 544 Page 780; Deed Book 551 Page 558; Deed Book 590 Page 239; Book 627 Page 606; Book 657 Page 451; Book 1030 Page 232, Book 1031 Page 295; Book 1059 Page 171; Book 1082 Page 36; Book 1087 Page 531; Book 1131 Page 193; Book 1313 Page 189; Book 1349 Page 303; Book 1437 Page 431; and Book 1523 Page 78; the descriptions of which (including exceptions) are incorporated herein by reference (the "Property").

TOGETHER WITH any property rights and benefits acquired by or reserved in any recorded document conveyed to or executed by Woodlake Partners, LLC, (or by its predecessor prior to conversion, Woodlake Partners, Limited Partnership) in relation to the Property, inclusive of easements, use of all private streets and other rights of way, and further including, but not limited to any reserved rights under recorded Restrictions applicable to the property herein conveyed, or any Assignment related thereto (collectively the "Property Rights").

EXCEPTING, HOWEVER, from the above descriptions, any tracts, parcels or lots subsequently conveyed from any of the parcels described in the above conveyances and not subsequently re-acquired (or if re-acquired, then subsequently conveyed and not re-acquired again) prior to the filing of the bankruptcy of Grantor.

FURTHER EXCEPTING, the following described specific properties:

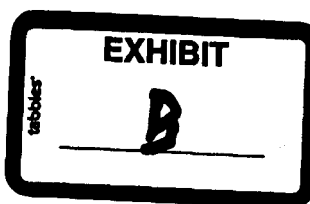
Unit 244, Shore Villas, Phase 1, Woodlake Country Club, as recorded in the Office of the Register of Deeds in Plat Cabinet 2 Slide 166.

Lot 509, Section Five, Woodlake Country Club, as recorded in the Office of the Register of Deeds in Plat Cabinet 1 Slide 47-B.

Lots 41 and 42, Section Seven, Woodlake Country Club as recorded in the Office of the Register of Deeds in Plat Cabinet Slide 106

SO ORDERED.

SIGNED this 9th day of April, 2015.



Lena Mansori James
 LENA MANSORI JAMES
 UNITED STATES BANKRUPTCY JUDGE

UNITED STATES BANKRUPTCY COURT
 FOR THE MIDDLE DISTRICT OF NORTH CAROLINA
 DURHAM DIVISION

IN RE: WOODLAKE PARTNERS, LLC, DEBTOR	CASE NO. 14 - 81035 CHAPTER 11
SALE APPROVAL ORDER [BHF COLLATERAL]	

The matter came before the Court for hearing on March 31, 2015, to consider approval of the public sale of certain property by Woodlake Partners, LLC (the "Debtor") conducted on March 26, 2015, pursuant to the Order confirming the Plan of Liquidation, the Plan and the Bidding Procedures.

The Debtor has filed a Report of Sale indicating that upon conclusion of the auction, the following bid (the "High Bid") was made by Steiner & Company (the "High Bidder") for the BHF Collateral (the "Property") and the Debtor has requested approval thereof:

1. BHF Collateral:
 - a. High Bidder: Steiner & Company
 - b. High Bid \$500,000
 - c. Buyer's Premium \$40,000
 - d. Total Purchase Price \$540,000
 - e. Deposit \$54,000
 - f. Back-up Bidder: None
 - g. Designee: to be determined

Based upon the evidence presented and the comments of parties wishing to be heard, no objections to the public sale having been filed or raised at the hearing, and for good and sufficient reasons the Court makes the following findings, conclusions and Orders:

1. On September 19, 2014 (the “Petition Date”), the Debtor filed a voluntary petition seeking relief under Chapter 11 of the Bankruptcy Code and an Order for relief was entered. On September 25, 2014, the Court entered an Order (Dkt. No. 29) authorizing the employment and appointment of Richard M Hutson, II as the Chief Restructuring Officer.

2. On March 19, 2015, this Court entered its Order Approving Disclosure Statement and Confirming Plan of Liquidation [Docket No. 170, the “Confirmation Order”], confirming the Debtor's Plan of Liquidation (the “Confirmed Plan”). The Debtor filed a certificate of service on March 23, 2015, confirming service of the Confirmation Order on all creditors and other parties in interest. No appeal has been filed with respect to the Confirmation Order, and time to file such an appeal has expired.

3. This Court has jurisdiction over this matter pursuant to 28 U.S.C. §§ 157 and 1334, and this matter is a core proceeding under 28 U.S.C. § 157(b)(2). Venue is proper pursuant to 28 U.S.C. §§ 1408 and 1409.

4. Consistent with the Confirmed Plan, the Property was sold and shall be transferred and conveyed free and clear of any and all liens pursuant to §363(f) of the Bankruptcy Code, with any such liens attaching to the net sale proceeds; provided however, the Property shall be transferred and conveyed subject to (i) Moore County ad valorem taxes for 2014 and 2015, and (ii) Property Owners Association dues for 2015, if applicable.

5. All parties in interest received adequate notice of the Confirmation Order, the Confirmed Plan and the public auction, the Property was adequately marketed, the public sale was attended by potential bidders, and the public sale was conducted in accordance with the approved Bidding Procedures.

6. The Debtor received no other offers which would generate an equal or greater value for the estate, and the Debtor believes that the proposed sale is in the best interest of the Debtor, creditors and the bankruptcy estate.

7. The sale of the Property is for fair and adequate consideration, consistent with the Confirmed Plan and in the best interest of the estate. Further, the Court finds that the High Bidder is a “good faith purchaser” entitled to the protections of § 363(m).

Based on the foregoing, it is hereby ORDERED as follows:

1. The Debtor is authorized to sell, transfer and convey the Property to the High Bidder or its designee (the “Purchaser”) in accordance with the Confirmation Order and the Confirmed Plan.

2. The Purchaser is hereby granted and is entitled to the protections of a good faith purchaser under section 363(m) of the Bankruptcy Code.

3. Pursuant to the Confirmed Plan no revenue stamps or transfer tax shall be assessed or imposed on this sale or the deed conveying the Property to the Purchaser.

4. The Property shall be transferred and conveyed subject to (i) Moore County ad valorem taxes for 2014 and 2015, and (ii) Property Owners Association dues for 2015, if applicable. Any and all other liens, claims or interests attached to the Property are hereby transferred to the sale proceeds with the same priority, validity, force and effect as existed with respect to the Property immediately prior to Closing, and such claims, liens or encumbrances of record shall have no further legal force or effect, including but not limited to the following:

- a. Judgment in favor of Paul Davis and Agnes Gioconda, filed September 12, 2012 in Case No. 11 CVS 1290, Superior Court of Moore County, N.C.
- b. Deed of Trust in favor of BHF Bank, filed June 4, 2001 at Book 1768, Page 495, as modified by Modification Deed of Trust filed January 30, 2007 at Book 3169, Page 407, Moore County Registry.
- c. Deed of Trust in favor of M.M. Warburg & Co., filed March 18, 2005 at Book 2760, Page 51, Moore County Registry.
- d. Deed of Trust in favor of Mel Danker and Jacqueline Danker, filed November 16, 1998 at Book 1444, Page 210, Moore County Registry.
- e. Deed of Trust in favor of Grover F. Hennings, et al, filed August 31, 2005 at Book 2880, Page 69, Moore County Registry.
- f. Deed of Trust in favor of First Bank, filed October 24, 1996 at Book 1216, Page 276, amended by Substitution of Collateral filed February 6, 2004 at Book 2490, Page 274, Moore County Registry.
- g. Deed of Trust in favor of First Bank, filed October 12, 2007 at Book 3314, Page 64, Moore County Registry.
- h. Notice of Claim of Lien for Unpaid Association Dues filed April 18, 2012 at File 12/132, Clerk of Superior Court, Moore County, N.C.
- i. Judgment in favor of Palmer Course Design Company, filed July 1, 2013 in Case No. 13 CVS 758, Superior Court of Moore County, N.C.

5. The Debtor is authorized to collect from the Purchaser the Total Purchase Price, and from such sale proceeds to pay at closing in accordance with the Confirmed Plan (i) any ordinary and customary closing costs, including the Buyer's Premium to Hilco Real Estate, (ii) the costs of marketing and sale incurred by the estate, (iii) the post-petition financing indebtedness provided by Steiner & Company, which may be credited against the cash due at closing, (iv) costs of administration allowed pursuant to the Confirmed Plan and other Orders of the Court, and (v) all remaining funds shall be payable to the holder of the secured claim evidenced by the existing first mortgage.

6. This Order shall become effective immediately, as permitted by Rule 6004(h).

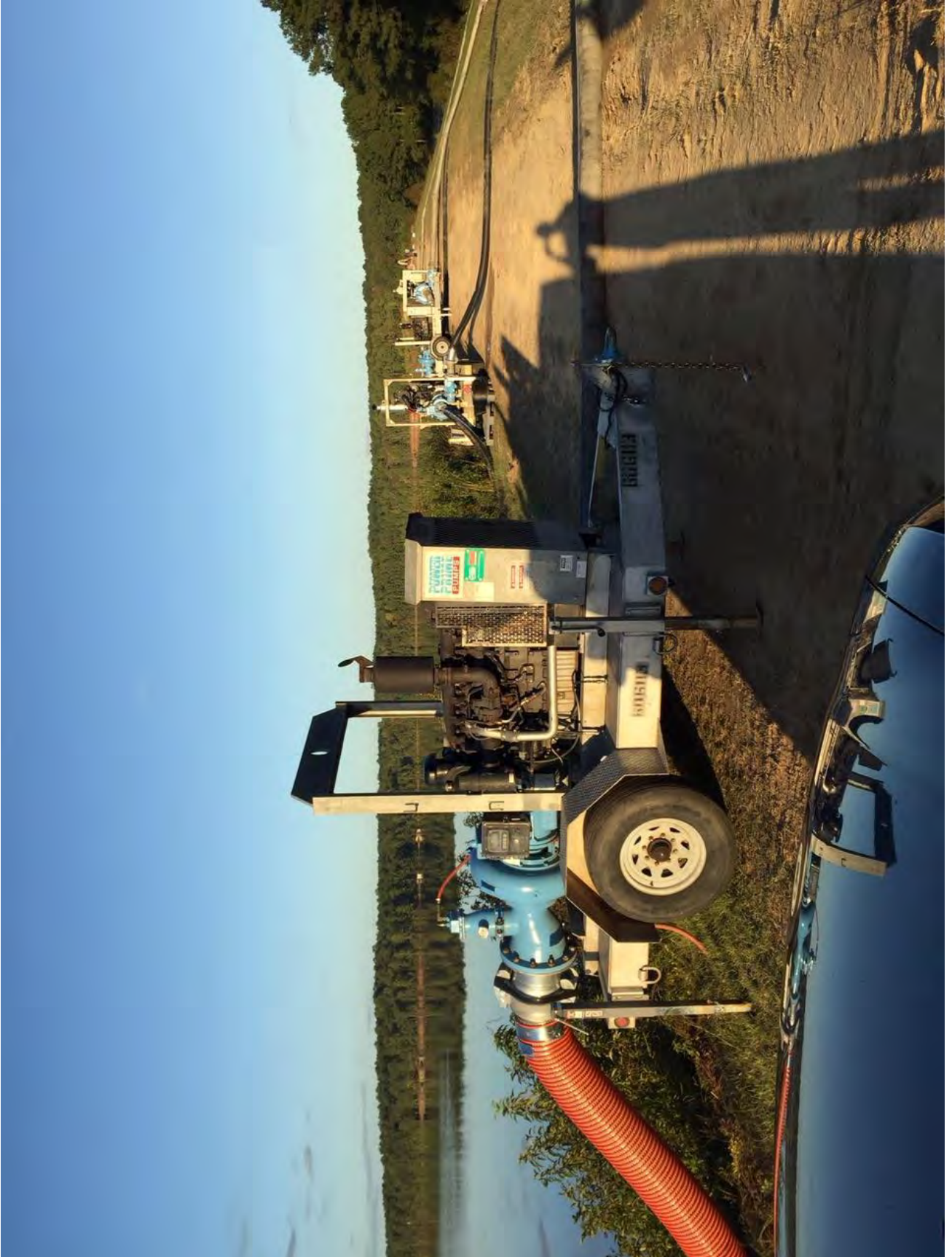
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Service List:

<p>William P. Miller Bankruptcy Administrator PO Box 1828 Greensboro, NC 27402</p>	<p>P. Wayne Robbins Robbins May & Rich, LLP Obo Paul Davis and Agnes Gioconda 120 Applecross Road Pinehurst, NC 28374</p>
<p>Caren D. Enloe Smith Debnam Drake Saintsing & Myers LLP Obo Agricredit Acceptance LLC P O Box 26268 Raleigh, NC 27611</p>	<p>Richard M. Hutson, II Chief Restructuring Officer PO Drawer 2252-A Durham, NC 27702</p>
<p>Richard D. Sparkman Richard D. Sparkman & Assoc Obo Woodlake Property Owners Association P O Box 1687 Angier, NC 27501</p>	<p>James M. Hash Obo Gabriele Boex and Lilian Schulz Everett Gaskins Hancock, LLP P O Box 911 Raleigh, NC 27602</p>
<p>Mark A. Pinkston/Robert A. Mays Van Winkle Buck Wall Starnes and Davis, PA Obo Violet Portfolio, LLC and Violet Portfolio Alpha, LLC P O Box 7376 Asheville, NC 28802</p>	<p>John A. Northen Counsel for the Debtor Northen Blue, LLP PO Box 2208 Chapel Hill, NC 27515</p>













PAT MCCRORY
Governor



DONALD R. VAN DER VAART
Secretary

TRACY DAVIS
Director

November 17, 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Dam Safety Order 16-02
Woodlake Dam
Moore County
State Dam ID: MOORE-040
Cape Fear River Basin

Dear Sir or Madam:

Attached is an order, issued under the authority of the North Carolina Dam Safety Law of 1967, requiring that by December 5, 2016, the final submittal of the final design of the interim emergency remedy for the subject dam located on Crane Creek in Moore County be developed by a North Carolina registered professional engineer and submitted to the Director of the Division of Energy, Mineral, and Land Resources. In addition, construction of the interim emergency remedy must be initiated by December 8, 2016 and completed by March 1, 2017 or temporary breach of the subject dam must be initiated by December 8, 2016 and completed by December 31, 2016. Lastly, a complete design for permanent replacement of the failed spillway must be developed by a North Carolina registered professional engineer and submitted to the Director of the Division of Energy, Mineral, and Land Resources within 91 days of issuance of this order. A copy of the North Carolina Dam Safety Law of 1967 is enclosed for your information.

If you wish to contest this Dam Safety Order, you must request a contested case hearing within 10 days after receiving this notice. This request must be in the form of a written petition that conforms to the requirements set forth in North Carolina General Statute (NCGS) 150B-23. The original petition and one copy must be filed as follows:

Woodlake CC Corp.
November 17, 2016
Page Two

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, North Carolina 27699

Any questions about filing a petition may be directed to the Clerk of the Office of Administrative Hearings by telephone at (919) 431-3000.

A copy of the petition must also be served on the Department as follows:

Mr. Sam M. Hayes, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

Please note that failure to comply with this Dam Safety Order may result in:

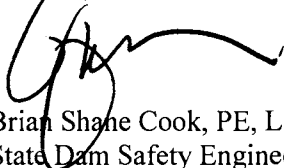
1. The assessment of a civil penalty of not less than \$100.00 nor more than \$500.00 for each day of violation. This penalty will begin to run from the deadline established in the Dam Safety Order; and/or
2. A request to the Attorney General's Office for injunctive relief.

If you have any questions, please contact me in writing or by telephone at:

Mr. Brian Shane Cook, PE, LSIT
State Dam Safety Engineer
1612 Mail Service Center
Raleigh, North Carolina 27699-1612
Telephone: (919) 707-9217

We would appreciate your calling us as soon as you receive this notice so that we can be aware of your plans and schedule.

Sincerely,


m Brian Shane Cook, PE, LSIT
State Dam Safety Engineer
Land Quality Section

Enclosure

cc: Mr. Njoroge Wainaina, PE, Geosyntec Consultants of NC, PC
Mr. Beau Hodge, PE, Geosyntec Consultants of NC, PC
Mr. Nick Mills, DEMLR Environmental Specialist – FRO
Surface Water Protection Regional Supervisor
Mr. Scot Brooks, CEM, Emergency Manager – Moore County
Ms. Julie Watson, Owner's Representative

DAM SAFETY ORDER

FINDINGS AND ORDER OF THE DIRECTOR DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Woodlake Dam
Moore County
MOORE-040
Cape Fear River Basin

Order No.: DSO 16-02

Pursuant to the authority contained in North Carolina General Statute (NCGS) 143-215.32 as delegated to the Director in the North Carolina Administrative Code, Title 15A, Subchapter 2K, Section .0302 (15A NCAC 2K.0302), I find the following:

1. Woodlake CC Corp. owns a dam on Crane Creek in Moore County. The dam is located approximately 2,450 feet northwest of the intersection of Lobelia Road (SR 690) and McGill Road (SR 2017).
2. The dam is approximately 23 feet in height and has an impoundment capacity of approximately 10,000 acre-feet at the top of the dam elevation.
3. The dam has the following deficiencies that threaten its integrity:
 - A. During Hurricane Matthew, a large portion of the concrete spillway system collapsed on the dam, damaged the underdrain system, and washed out a large portion of the downstream embankment of the dam.
 - B. Boils were noted downstream of the dam while the reservoir was draining and since the reservoir has been drained, large amounts of sand and other types of soil have been found on the downstream side of the dam which seems to indicate that undermining of the soil under the concrete spillway has occurred.
 - C. Several cracks were noted in the concrete of the principal spillway of the dam. Areas of concern are located along the right side (as viewed facing downstream) subsurface drain outlets. All joints in the principal spillway are in need of maintenance or repair. In addition, large areas of spalling concrete are present at the entrance and outfall of the spillway.
 - D. A void of unknown size is present at the bottom of the principal spillway. Unsuccessful attempts have been made to stabilize these voids with concrete debris deposited at the end of the spillway.

- E. Voids are present along the right side (as viewed facing downstream) wing wall as well as at the subsurface drain outlet locations.
 - F. Seepage was noted at various locations on the downstream slope of the dam.
 - G. Independent Hydrologic and Hydraulic engineering modeling was completed by DEMLR staff that indicate that it is possible for the spillway to be activated during a 4.75 inch in 6-hour rain event even with the reservoir completely drained and with both bottom drains fully open. Since October 2015, there have been at least 3 storm events that have exceeded this rainfall amount and duration in this area. Should another one of these type of storm events occur before the dam is temporarily breached, the spillway could be activated and the flow of water could continue to damage the spillway to a point that a breach of the dam could occur at or near full pool which could cause major destruction to downstream property and potential loss of life.
 - H. This dam is currently hydraulically deficient under applicable regulatory requirements and could potentially overtop during the regulatory design storm event. This structure is capable of passing and/or storing 9.14 inches of rainfall in a six-hour period without overtopping the dam in a pre-hurricane condition (reservoir being at normal pool before the storm event) based on the independent H&H analyses performed by DEMLR staff. The regulatory minimum spillway design storm for a large high hazard dam in Moore County is a $\frac{3}{4}$ PMP (22.9 inches of rainfall) described in 15A NCAC 2K.0205(a).
4. The dam is classified in the high hazard category because failure of the dam poses a threat to human life and property downstream from the dam that includes but not limited to downstream single-family residences at 3862 Lobelia Road and 1484, 1492, and 1494 McGill Road, as well as State Road 690 (Lobelia Road) and State Road 2017 (McGill Road). State Road 690 is a public roadway with a traffic count of approximately 4,000 vehicles per day (AADT). State Road 2017 is a public roadway with a traffic count of approximately 330 vehicles per day (AADT). The Emergency Action Plan that was submitted by Geosyntec Consultants of NC, PC on September 12, 2016 indicates that there are at least 551 structures that could potentially be inundated by a breach of the subject dam.
 5. A Certificate of Approval to Repair for the subject dam was issued on May 15, 2015 to Woodlake CC Corp and was received by Woodlake CC Corp. on May 26, 2015. As part of that approval, Woodlake CC Corp. was notified that adherence to the approved construction schedule and impoundment drawdown elevation would be required to avoid further enforcement action by this Division. To date, no substantial site work has been performed to implement the approved repair plans. 15A NCAC 2K.0202(b) states that the Certificate of Approval period shall be valid for the construction schedule specified in the approved final design report. In any event, construction must commence within one year after the certificate is issued. 15A NCAC 2K.0202(d) states that if construction does not commence within one year after the certificate of approval is issued, the certificate shall expire and a new application shall be submitted. As this work did not commence within the period allowed by rule, the prior Certificate of Approval to Repair has expired and is no longer valid, thus, a new course of action must be taken to improve the current situation.
 6. Since the repair plans were approved, Hurricane Matthew has caused further damage to the spillway system and, thus, there is an immediate need to temporarily breach the dam or implement an interim emergency remedy to protect the public and property downstream of the structure.
 7. As an elevation reference datum, the elevation at the top of the spillway gates is plan elevation 224.5 according to the repair plans approved by this Division by letter dated May 15, 2015.

Therefore, by the authority of NCGS 143-215.32(b) and 15A NCAC 2K.0302, it is hereby Ordered that:

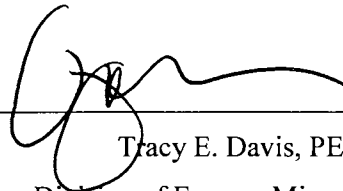
1. The reservoir surface elevation shall be immediately drawn down to a maximum plan elevation of 211 feet and maintained at or below that elevation until repair, alteration, reconstruction, or breaching is accomplished pursuant to plans and specifications developed by a licensed engineer and approved by Tracy E. Davis, PE, CPM, Director, Division of Energy, Mineral, and Land Resources. Any devices necessary to control erosion and prevent discharge of sediment shall be installed in the interim. Re-impoundment will also require the issuance of a Certificate of Approval to Impound after a design for a new permanent spillway has been submitted to and approved by DEMLR, said spillway has been constructed under the supervision of a North Carolina licensed professional engineer, and as-builts of said construction have been certified by a North Carolina licensed professional engineer and approved by DEMLR.
- 2.a. Woodlake CC Corp. shall by December 5, 2016 complete final design of the interim emergency remedy or emergency plans for temporary breaching the subject dam and submit such design to the Division of Energy, Mineral, and Land Resources in accordance with 15A NCAC 2K.0302(b).;

and

- 2.b. Woodlake CC Corp. shall by December 8, 2016 initiate the construction of the interim emergency remedy or emergency temporary breach in accordance with 15A NCAC 2K.0302(b) and said construction shall be completed by March 1, 2017. All construction or breach activities at this dam shall be conducted in a manner that will preclude the washing of sediment downstream.

11/17/2016

Date



Tracy E. Davis, PE, CPM

Director, Division of Energy, Mineral, and Land Resources

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF LAND RESOURCES



JAMES B. HUNT JR.
GOVERNOR

WAYNE McDEVITT
SECRETARY

CHARLES H. GARDNER
P.G., P.E. DIRECTOR
AND STATE GEOLOGIST

July 9, 1999

EXHIBIT

D

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

AUG 10 1999

LAND QUALITY SECTION
FAYETTEVILLE REGIONAL OFFICE

Woodlake Partners, Limited Partnership
150 Woodlake Boulevard
Vass, North Carolina 28394

Attention: Mr. Martin W. Schroering
Chief Executive Officer

RE: Approval to Impound
Woodlake Dam
Moore County
MOORE-040
Cape Fear River Basin

Dear Mr. Schroering:

This concerns the subject dam recently repaired on Crain's Creek in Moore County pursuant to issuance of an Approval to Repair on May 7, 1999 as required by the Dam Safety Law of 1967. "As-built" plans and the engineer's certification were received on June 21, 1999. The dam was certified by Mr. F. Sean McGrath, P. E. with S&ME, Inc.

An inspection of this dam was made by Land Quality Section staff of the Fayetteville Regional Office and Raleigh Central Office on July 1, 1999. The dam was found to be in general conformance with the approved plans and specifications, and you may impound water subject to the following stipulation:

The items listed in a memorandum dated July 9, 1999 shall be addressed within 30 days of receipt and prior to allowing water to discharge over the spillway. A copy of the memorandum dated July 9, 1999 is enclosed herewith. Following completion of the items listed in the memorandum, it is requested that this office be contacted so that a follow-up inspection can be performed.

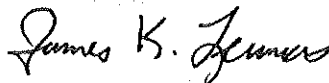
LAND QUALITY SECTION (919) 733-4574 FAX (919) 733-2876
GEOLOGICAL SURVEY SECTION (919) 733-2423 FAX (919) 733-0900

P.O. BOX 27687, RALEIGH, NORTH CAROLINA 27611-7687 TELEPHONE (919) 733-3833 FAX (919) 715-8801
AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER - 50% RECYCLED/10% POST-CONSUMER PAPER

Mr. Martin W. Schroering
July 9, 1999
Page Two

The Land Quality Section staff will make periodic inspections of this dam to assure that the dam is being maintained in good operating condition. These inspections, however, will be relatively infrequent. It is advised that you closely inspect and monitor your dam, and that you notify your engineer and the Division of Land Resources if you see or suspect any problems concerning its safety.

Sincerely,



James K. Leumas, P. E.
State Dam Safety Engineer
Land Quality Section

JKL/

Enclosure

cc: ~~Mr. William E. Vinson, Jr., E.I.T.~~
Mr. F. Sean McGrath, P. E.
Mr. Robert Fowler

North Carolina
Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

James D. Simmons, P.G., P.E.
Director and State Geologist



Division of Land Resources

12 February 2009

NOTICE OF DEFICIENCY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
RECEIPT#: 7001 2510 0006 9499 2500

Woodlake Country Club
ATTN: Julie Watson
150 Woodland Blvd
Vass, NC 28394

RE: Woodlake Dam
Moore-040
Moore, N.C.

Dear Ms. Watson:

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

A visual inspection of the subject dam located off Hwy 690 was conducted on 11 February 2009, by staff of the Land Quality Section.

During this inspection the following conditions were noted:

1. Several cracks were noted in the concrete of principle spillway of the dam. Areas of concern are located along the two trench drains, the right spilling basin drain, and the subsurface drain outlets. In addition, spalling of concrete is occurring in large areas at the entrance of the spillway.

2. The bottom drain located to the right of the principle spillway, when looking downstream, appears to be inoperable and needs repair.

These conditions appear serious and justify further engineering study to determine appropriate remedial actions. During this inspection we also investigated the potential for property damage and loss of life in the event that your dam fails. This investigation determined that failure of your dam could result in severe property damage and/or possible loss of life downstream. Therefore, we are listing your dam in the High Hazard category.

In addition to the above, the following remedial actions, not requiring design or approval, should be completed:

1. Maintain a ground cover sufficient to restrain accelerated erosion on all earthen portions of the structure.
2. Periodically remove trees less than about six inches in diameter and thick undergrowth from the slopes and crest of the dam. This will serve to (A) prevent the formation of a root system which might significantly increase seepage through the dam which could ultimately result in failure of the structure, (B) reduce the possibility of damage to the dam due to the uprooting of trees by wind or other natural causes, and (C) facilitate ease of inspection and increase the likelihood of early detection of more serious problems connected with the dam.
3. Periodically remove all trees and vegetation from the emergency spillway. This will reduce the possibility of its capacity being reduced by the entrapment of debris, should it become active.
4. Periodically check the operation of all drain valve facilities. This will insure satisfactory operation of the drains should an emergency situation arise.
5. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.

In order to insure the safety of this dam, you are directed to retain the services of a registered professional engineer or an experienced engineering firm to make a study of the conditions outlined in this letter. Plans and specifications for repair based on the results of the study must be filed with the Division for approval pursuant to Title 15A, Subchapter 2K, of the North Carolina Administrative Code.

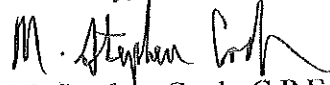
Please advise this Office of your intended action in this matter. If positive action is not taken on or before 1 June 2009 your case will be referred for appropriate enforcement action. Enforcement could

Page.3
Ms. Watson

include a civil penalty of up to \$500.00 per day of violation, and/or issuance of a Dam Safety Order requiring the repair or removal of this dam, and/or injunctive relief to gain compliance.

Should you have any questions, please contact me at (910) 433-3300.

Sincerely,



M. Stephen Cook, C.P.E.S.C.
Regional Engineer
Land Quality Section

MSC\joh

cc: State Dam Safety Engineer



North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

James D. Simons, PG, PE
Director and State Geologist

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

January 8, 2010

Woodlake Partners Limited Partnership
c/o Mr. Gregory Dean Blevins, Woodlake Dam Operator
150 Woodlake Boulevard
Vass, North Carolina 28394

RE: Woodlake Dam
Moore County
MOORE-040 H
Cape Fear River Basin

Dear Mr. Blevins:

A review has been made of the project status report, dated October 19, 2009 received by this office on October 22, 2009 for the referenced dam. We concur with the phased recommendations outlined in this report by Mr. B. Dan Marks, PhD, PE, based upon a Notice of Deficiency dated February 12, 2009.

In accordance with my letter of October 22, 2009, the items listed below may be performed as maintenance. Further submission of plans or specifications for this work will not be required. The work may proceed as proposed.

1. Replacement or repair of the wooden access bridge to the original bottom drain intake structure.
2. Removal of woody vegetative growth on the upstream embankment slope. Once the vegetation is removed, the riprap wave protection must be repaired and maintained.

The following proposed work must be designed by a North Carolina professional engineer. The engineer must submit plans, specifications and design data, and secure approval prior to beginning construction activities:

1. As noted in the report, "the concrete spillway structure is in need of significant remediation to upgrade the performance and integrity of the structure."
2. Replacement of spillway walkway and gate lifting mechanisms. The gates must remain operable during this process. Operation of the gates prior to and during significant storm events approaching the spillway design storm is critical to safe operations and performance of the dam.

Mr. Gregory Dean Blevins
Woodlake Dam
January 8, 2010
Page 2 of 2

Before beginning repair work on the referenced dam, 2 sets of plans and specifications for repair work to the spillway must be filed with the Division of Land Resources for approval pursuant to Title 15A, Subchapter 2K of the North Carolina Administrative Code. Each phase of the repair work may be submitted separately for approval pursuant to a proposed time line for each phase of work.

Additional improvements noted in a report dated June 18, 1999 by S&ME, Inc. were recommended to be "completed in the next phase of repairs." These repairs included:

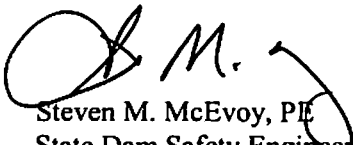
1. Repair of deteriorated concrete in vicinity of sluice gates.
2. Fill in depression approximately 40 feet left of chute.
3. Repair damaged concrete by protecting and/or replacing slab surface.
4. Repair sluice gates, i.e. deteriorated metal and gaskets.

Final Approval of the repairs made in 1999 was contingent upon these additional items being completed "in the near future." At this time, repair plans for all items pertinent to the safe operation of this dam must be included in the submittal for approval. These items were confirmed during an inspection by Land Quality staff on January 6, 2010.

Also, there is no record that the Woodlake Dam has an Operation and Maintenance Plan (OMP) or an Emergency Action Plan (EAP) on file with this office. These items were included as stipulations of the Approval to Repair dated August 17, 1988. The OMP & EAP are pertinent to the safe operation of this dam and will be required to be submitted prior to final approval of any necessary repairs at this time. Without proper operation of all ten gates, the spillway systems combined do not meet minimum criteria for the required spillway design storm, and may overtop the dam.

Please contact Mr. Steve Cook, Regional Engineer; at telephone number (910) 433-3300 or me at telephone number (919) 733-4574 should you have any questions concerning this matter. We look forward to receiving final design documents from you.

Sincerely,



Steven M. McEvoy, PE
State Dam Safety Engineer
Land Quality Section

cc: Mr. Steve Cook, Land Quality Regional Engineer
Mr. B. Dan Marks, PhD, PE
DWQ Regional Supervisor

File Name: MOORE-040_20100108_PDR_Woodlake Dam

MARKS ENTERPRISES of NC, PLLC

One Palatka Street - Arden, NC 28704

Tel: 828-231-7424 Fax: 828-681-8909

January 17, 2011

NC Department of Environment and Natural Resources
Division of Land Resources, Land Quality Section
512 North Salisbury Street (Archdale Building)
Raleigh, North Carolina 27606



Attention: Mr. Steve McEvoy, P.E.
NC State Dam Safety Engineer

Reference: **DAM REMEDIATION DESIGN SUBMITTAL**
Woodlake Dam Phase I Spillway Remediation
Vass, Moore County, North Carolina
Marks Enterprises Project No. ME-09-007

Dear Mr. McEvoy:

Submitted herewith are two copies of the dam remediation documents for Woodlake Dam at the Woodlake Resort and Golf Club in Moore County near Vass, North Carolina. Each set of documents consists of the Dam Remediation Design Report and the Phase I Construction Plans and Specification for the project. One set of the dam remediation documents has been sent directly to Mr. Steve Cooke, Director of the Fayetteville Regional Office (FRO). The owner(s) of Woodlake Dam and Marks Enterprises of NC, PLLC (Marks Enterprises) appreciate your assistance and cooperation throughout this project. Please contact us if there are questions concerning this submittal.

Respectfully,

Marks Enterprises of NC, PLLC

A large, stylized handwritten signature in black ink, appearing to read "B. Dan Marks".

B. Dan Marks, Ph.D., P.E.
Owner/Manager/Consultant
NC Registration No. 009631

cc: Mr. Steve Cook, Director of the FRO, DENR
Mr. Greg Blevins, Lake Resource Manager

BDM/dm

DAM REMEDIATION DESIGN REPORT

**WOODLAKE DAM PHASE I SPILLWAY
REMEDICATION PROJECT
NCID No. MOORE – 040
VASS, MOORE COUNTY, NORTH CAROLINA**

Prepared For:

**Woodlake Partners Limited Partnership
150 Woodlake Boulevard
Vass, North Carolina 28394
(910) 245-4091**

Prepared By:

**Marks Enterprises of NC, PLLC
1 Palatka Street
Arden, North Carolina 28704
(828) 231-7424**

January 17, 2011

MARKS ENTERPRISES of NC, PLLC

One Palatka Street - Arden, NC 28704

Tel: 828-231-7424 Fax: 828-681-8909

**DAM REMEDIATION DESIGN REPORT
Phase I - Woodlake Dam Spillway Remediation
North Carolina Identification Number Moore-040
Woodlake Resort and Golf Club
Vass, Moore County, North Carolina**



INTRODUCTION

Woodlake (formerly named Lake Surf) is the central amenity to the Woodlake Resort and Golf Club in Moore County near Vass, North Carolina. The lake has a surface area of approximately 1000 acres at the normal maximum pool elevation. As such, Woodlake is the largest privately-owned lake in North Carolina relative to surface area. Although Woodlake is large in surface area the lake is relatively shallow and the impounding dam does not have a significant structural height. Woodlake Dam is classified as a high-hazard dam according to current criteria and regulations associated with the North Carolina Dam Safety Act.

The primary spillway of Woodlake Dam is a large over-flow reinforced concrete chute spillway located at approximately the mid-length of the earthen embankment of the dam. This spillway structure was the subject of a major dam remediation project in the late 1980's as a result of severe and extensive internal erosion of the subgrade of spillway slabs that had unprotected joint seals and no intercepting subdrainage system to collect and properly discharge infiltrating spillway discharge. The remediation design consisted of an extensive pressure injection grouting program and the installation of multiple subdrainage systems designed to filter, collect, and discharge water infiltrating the unprotected concrete slab joints.

Although the reinforced concrete slabs of the spillway structure exhibited significant joint separations and vertical displacement at the time of the previous major remediation project the dam owner(s) decided to postpone extensive spillway slab remediation at that time. The author of this report (also the engineer-of-record for the referenced previous spillway remediation project) advised the dam owner(s) that extensive structural remediation of the spillway structure would likely be required within a 20 – 25 year time period as a result of continuing spillway concrete deterioration. Furthermore, he advised that the future spillway remediation would likely require reconstruction of the concrete spillway slabs.

PROJECT BACKGROUND INFORMATION

The North Carolina Department of Environment and Natural Resources (DENR) issued a **NOTICE OF DEFICIENCY** for Woodlake Dam on February 12, 2009 citing dam safety concerns associated with the structural integrity of the reinforced concrete spillway structure and the inoperable condition of one of the bottom drain valves. A copy of this document is included in Appendix A of this report. In response to the referenced **NOTICE OF DEFICIENCY** the dam owner(s) had the bottom drain valve repaired by Intercoastal Diving, Inc. and contacted local engineers to inspect the condition of the concrete spillway. The dam owner(s) were advised to contact the author of this report to provide an evaluation of the condition of the spillway and possible remediation actions that might be required to address dam safety concerns and issues presented by DENR.

Dr. B. Dan Marks, P.E. (author of this report) owner of Marks Enterprises of NC, PLLC (Marks Enterprises) conducted an initial site visit with Mr. Greg Blevins, Lake Resource Manager for Woodlake Resort and Golf Club on June 30, 2009. Although the lake was at the maximum normal pool level and the spillway was discharging slightly during the initial site visit the advanced deteriorated condition of the reinforced concrete comprising

the spillway structure was readily apparent. Weeds and small woody vegetation were growing from several of the joints in the spillway slabs near the bottom of the spillway chute on the left (facing downstream) abutment side of the spillway chute. In addition, the reinforced concrete walls of the chute spillway were observed to have undergone some lateral displacements where the walls were cracked or joints were present in the walls. Internal erosion of the backfill soils behind the walls was evidenced by existing “dropouts” at some locations along the spillway walls. The spillway walkway and gate lifting system was found to be in an advanced state of deterioration and disrepair. Dr. Marks advised Mr. Blevins that access to the walkway and to the bridge extending to the bottom drain structure be restricted to emergency situations.

Mr. Blevins advised Dr. Marks that the lake level would be lowered for annual dock maintenance beginning around the first of November 2009. Furthermore, the winter drawdown period would be extended to allow extensive reconstruction of the “causeway” on the roadway near the entrance to the Woodlake development. Dr. Marks advised Mr. Blevins that a subsequent site visit would be conducted in October or November when the spillway structure could be observed in a “no-flow” condition. Dr. Marks issued a Project Status Report to DENR on October 19, 2009 following the second site visit conducted during a minimum flow condition that allowed observation of major portions of the spillway slabs in a “dry” (no discharge) condition. A copy of this report and other associated DENR correspondence is presented in Appendix A of this report. In the reference Project Status Report of October 19, 2009 Dr. Marks suggested that the only way that remediation of the spillway structure could be done in the extended winter lake drawdown in 2009 – 2010 would be to do the spillway remediation utilizing a design-build concept under an emergency maintenance permit from DENR. As expected, Mr. Steve McEvoy, P.E., North Carolina Dam Safety Engineer responded in his letter of October 22, 2009 that **APPROVAL TO REPAIR** permits would have to be obtained from DENR prior to commencement of any of the construction associated with

remediation of the concrete spillway structure. A copy of this letter is also presented in Appendix A of this report.

Subsequent to receipt of the letter of October 22, 2009 from Mr. McEvoy, P.E. Marks Enterprises issued a Proposal for Professional Engineering Services on November 2, 2009. At this time the author of this report continued to be of the opinion that remediation of the Woodlake Dam spillway structure would consist of some type of high-strength overlay of the existing spillway slabs. The overlay materials being considered at this time consisted of a High-Performance-Concrete (HPC) overlay and/or a high-strength Latex overlay. However, at this time detailed slab cracking mapping and concrete integrity testing had not been completed since the lake drawdown was still in process.

Dr. Marks contacted a highly reputable contractor having a construction division specializing in the remediation of reinforced concrete by the application of HPC and Latex overlays to visit the site with him to obtain a second opinion concerning the concept of spillway remediation design by overlaying the existing spillway slabs. A site visit was conducted with a contractor representative on December 9, 2009 to observe conditions of the spillway slabs. The contractor was of the opinion that the spillway structure could be successfully remediated by construction of a four (4) inch thick Latex overlay or a six (6) inch thick HPC overlay, provided the overlay material could be properly tied to the existing concrete spillway slabs. HPC has the capability of developing approximately 150 to 200 pounds per square inch of "lift-off" or bonding strength with the underlying concrete provided the underlying concrete has sufficient surficial strength to achieve this level of bonding. Latex is capable of creating bonding or "lift-off" strengths about twice that of HPC. The contractor agreed that the splash pool area at the bottom of the spillway could likely be reinforced by an overlay of heavily reinforced concrete without use of either Latex or HPC.

A light rainfall during this site visit intensified into a steady rainfall that produced a gradually increasing stormwater runoff from the spillway slab. Dr. Marks noted that the runoff was infiltrating many of the existing cracks in the spillway slabs and almost all of the spillway slab joints that were transverse to the direction of runoff flow. This observation was not shared with the contractor representative but created significant concern about the integrity of the subgrade soils beneath the spillway slabs. Although there was no evidence that internal erosion or “piping” of subgrade soils back to the surface at slab joints down gradient of observed joint and crack infiltrations the splash pool did contain what seemed to be an overabundance of fine sand, particularly near the left abutment corner of the splash pool down gradient from the locations of observed weeds and small woody vegetation growing in some of the joints between spillway slabs. At this point the spillway slab overlay remediation concept became quite questionable.

Detailed mapping of slab cracks, separations, uplifts, and other evidence of movement was conducted during the period of December 15 – 16, 2009 along with examination of slab integrity by the use of hand tools such as geologist rock hammers, mason hammers, and sharp-pointed shovels. The concrete of the existing concrete spillway slabs was found to be advanced to such a level of deterioration at some locations that significant amounts of concrete could be displaced from the slabs by impacting the concrete slabs with the heel of work boots. Slab cracking and evidence of slab displacement were found to be much more severe than that which was apparent during previous site visits when the spillway slabs remained in a wet condition and not completely dry as was the case during the December inspection.

Subsequent structural analyses of the spillway slabs revealed that the existing slabs could not resist the design loading conditions even with the application of HPC and/or Latex overlays of reasonably economical thicknesses (four to six inches). Furthermore, the overlay remediation design concept would not allow exposure of the existing concrete

slab subgrade conditions. As such, the Woodlake Dam spillway remediation design concept was redirected to that of removal and replacement of the existing concrete spillway slabs.

Removal of the bottom lateral restraint of the concrete spillway walls associated with the existing concrete slabs during construction became a significant concern based upon observed displacements and deterioration of the walls of the spillway chute. As such, regression stability analyses of the spillway walls were conducted to determine approximate factors of safety of the walls with and without the presence of the bottom restraint provided by the existing concrete spillway slabs. These retaining wall stability analyses indicated that the factors of safety of the wall against both sliding and overturning would become dangerously low if the concrete spillway slabs were removed prior to stabilization of the walls by providing some type of wall tie-back system.

On January 2, 2010 Mr. Steve McEvoy, P.E. corresponded with the owner(s) of Woodlake Dam after review of the Project Status Report issued on October 19, 2009 by the author of this report. This correspondence defined which dam remediation work items could be done as maintenance activities and which dam remediation work items had to have **APPROVAL TO REPAIR** permits prior to initiation of construction. The two items of work requiring pre-approved plans and specifications consisted of 1) remediation of the structural integrity of the concrete spillway slabs and associated chute spillway walls, and 2) replacement of the spillway walkway and spillway gate lifting mechanisms. At this time the owner(s) of Woodlake Dam decided to break the dam remediation project into two (2) phases. Based upon the severely advanced state of deterioration of the concrete spillway slabs the owner(s) of Woodlake Dam decided to make remediation of the concrete chute spillway structure the priority and Phase I of the overall remediation project.

Preliminary Phase I Dam Remediation Plans (no specifications) for remediation of the Woodlake Dam concrete spillway were hand-delivered for review by the owner(s) of Woodlake Dam on February 23, 2010. Subsequent to submittal of the Preliminary Phase I Dam Remediation Plans the project was delayed until October 2010 as a result of financial restraints placed on the project.

DAM REMEDIATION CONSTRUCTION SEQUENCE

The dam remediation construction will be completed in three major sequential construction operations. Initially, the walls of the concrete chute spillway will be reinforced by the installation of a soil nail tie-back system. Secondly, the existing spillway slabs will be removed, the subgrade repaired as necessary, and the new spillway slab system installed. Thirdly, the new spillway wall overlay system will be installed with reinforced and sealed joints between the new wall and new spillway slab systems.

DAM REMEDIATION DESIGN ANALYSES

The dam remediation design analyses are presented in Appendix B of this report in the order of the design sequence except that the new wall system analyses are presented with the wall tie-back system design analyses. Dam remediation design analyses are based upon evaluations of loading conditions utilizing appropriate design load factors for the structural design of reinforced concrete sections.

Tie-Back Wall Design and Analyses

The soil nail tie-back system was designed to resist fifty (50) percent of the lateral earth pressure forces on the wall while providing a factor of safety (load factor) of 1.5. The tie-backs will be post-tension to about 4000 pounds after installation which is a slightly greater load than the fifty (50) percent design load. The slightly increased post-tension

load will provide for some elastic relaxation in the soil nail tie-back system. Soil nail anchors will be located at the lateral earth pressure resultant location approximate two feet above the existing surface. The total 20-foot length of the soil nail anchors will consist of about fifteen (15) feet of bonded length, three (3) feet of free length through the active earth pressure zone behind the spillway walls, and about two (2) feet of length for penetration of the existing and new wall sections and the waler anchor system. The soil nail anchors will be installed in six (6)-inch diameter grout holes slope downward at about fifteen (15) degrees plus or minus two degrees. The free length of the soil nail anchor grout holes will be filled with NCDOT C-33 concrete sand.

The new overlay reinforced concrete wall system was designed to resist the remaining fifty (fifty) percent of the lateral earth pressure forces while providing a factor of safety (load factor) of 1.5. As such, the factor of safety of the spillway chute walls will exhibit factors of safety well in excess of three (3) following construction. The required lateral load resistance for the old concrete chute retaining walls will be reduced to near zero.

Spillway Slab System Design and Analyses

Three loading conditions were evaluated to determine the factored design load to be used for design and analyses of the new reinforced concrete slab system. The loading conditions evaluated were as follows.

Case I: Factored Dead Load (DL) of the New Slab Section

Case II: Factored Dead Load (DL) plus Factored Full Uplift Live Load (LL)

Case III: Factored Spillway Design Flood (SDF) DL plus LL

A combination of Case I and Case II was used for the new spillway design analyses which resulted in the use of a uniform load of 200 pounds per square foot using a two-way flat-slab design coefficient of 0.36.

The resulting new reinforced concrete spillway slab design consists of a nine (9)-inch thick concrete slab constructed of minimum 4000 pounds per square inch 28-day compressive strength concrete reinforced with No. 6 deformed reinforcement steel bars spaced at eight (8) inches on centers with two (2) inches of cover at both faces. The new reinforced concrete spillway slab system is supported on nine (9) inches of compacted NCDOT No. 78M stone that provides a uniform bearing surface and a blanket drainage and filtration system beneath the new spillway slabs that will be connected to subdrain systems beneath the spillway slab system. The existing subgrade will be evaluated and repaired in accordance with directions of the project engineer prior to application of a layer of Mirafi 180N non-woven geotextile beneath the No. 78M stone base and drainage blanket. All joints in the new spillway slab system will be provided with "barbell" waterstops to reduce infiltration of water through the joints into subgrade materials. Expansion joints will be sawed joints at the mid-length and width of all slabs directly above previously placed waterstops. Construction joints will be used for reinforced concrete slab expansion and downward movement of the sloped spillway slabs.

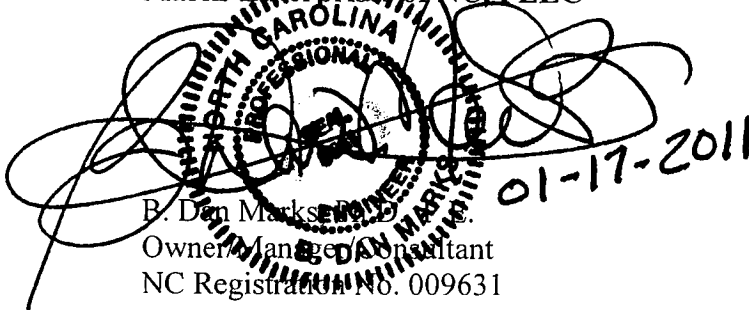
End - of - Report

CLOSURE

Marks Enterprises appreciates the opportunity to provide professional engineering services on this phase of the dam remediation project for Woodlake Dam. We are of the opinion that the dam remediation design provided by this report and the associated **Phase I Dam Remediation Construction Plans and Specifications** will solve many dam safety issues that have historically been of concern to State dam safety officials and the author of this report. If there are questions concerning this design report or the associated plans and specifications please contact us at your convenience.

Respectfully,

Marks Enterprises of NC, PLLC



E. Dan Marks
Owner/Manager/Consultant
NC Registration No. 009631

cc: Mr. M. Stephen Cook, C.P.E.S.C., Fayetteville Regional Office (1)
Mr. Steven M. McEvoy, P.E., North Carolina Dam Safety Engineer (2)

BDM/dm



North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

James D. Simons, PG, PE
Director and State Geologist

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

March 10, 2011

Marks Enterprises of NC, PLLC
Dr. B. Dan Marks, PhD, PE
One Palatka Street
Arden, NC 28704

RE: Woodlake Dam
Moore County
MOORE-040-H

Dear Dr. Marks:

A review has been made of the plans, specifications and design data submitted under cover letter dated January 17, 2011 and received in this office on January 19, 2011 for the repair of the referenced dam. Prior to issuance of an approval to repair, additional information or revision is requested for the following items:

1. An Emergency Action Plan (EAP) and Operations and Maintenance Manual (O&M Manual) are required for all high hazard dams such as this one. An Approval to Repair cannot be issued until an EAP has been submitted and approved. The O&M manual will be required prior to issuance of an Approval to Impound.
2. Please provide a scaled drainage area delineation map.
3. According to 15A NCAC 2K Section .0205, this structure is classified as a large high hazard dam which is required to have a spillway system designed to pass the $\frac{3}{4}$ PMP storm. Preliminary calculations performed by this office indicate that the dam would likely overtop by several feet during a $\frac{3}{4}$ PMP storm. Please discuss and justify any proposed variance to the $\frac{3}{4}$ PMP storm.
4. Please provide a schedule for repairs to be completed including a schedule for phase 2 repairs. A stipulation will be included in the Approval to Repair based on this proposed schedule.
5. Please address repair of the depression located approximately 40 feet left of the concrete chute spillway.

6. What methods will be used to remove the existing concrete?
7. Title Sheet: Please provide the State ID number (MOORE-040) and the phone number for Mr. Blevins.
8. Sheet 2: PHASE 1 REMEDIATION PROFILE: Joints are not consistent with the details. Please reconcile.
9. Sheet 2: PHASE 1 REMEDIATION PROFILE: How will the slabs, located from water to the gates, drain? It appears that the drainage blanket dead ends into a concrete slab.
10. Sheet 3: Please provide support shelf extension beneath each upstream slab from the adjacent downstream slab (articulated floor lining) (ref: Design of Small Dams, USDI-Bureau of Reclamation, 1987, Chapter 9 Section G.). This should be provided for longitudinal joints as well. Show extent of under drain system and means of collection and discharge (see 15A NCAC 2K Section .0205 (c)).
11. Sheet 3: The concrete slab thickness is not consistent with what is acceptable per Design of Small Dams, USDI-Bureau of Reclamation, 1987, Chapter 9 Section G. The Design of Small Dams states that when lining is placed upon rock a minimum of 8" thick slab is recommended. When placing the lining upon earth or an intervening gravel layer, a somewhat thicker slab should be provided. (12" or greater). Please reconcile.
12. Sheet 3: Construction joints should be placed every 25 to 50 feet apart. (Ref: Design of Small Dams, USDI-Bureau of Reclamation, 1987, Chapter 9 Section G.). Please reconcile.
13. Sheet 3: Please provide REINFORCED CONCRETE SLAB & STEEL DIMENSIONS for the splash pool overlay slab.
14. Sheet 3: Sawed contraction joints are typically used to control where cracking of the slab is to take place. Is it intended to have planned cracks without water stops? Please refer to National Ready Mixed Concrete Association (NRMCA) document CIP-6 for proper contraction joint planning and construction.
15. Sheet 3: Is the construction and contraction joint filler rated for continuous submergence?
16. Sheet 3: Please provide specifications for the Tie-Back materials being utilized in this project.

17. Sheet 3: In the TYPICAL WALL SECTION detail, a note states TIE-BACKS @ 12' CTRS TORQUE TO 4000 #. In the calculations provided it shows Tie-Backs are to be torque to 3600 #. Please reconcile.
18. Sheet 3: Please provide adequate detail on the placement of the Mirafi 180N. It appears that the geotextile will be used on the bottom only.
19. Sheet 4: Subdrain pipes and outlet pipes are specified, but none are shown on the plan sheets. Please reconcile.

It would greatly aid further application review if a response to each of the above comments were made in a cover letter submitted with two sets of the revised plans, specifications and design data.

Please contact this office should you have any questions concerning the above items.

Sincerely,



Brad Cole, PE
Assistant State Dam Safety Engineer
Land Quality Section

cc: Mr. Gregory Dean Blevins, Owner
Mr. Steve Cook, CPESC, Fayetteville Regional Engineer
Surface Water Protection Regional Supervisor

Filename: MOORE-040_20110310_revreq

North Carolina
Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

James D. Simons, P.G., P.E.
Director and State Geologist



Division of Land Resources



NOTICE OF INSPECTION

**DIVISION OF LAND RESOURCES
LAND QUALITY SECTION**

4 February 2011

Woodlake Country Club
ATTN: Gregory Blevins
150 Woodlake Boulevard
Vass, NC 28394

RE: Woodlake Dam
Moore-040
Moore County, North Carolina
Cape Fear River Basin

Dear Mr. Blevins:

The Dam Safety Law of 1967, as amended, provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam, which is located off Hwy 690. This dam was inspected on 3 February 2011 by personnel of the Land Quality Section. This inspection revealed the conditions outlined below:

1. This dam is still under the Notice of Deficiency dated 12 February 2009. Those deficiencies associated with the deterioration of the principle spillway channel were noted as still present at the time of inspection. Repair plans were received by this office on 19 January 2011 and are pending review. No additional deficiencies were noted.

The following items pertinent to maintenance and operation of the dam are also recommended.

1. Maintain a ground cover sufficient to restrain accelerated erosion on all earthen portions of the structure.
2. Periodically remove trees less than about six inches in diameter and thick undergrowth from the slopes and crest of the dam. This will serve to (A) prevent the formation of a root system which might significantly increase seepage through the dam which could ultimately result in failure of the structure, (B) reduce the possibility of damage to the dam due to the uprooting of trees by wind or other natural causes, and (C) facilitate ease of inspection and increase the likelihood of early

- detection of more serious problems connected with the dam.
3. Periodically remove all trees from the emergency spillway. This will reduce the possibility of its capacity being reduced by the entrapment of debris, should it become active.
 4. Periodically check the operation of all drain valve facilities. This will insure satisfactory operation of the drains should an emergency situation arise.
 5. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.

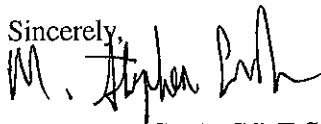
During this inspection we also investigated the potential for property damage and loss of life in the event that your dam fails. This investigation determined that failure of your dam could result in severe property damage and/or possible loss of life downstream. Therefore, we are listing your dam in the "High Hazard" category.

Also be advised that any excavations in this dam or major repair work to this dam must be approved by this Office before any work is done. Also, note that this dam may not be breached, meaning the dam may not be drained by cutting a notch in the dam, without prior engineered breach plans being submitted to and approved by this Department.

Please be advised that though we make every reasonable effort to determine the safety of your dam, our resources limit us to surficial inspection. There is no certainty regarding the internal stability of the dam. Dams, and especially their spillways and conduits, deteriorate with age. Therefore, you are advised to keep a close watch on your dam and to notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

Your cooperation and consideration in maintaining a safe dam is appreciated. If ownership of the dam has changed, or if you are not responsible for the dam, please notify us so that we can update our records. Should you have any questions concerning our inspection, please contact me at (910) 433-3300.

Sincerely,



M. Stephen Cook, C.P.E.S.C.
Regional Engineer
Land Quality Section

MSC/joh

cc: State Dam Safety Engineer (electronic copy)
cc: Fayetteville Regional Office File

North Carolina
Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

James D. Simons, P.G., P.E.
Director and State Geologist



Division of Land Resources

NOTICE OF INSPECTION

**DIVISION OF LAND RESOURCES
LAND QUALITY SECTION**

8 February 2012

Woodlake Country Club
ATTN: Gregory Blevins
150 Woodlake Boulevard
Vass, NC 28394

RE: Woodlake Dam
Moore-040
Moore County, North Carolina
Cape Fear River Basin

Dear Mr. Blevins:

The Dam Safety Law of 1967, as amended, provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our records indicate you are the owner of the referenced dam, which is located off Hwy 690. This dam was inspected on 7 February 2012 by personnel of the Land Quality Section. This inspection revealed the conditions outlined below:

1. This dam is still under the Notice of Deficiency dated 12 February 2009. Those deficiencies associated with the deterioration of the principle spillway channel were not able to be inspected due to the water level and the principle spillway being active. The latest repair plans were reviewed and a request for additional information was sent on 10 March 2011. No response has been received by this office. Please contact this office with the status of these plans/repairs.
2. It was noted that the right side, when facing downstream, bottom drain was slightly active and may be leaking. This condition should be monitored and this office should be notified of any changes.
3. There is a large bare area on the downstream slope adjacent to the principle spillway channel. This area should be permanently stabilized as soon as possible to prevent erosion.

The following items pertinent to maintenance and operation of the dam are also recommended.

1. Maintain a ground cover sufficient to restrain accelerated erosion on all earthen portions of the structure.

2. Periodically remove trees less than about six inches in diameter and thick undergrowth from the slopes and crest of the dam. This will serve to (A) prevent the formation of a root system which might significantly increase seepage through the dam which could ultimately result in failure of the structure, (B) reduce the possibility of damage to the dam due to the uprooting of trees by wind or other natural causes, and (C) facilitate ease of inspection and increase the likelihood of early detection of more serious problems connected with the dam.
3. Periodically remove all trees from the emergency spillway. This will reduce the possibility of its capacity being reduced by the entrapment of debris, should it become active.
4. Periodically check the operation of all drain valve facilities. This will insure satisfactory operation of the drains should an emergency situation arise.
5. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.

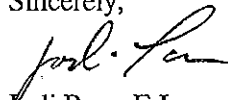
During this inspection we also investigated the potential for property damage and loss of life in the event that your dam fails. This investigation determined that failure of your dam could result in severe property damage and/or possible loss of life downstream. Therefore, we are listing your dam in the "High Hazard" category.

Also be advised that any excavations in this dam or major repair work to this dam must be approved by this Office before any work is done. Also, note that this dam may not be breached, meaning the dam may not be drained by cutting a notch in the dam, without prior engineered breach plans being submitted to and approved by this Department.

Please be advised that though we make every reasonable effort to determine the safety of your dam, our resources limit us to surficial inspection. There is no certainty regarding the internal stability of the dam. Dams, and especially their spillways and conduits, deteriorate with age. Therefore, you are advised to keep a close watch on your dam and to notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

Your cooperation and consideration in maintaining a safe dam is appreciated. If ownership of the dam has changed, or if you are not responsible for the dam, please notify us so that we can update our records. Should you have any questions concerning our inspection, please contact me at (910) 433-3300.

Sincerely,



Jodi Pace, E.I.
Acting Regional Engineer
Land Quality Section

JP/joh

cc: State Dam Safety Engineer (electronic copy)
cc: Fayetteville Regional Office File



North Carolina Department of Environment and Natural Resources
Division of Energy, Mineral, and Land Resources
Land Quality Section



Tracy E. Davis, PE, CPM
Director

Pat McCrory, Governor
John E. Skvarla, III, Secretary

NOTICE OF DEFICIENCY

March 13, 2013

CERTIFIED MAIL 70103090000132161273
RETURN RECEIPT REQUESTED

Woodlake Country Club
Attn: Julie Watson
150 Woodland Blvd.
Vass, NC 28394

RE: Woodlake Dam
Moore-040
Moore County North Carolina

Dear Ms. Watson:

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of dams, to prevent injuries to persons, damage to downstream property, and to ensure the maintenance of stream flows.

An inspection of the referenced dam was conducted on February 20, 2013 by staff of the Land Quality Section Fayetteville Regional Office. During this inspection, the following conditions were noted:

1. Several cracks were noted in the concrete of the principal spillway of the dam. Areas of concern are located along the two trench drains, the right spilling basin drain, and the subsurface drain outlets. In addition, spalling of concrete is occurring in large areas at the entrance of the spillway.

2. An unknown size void was noted right of center at the bottom of the principal spillway. The sheet piling was noted to be decayed in this location and large voids and holes were noted behind sheet pilings right of center at the bottom of the principal spillway. Attempts have been made to block or stabilize voids with pieces of concrete slabs.
3. Subsurface drain on lower right side wall has created a void along right side wing wall. In addition outlets of subsurface drains have created joint displacement and holes around subsurface drain outlets.
4. Emergency spillway drop inlet was obstructed by decking. This could have significant impact on the hydraulic capacity of the dam.

These conditions appear serious and justify further engineering study to determine appropriate remedial measures. In the event of a dam failure, human life and significant property would be endangered. Therefore, we are listing your dam in the High Hazard category.

In order to ensure the safety of this dam, you are directed to retain the services of a registered professional engineer or an experienced engineering firm to make a study of the conditions outlined in this letter. Plans and specifications for repair based on the results of the study must be filed with the Division of Land Resources for approval pursuant to the North Carolina Administrative Code, Title 15A, Subchapter 2K - Dam Safety (15A NCAC 2K). Two copies of an emergency action plan for this dam shall be submitted to this office by July 1, 2013.

In addition to the above, the following remedial actions, not requiring design or approval, should be completed by September 1, 2013. These items include the following:

1. Maintain a ground cover sufficient to restrain accelerated erosion on all earthen portions of the structure.
2. Periodically remove trees less than about six inches in diameter and thick undergrowth from the slopes and crest of the dam. This will serve to (A) prevent the formation of a root system which might significantly increase seepage through the dam which could ultimately result in failure of the structure, (B) reduce the possibility of damage to the dam due to the uprooting of trees by wind or other natural causes, and (C) facilitate ease of inspection and increase the likelihood of early detection of more serious problems connected with the dam.
3. Periodically remove all trees from the emergency spillway. This will reduce the possibility of its capacity being reduced by the entrapment of debris, should it become active.
4. Periodically check the operation of all drain valve facilities. This will insure satisfactory operation of the drains should an emergency situation arise.

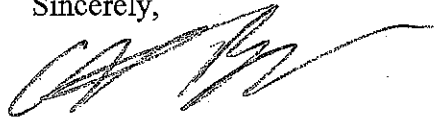
5. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.
6. Periodically monitor seepage that was noted approximately 100 yards left of center, 100 yards right of center, and 400 yards right of center from the principal spillway.

As a dam owner, you may incur liability should your dam have a problem or fail, if such an event results in loss of life, property damage, or environmental damage downstream. It is therefore requested that you prepare an Emergency Action Plan (EAP) for this dam. The EAP establishes procedures to be followed in events that could adversely impact the dam such as extreme precipitation, seismic activity, excessive seepage, slides, sinkholes, and other natural hazards, and for warning the public downstream in the event of an emergency at the dam. Guidance for preparing an EAP can be found on the Internet at <http://portal.ncdenr.org/web/lr/dams> or by calling Dam Safety Program staff at (919) 707-9220. Two copies of an EAP for this dam should be submitted to the following address:

NC Division of Land Resources
Land Quality Section
Attn: Mr. Steven M. McEvoy, PE
1612 Mail Service Center
Raleigh, NC 27699-1612

Please contact us at 910-433-3300 to advise us of your intended action in this matter. If we do not receive notification on or before June 1, 2013 we shall present the case information for appropriate enforcement action. Enforcement action could include a civil penalty of up to \$500.00 per day of violation, and/or issuance of a Dam Safety Order requiring the repair or removal of this dam, and/or injunctive relief to gain compliance.

Sincerely,



Brad Cole, PE
Regional Engineer

BC/

cc:

Water Quality Regional Supervisor
Fayetteville Regional Office File



North Carolina Department of Environment and Natural Resources

Pat McCrory,
Governor

John E. Skvarla, III
Secretary

NOTICE OF DEFICIENCY

April 22, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7010 3090 0001 3216 1396

Woodlake Country Club
Attn: Julie Watson
150 Woodland Blvd.
Vass, NC 28394

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7010 3090 0001 3216 1389

Woodlake Partners
P.O. Box 648
Vass, NC 28394

RE: Woodlake Dam
Moore-040
Moore County North Carolina

Dear Ms. Watson:

The Dam Safety Law of 1967 provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of dams, to prevent injuries to persons, damage to downstream property, and to ensure the maintenance of stream flows.

An inspection of the referenced dam was conducted on April 1, 2014 by staff of the Land Quality Section Fayetteville Regional Office. During this inspection, the following conditions were noted:

1. Several cracks were noted in the concrete of the principal spillway of the dam. Areas of concern are located along the right side subsurface drain outlets. All joints in the principal spillway are in need of maintenance and repair. In addition, spalling of concrete is occurring in large areas at the entrance of the spillway and at the bottom of the spillway.

Division of Energy, Mineral, and Land Resources
Land Quality Section

Fayetteville Regional Office 225 Green Street – Suite 714, Fayetteville, North Carolina 28301
Phone: 910-433-3300 Fax: 910-486-0707 Internet: <http://portal.ncdenr.org/web/lr/dams>
An Equal Opportunity \ Affirmative Action Employer – 50% Recycled \ 10% Post Consumer Paper

2. An unknown size void was noted right of center at the bottom of the principal spillway. The sheet piling was noted to be decayed in this location and large voids and holes were noted behind sheet pilings right of center at the bottom of the principal spillway. Attempts have been made to fill or stabilize voids with pieces of concrete slabs.
3. Subsurface drain on lower right side wall has created a void along right side wing wall. In addition outlets of subsurface drains have created joint displacement and holes around subsurface drain outlets. Right side subsurface drain has hole below outlet and has been barricaded off with sand bags since principal spillway is active.
4. There was seepage noted on the downstream slope of the dam. Excessive seepage can cause failure of dam due to internal erosion and/or embankment sliding. You should inspect the seepage periodically and notify this office if there is an increase in the amount of seepage, discoloration of water or embankment sliding occurs.

These conditions appear serious and justify further engineering study to determine appropriate remedial measures. In the event of a dam failure, human life and significant property would be endangered. Therefore, we are listing your dam in the High Hazard category.

In order to ensure the safety of this dam, you are directed to retain the services of a registered professional engineer or an experienced engineering firm to make a study of the conditions outlined in this letter. Plans and specifications for repair based on the results of the study must be filed with the Division of Land Resources for approval pursuant to the North Carolina Administrative Code, Title 15A, Subchapter 2K - Dam Safety (15A NCAC 2K). Two copies of an emergency action plan for this dam shall be submitted to this office by May 22, 2014.

In addition to the above, the following remedial actions, not requiring design or approval, should be completed by July 22, 2014. These items include the following:

1. Maintain a ground cover sufficient to restrain accelerated erosion on all earthen portions of the structure.
2. Periodically remove trees less than about six inches in diameter and thick undergrowth from the slopes and crest of the dam. This will serve to (A) prevent the formation of a root system which might significantly increase seepage through the dam which could ultimately result in failure of the structure, (B) reduce the possibility of damage to the dam due to the uprooting of trees by wind or other natural causes, and (C) facilitate ease of inspection and increase the likelihood of early detection of more serious problems connected with the dam.
3. Periodically remove all trees from the emergency spillway. This will reduce the possibility of its capacity being reduced by the entrapment of debris, should it become active.


4. Periodically check the operation of all drain valve facilities. This will insure satisfactory operation of the drains should an emergency situation arise.
5. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.
6. Periodically monitor seepage that was noted at the following locations: -Right Side of Principal Spillway located approximately 75, 100, 125, 200, 250, and 350 yards from principal spillway. Left Side of Principal Spillway located approximately 100, 120, 150 and 170 yards from principal spillway

As a dam owner, you may incur liability should your dam have a problem or fail, if such an event results in loss of life, property damage, or environmental damage downstream. It is therefore requested that you prepare an Emergency Action Plan (EAP) for this dam. The EAP establishes procedures to be followed in events that could adversely impact the dam such as extreme precipitation, seismic activity, excessive seepage, slides, sinkholes, and other natural hazards, and for warning the public downstream in the event of an emergency at the dam. Guidance for preparing an EAP can be found on the Internet at <http://portal.ncdenr.org/web/ir/dams> or by calling Dam Safety Program staff at (919) 707-9220. Two copies of an EAP for this dam should be submitted to the following address:

NC Division of Land Resources
Land Quality Section
Attn: Mr. Steven M. McEvoy, PE
1612 Mail Service Center
Raleigh, NC 27699-1612

Please contact us at 910-433-3300 to advise us of your intended action in this matter. If we do not receive notification on or before May 22, 2014 we shall present the case information for appropriate enforcement action. Enforcement action could include a civil penalty of up to \$500.00 per day of violation, and/or issuance of a Dam Safety Order requiring the repair or removal of this dam, and/or injunctive relief to gain compliance.

Sincerely,


Brad Cole, PE
Regional Engineer

BC/nm

cc: Fayetteville Regional Office File

MARKS ENTERPRISES of NC, PLLC

August 22, 2014

One Palatka Street - Arden, NC 28704
Tel: 828-231-7424 Fax: 828-681-8909

EXHIBIT

I

North Carolina Department
of Environment and Natural Resources
Division of Energy, Mining, and Land Resources
Land Quality Section, Dam Safety Group
1612 Mail Service Center
Raleigh, North Carolina 27699-1612
512 North Salisbury Street
Raleigh, North Carolina 27604

RECEIVED

SEP 05 2014

LAND QUALITY SECTION
DAM SAFETY

Attention: Mr. Steve McEvoy, P.E.
State Dam Safety Engineer

Reference: REVIEW COMMENTS RESPONSE DOCUMENTS
Woodlake Dam Remediation Construction Project
Phase I: Spillway Structure Slabs and Walls
Woodlake Dam (A.K.A. Lake Surf Dam)
NCID No. MOORE-040-H
Woodlake Resort and Country Club
150 Woodlake Boulevard
Vass, North Carolina 28394

Dear Mr. McEvoy:

Marks Enterprises of NC, PLLC (Marks Enterprises) is submitting herewith the review comments response documents which consist of the following items: a) the review comments response letter that addresses each of the review comments; b) an Inflow Design Flood (IDF) Evaluation Report for Woodlake Dam and associated spillway systems; and c) one set of Construction Plans and Specifications for Phase I: Spillway Slabs and Walls of the project. The Review Comments Response Letter is organized in such a manner that responses to review comments are presented in the same sequence as the review comments were presented in the letter of March 10, 2011. A copy of the referenced letter is presented in Appendix A of this document. The IDF Evaluation Report and recommendation for lowering the Spillway Design Flood (SDF) for Woodlake Dam is presented as Attachment I of this document. Construction Plans and Specifications associated with this document have been revised in accordance with review comments and suggestions made in an effort to make the documents more commensurate with articles of the North Carolina Dam Safety Law, regulations, and amendments. By copy of this letter a complete set of items

comprising the Review Comments Response Documents has been submitted directly to Mr. Brad Cole, P.E., Regional Engineer in the Fayetteville Regional Office. As such, only one copy of the documents is being submitted to the Raleigh Central Office.

The author of this document is of the opinion that some discussion of the timeline of this project should be presented herein for the benefit of individuals outside the North Carolina Department of Environment and Natural Resources (DENR) that may have cause to review these documents. The original plans and specifications submitted for review January 17, 2011 were received by the Raleigh Central Office of the Land Quality Section of DENR on January 19, 2011. These documents were signed and sealed by the author of this document on January 11, 2011. The review comments letter from DENR was dated March 10, 2011. Shortly after receipt of this letter a stop-work order was placed on the project. The stop-work order was in place until August 2013 when the Owner of Woodlake Dam came to Woodlake from Germany and met with the author of this document. Dr. Ingolf Boex, D.J.P. expressed to Dr. Marks, Ph.D., P.E. that he wished to continue the project beginning in the spring of 2014. He was reminded that one of the review comments was the need to submit a comprehensive schedule for construction of both Phases I and II of the project. Dr. Marks set about development of a schedule that Dr. Boex felt would work into the economic environment that was much improved since 2011.

During the period of March 11, 2014 through March 13, 2014 Dr. Marks met with Ms. Julie Watson and Greg Blevens (then Water Resources Manager) to present an overall project plan summarizing all of the tasks that had to be accomplished in order to properly respond to NC DENR review comments on the previously submitted Plans and Specifications for remediation of the Woodlake Dam spillway structure. A detailed Proposal for Professional Engineering Services that followed the submitted summary of activities required to resubmit construction documents to NC DENR was presented as a separate document to be reviewed by Dr. Boex, Ms. Watson, and Mr. Blevens. The proposal was converted to a signed Agreement for Professional Services on March 17, 2014. Dr. Marks traveled to Woodlake on July 16, 2014 to meet with Mr. Chris Shepard, the new Water Resources Manager and Superintendent of the two golf courses; and to present a preliminary set of construction documents for review by Ms. Watson and Mr. Shepard. Dr. Marks indicated that final construction documents should be ready for submittal to NC DENR by August 15, 2014. Eye surgery on the part of Dr. Marks has delayed this date by two weeks.

RESPONSES TO REVIEW COMMENTS

As indicated in the introductory paragraph, responses to review comments presented herein are presented in the same order as review comments appeared in the referenced letter of March 10, 2011. Revisions to the original plans such as selection of a different method for stabilization of the spillway channel walls have rendered some of the original review comments non-applicable to the current construction plans and specifications.

1. The author of this report contacted the Raleigh Central Office of the NC DENR on August 22, 2014 to confirm that Item No. 1 was incorrectly stated since he had never see the Emergency Action Plan (EAP) required prior to Approval to Repair. Mr. Bill Denton, P.E., Assistant State Dam Safety Engineer concurred that the sentence should have read Approval to Impound instead of Approval to Repair.
2. A large size scaled map of the contributing watershed is presented on Sheet 1 of 14 of the Construction Plans and Specifications that accompany this document. The contributing watershed of Woodlake is approximately 95.2 square miles.
3. Extensive Inflow Design Flood (IDF) Analyses were conducted for Woodlake Dam and its appurtenances in order to provide a recommendation for adjustment of the Spillway Design Flood (SDF) currently assigned to Woodlake Dam on the basis of size and hazard classifications in the regulations of the North Carolina Dam Safety Act of 1967 and its amendments. Based upon evaluations of the IDF Analyses the author of this document recommends that the SDF or IDF for Woodlake Dam be reduced to the 0.33 Probable Maximum (PMP) rainfall event. Woodlake Dam and its spillway systems can safely pass the 0.33 PMP storm event without overtopping the crest of the dam embankment. The flood level at the roadway bridge on NC Highway 690 (Cobelia Road) calculated in the IDF Analyses is near or only slightly higher that that observed in 1988 when the dam was purposely breached before extensive remedial repairs were undertaken. No individuals downstream of the dam had to be evacuated during breach of the dam 1988. The author is aware that reductions to assigned SDF are typically limited to one SDF designation; however, we suggest that an exception to this policy be made since a similar spillway to the existing structure would have to be increased in width to about 1000 feet.

4. The following project schedule was presented to the Owner and agreed upon in April 2014 when a new Agreement for Professional Services Contract was executed for completion of the Construction Plans and Specifications for Remediation of Woodlake Dam. An agreement had previously been reached with NC DENR to allow the project to be completed in two phases coinciding with winter drawdown periods.

- **September 1, 2014: Submittal of Phase I Construction Plans and Specifications for Remediation of Woodlake Dam.** Phase I includes remediation of the spillway channel slabs and walls that are the highest prioritized items that must be addressed.
- **October 1, 2014:** Execution of the Construction Contract for Phase I of the dam remediation project; and issue a Notice-to-Proceed with Non-Dam Remediation Tasks no later than October 15, 2015. Non-Remediation Tasks consists of building a Construction Access Road; installing security fences and gates; building a secure materials storage compound; preparing a construction personnel parking area; and setting up a Field Office and Concrete Laboratory.
October 15, 2014: Latest date to begin Mobilization and construction of the Construction Access Road off NC Highway 690 near Cobelia.
- **Date Unknown:** Receive Approval to Repair Certificate to begin work on Dam Remediation Tasks. Lake level will begin to be lowered as soon as possible after October 1, 2014 depending upon golf course irrigation requirements.
- **March 31, 2015:** Last date for completion of Phase I
- **April–October 2015: Monitor 2014 Woodlake Dam Remediations**
- **July 15, 2015:** Submit Phase II Dam Remediation Plans. Phase II Remediation Plans will include

lateral Sheetpile walls and subdrain systems to control seepage and internal erosion along the spillway channel walls; and construction of a new crosswalk with a hydraulic gate lifting system.

- **Date Unknown:** Submit Emergency Action Plan (EAP) and Operation and Maintenance (O & M) Plan for review and approval.
- **March 31, 2016:** Last date for completion of Phase II dam remediation construction.
- **April 30, 2016:** Submittal of Drawings-of-Record (Combining Phase I and Phase II into one Set of Drawings)

5. Treatment of the seepage and internal erosion condition on both the left and right abutment sides of the spillway will be the priority tasks of the Phase II remedial construction in 2015 – 2016. Lateral sheetpile walls will be used to stop as much seepage as possible with backup subdrain systems used to collect as much seepage as possible that leaks through the sheetpile walls.
6. Existing concrete spillway slabs will be removed by a large hydraulic jack hammer mounted on a medium size track-mounted excavator similar to a CAT 325. All steel reinforcement will be removed from the concrete by breaking the concrete to free the reinforcement. Broken concrete will then be used as a substitute for rip-rap stone beneath the splash pool.
7. The NCID No. for Woodlake Dam has been added to the Cover Sheet. Telephone numbers for the Owner of Woodlake and the Project Engineer have been added to the Cover Sheet.
8. Details of joints and joints shown on profiles of the spillway channel have been corrected so that they are in agreement.
9. The Coarse Aggregate Base Course (CABC) stone beneath the approach slabs will not drain while the lake level is above the low-level operation level that is the elevation of the approach slabs. The slabs and CABC

Stone will be under water. The CABC Stone will drain back into the lake during the winter drawdown period.


- 10. Butt joints with waterstops have been deleted and downslope slabs with support shelves have been used as suggested. Subdrain systems have been more clearly identified at the joint locations to collect seepage in the blanket drain system. Discharge pipes have been more clearly identified.**
- 11. The new reinforced concrete slabs have been increased in thickness to twelve (12) inches as suggested.**
- 12. Construction Joints currently are placed as much as 80 to 100 feet on Centers provided the temperature steel is properly designed and distributed throughout the slab. However, the length to width ratio of large concrete slabs must be maintained near 2.0 by the use of intermittent "control joints" (contraction joints). Control of cracking in concrete is directly related to length to width ratios. Concrete attempt to crack in such a manner that the resulting "pieces are near square. If you calculate friction force along the bottom of a concrete slab that resist the movement of the slab by shrinkage you will find that all forces will balance if the slabs are square or have length to width ratios near two and a contraction joint is located near mid-length.**
- 13. Detail 8-1 provides a typical detail for all reinforced concrete slabs that do not have some type of joint in the section.**
- 14. I have placed a second layer of thick (Mirafi 180N) geotextile between the slab and stone to laterally distribute any leakage of the control joint. Mirafi 180N has a high lateral coefficient of transmissivity that will quickly wick water away from the contraction joint. This is a tough call: Look at the concrete section where you have a waterstop. You have three (3) inches of concrete cover then 1.25 inches of steel (two #5 bars) then two (2) inches of concrete and one-half inch of rubber and the same coming out the other side. As such, you have only eight (8) out of twelve (12) inches of continuous concrete. This is a seriously weaken section that will completely deteriorate over time (twenty years). A strong O & M Plan is better than a waterstop at control joints.**
- 15. I have never found a joint sealant that does not deteriorate after about three years as a result of oxidation of petroleum biodegradation. Joint sealants must be checked every year with damage areas removed and replaced.**

Every third year all joint sealants should be removed, joints routed, and the sealant replaced. To answer the question - Yes, they are Rated for continuous submergence, but by whom? (An organic chemist in a laboratory that has never seen either a contraction or construction joint and does know the difference or really cares).

16. No Longer Applicable — Using Internal Stabilization Wall
17. No Longer Applicable — Using Internal Stabilization Wall
18. The geotextile will be used on top and bottom of the base stone or drainage blanket. Details for placement, overlap, and pinning are provided on Sheet 11 of 14.
19. Outlet pipes for subdrains are currently shown more clearly in profiles and details where appropriate.

On behalf of the Owners of Woodlake Dam and Marks Enterprises of NC, PLLC the author expresses his sincere appreciation for the cooperation, assistance, and helpful reviews of the submitted plans and supporting analyses, calculations, and evaluations. If there are questions that arise during your review please do not hesitate to contact me at (828) 231 - 0598 or via Email at drbdan@bellsouth.net or drbdan@marksenterprises.net

Respectfully,


B. Dan Marks, Ph.D., P.E., Principal
NC Registration No. 09631
Marks Enterprises of NC, PLLC
NC Firm Registration No. P-0199

Enclosures: Appendix A
Appendix B

Attachment: ATTACHMENT I: INFLOW DESIGN FLOOD (IDF) ANALYSES REPORT

cc: Ingolf Boex, D.J.P., Owner
Julie Watson, General Manager
Chris Shepard, Water Resources Manager

BDM/dm

MARKS ENTERPRISES of NC, PLLC

December 4, 2014

One Palatka Street - Arden, NC 28704
Tel: 828-231-7424 Fax: 828-681-8909

EXHIBIT

J

State of North Carolina
Department of Environment and Natural Resources
Division of Energy, Mineral, and Land Resources
Land Quality Section, Dam Safety Group
1612 Mail Service Center
Raleigh, North Carolina 27699 – 1612

RECEIVED
DEC 08 2014
DENR
LAND QUALITY SECTION

Attention: Mr. Steven M. McEvoy, P.E.
State Dam Safety Engineer

Reference: PROJECT WORK, SCHEDULE, AND COST BREAKDOWN
Woodlake Dam & Spillway Remediation Project
NCID No. MOORE – 040
Woodlake Resort and Country Club
Vass, Moore County, North Carolina
Project No. ME – 09 – 007

Dear Mr. McEvoy:

The purpose of this letter is to provide the requested detailed breakdown of project work, schedule, and cost for the sequential or staged construction that will be required to complete the referenced project under the current Chapter 11 Bankruptcy Proceeding. As per our previous agreement, the project design and associated Construction Plans and Specifications were previously divided into two (2) phases to allow remediation construction to be completed in two (2) successive winter drawdown periods. The Phase I Construction Plans and Specifications have been reviewed by your office and review comments submitted in the letter dated October 6, 2014.

Woodlake Partners, LLC (the "Owner" of Woodlake Dam and its appurtenances and amenities) has identified a group of investors that may be willing acquire the property through a plan of reorganization which includes a sale of the property subject to higher and better bids and approval by the Bankruptcy Court. The Phase I: Spillway Slabs and Walls portion of the project has been bid at a cost of approximately \$1.8 Million. Understandably, the new investors are reluctant to commit to an initial lump sum investment of this magnitude until they are satisfied that the dam remediation project is proceeding in a manner which has been approved by the Bankruptcy Court.

In order to present a plan and sale which may be acceptable to the potential purchaser or other investors, the Owner is requesting concurrence from the Department of Environment and Natural Resources (DENR) to further dividing the presented Phase I Dam Remediation Construction.

The Project Engineer has completed extensive analyses and evaluations of the project work, schedule, and itemized construction costs associated with each item set forth in the developed Critical Path Method of construction scheduling in order to present a sequential or staged construction plan that meets with your requirements set forth in our previous conversations concerning staged dam remediation construction. There are many issues that must be addressed in this method of construction; however, there is no issue of greater importance than that of assuring that the dam, spillway, and other appurtenances are left in safe operating conditions between the completions of individual stages of construction. Furthermore, construction workmanship quality, schedule, and financial control of staged construction projects are much more demanding of the Project Engineer and the Project Superintendent.

As such, the Project Engineer is scheduled to be on-site approximately seventy-five (75) to eighty (80) percent of the duration time of the project. This will include time that the Contractor is not working since concrete curing and testing will be done on-site and the Project Engineer will have to fill-in for inspectors/technicians that may be off-work on scheduled alternate weekends. The Project Engineer will make all decisions concerning field changes, and/or substitution of materials, and /or alteration of construction techniques. Similarly, the Contractor will have his Office Manager and Financial Administrator on-site during the entire project.

The Project Engineer and I have considered several alternative means of presenting details of the proposed project breakdown. The following tabulated summary of project task work, anticipated schedule, and associated costs reinforced by an attached spreadsheet exhibit is considered to be the best manner in which to present the significant amount of information in the most organized fashion. In addition, existing Phase I Construction Plans and Specifications will be modified so that sequential task drawings and details are presented in the same sequential order as the project schedule.

Please be aware that schedule dates presented herein are subject to change in accordance with the reorganization plan and sale process, all of which require final approval by the Bankruptcy Court. The "Project Team" for this project will

not only include representatives of the State Dam Safety Engineer, Owner, Engineer, and Contractor; but will be expanded by involvement of the Chief Restructuring Officer and Bankruptcy Attorney. As such, the Project Engineer has used a realistic degree of conservatism in establishing the construction schedule. After all is said and done, the actual initiation of each identified construction task will be controlled by the investors who acquire ownership through the Chapter 11 sale.

TABULATED SUMMARY OF PHASE I CONSTRUCTION ITEMS

The Construction Plans and Specifications for Phase I: Spillway Slabs and Walls were originally divided into two (2) major components that included: 1) Non-Regulated Construction Activities; and 2) Regulated Construction Activities. This division was made to allow construction to begin at the earliest possible date even if the final Approval to Repair Certificate had not been issued by the Department of Environment and Natural Resources (DENR) since these activities do not involve any elements of the dam or its appurtenances. The second component of the Phase I Construction Plans and Specifications involve regulated dam safety activities that impact the safety of the dam and/or its appurtenances.

Marks Enterprises of NC, PLLC (Marks Enterprises) was notified by Mr. John Northen, Chapter 11 Bankruptcy Attorney, on November 3, 2014 that Marks Enterprises had been approved by the Court to continue to provide professional engineering services to the Owner. The first order of business involved conference telephone calls to outline a preliminary schedule of events that included a range of investment amount and the approximate timing of the investment. The Owner requested a breakdown of the project so that concurrence could be obtained from DENR. The previously referenced analyses and evaluations have resulted in the publication of this document. Mr. Northen further advised that Marks Enterprises should proceed with engineering services associated with obtaining an Approval to Repair Certificate from DENR. Based upon our current workload and the upcoming holiday season we anticipate having the revised Plans and Specifications for the Phase I Construction back to DENR by January 9, 2014.

<u>TASK</u>	<u>DESCRIPTION OF ACTIVITIES</u>	<u>DATE</u>	<u>FUNDING</u>
1.	Non-Regulated Construction Items	01-16-15	
	a. Construction Access Roads		\$116K
	b. Secured Equip. & Matls. Yard		\$ 16K
	c. Office Trailer & Concrete Lab		<u>\$ 32K</u>
		Subtotal	\$164K
2.	Regulated Construction Items	02-20-15	
	a. Remove Rear Wall of Splash Pool		\$ 50K
	b. Replace Rear Wall of Splash Pool		\$ 90K
	c. Remove & Replace Splash Pool Slabs		<u>\$200K</u>
		Subtotal	\$340K
			<hr/>
		TOTAL	\$504K

Notes: Task 1 will begin before receipt of Approval to Repair
 Task 2 will not begin before receipt of Approval to Repair
 Task 2 is estimated to be completed by 05-15-2015
 Site Clean-up and Demobilization by 05-22-2015
 Project Engineer will conduct Monthly Inspections until
 Task 3 begins

3.	Reinforcement of Spillway Walls	11-01-2015	\$160K
4.	Remove and Replace 50% Spillway Slabs		<u>\$490K</u>
		TOTAL	\$650K

Notes: The funding for Tasks 3 & 4 is the estimated construction
 Cost. Task 4 will be completed by May 1, 2016

5.	Complete 50% of Spillway Slabs	11-01-2016	\$490K
6.	New Walkway & Gate Liter Foundations		<u>\$160K</u>
		TOTAL	\$650K

Notes: The funding for Tasks 5 & 6 is the estimated construction
 Cost. Task 6 will be completed by May 1, 2017

THIS WILL CONCLUDE THE WORK FOR PHASE I

Phase II of the dam remediation plans and specifications for Woodlake Dam have not been prepared at this time; however, preliminary design concepts and details were developed prior to the decision to divide the Construction Plans and Specifications into two (2) documents. As such, these preliminary plans have been utilized to estimate the construction cost of Phase II and establish a construction schedule. The Phase II portion of the dam remediation will consist of three (3) components of approximately equal cost and construction time.

Phase II: Spillway Wall and Embankment Seepage Control

7.	New Crossway & Gate Lifters	11-01- 2017	\$250K
8.	Sheetpile Walls and External Wall Subdrains		\$250K
9.	Embankment Subdrains and Toe Drains		<u>\$200K</u>
		TOTAL	\$700K

PROJECT GRAND TOTAL \$2.5 M

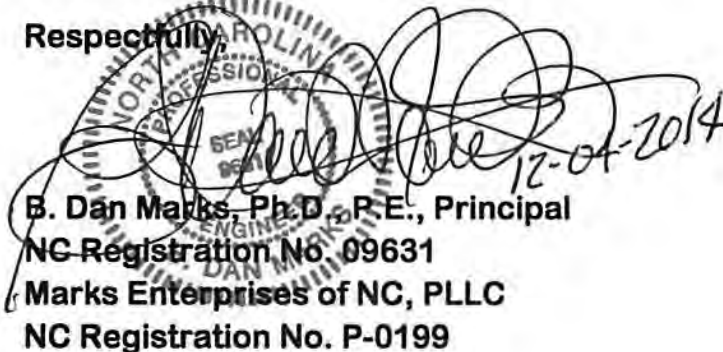
Adjustments in construction cost will have to be made at the conclusion of each construction period so that a more accurate assessment of project costs can be made to present to the Bankruptcy Court, Investors, and Owner.

**THE DAM REMEDIATION PROJECT FOR WOODLAKE DAM AND ITS
SPILLWAY SHOULD BE COMPLETED WITH TASK 9. IN MAY 2018**

CLOSURE

Marks Enterprises extends our sincere appreciation for your assistance throughout this project. We believe the Owner is sincere in its desire to bring Woodlake Dam into a condition that will provide protection of residents and landowners downstream of the Woodlake Resort and Country Club. As you are aware, the Woodlake Dam provides significant flooding protection to downstream property owners and the integrity of Woodlake Dam and its appurtenances must be paramount to the Woodlake Community. If there are questions that arise during your review of this document please contact me at your convenience, I will be happy to travel to your office to discuss any issues that you feel can be best worked out in person with drawings before us.

Respectfully,



B. Dan Marks, Ph.D., P.E., Principal
NC Registration No. 09631
Marks Enterprises of NC, PLLC
NC Registration No. P-0199

Attachment: WOODLAKE DAM REMEDIATION PROJECT BREAKDOWN

Cc:

Mr. John Northen, Esq., Bankruptcy Attorney for Owner
Mr. Richard M. Hutson II, Chief Restructuring Officer for Owner

BDM/dm



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

December 15, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake Partners, LLC
c/o Woodlake Country Club
Attn: Ms. Julie Watson, Registered Agent
150 Woodland Boulevard
Vass, North Carolina 28394

Woodlake Partners, LLC
Attn: Ms. Julie Watson, Registered Agent
Post Office Box 648
Vass, North Carolina 28394

RE: Woodlake Dam
Moore County
State Dam ID: MOORE-040
Cape Fear River Basin

Dear Ms. Watson:

Attached is an order, issued under the authority of the North Carolina Dam Safety Law of 1967, requiring that within 91 days plans and schedule for repairing or breaching the subject dam located on Crains Creek in Moore County be developed by a North Carolina registered professional engineer and submitted to the Director of the Division of Energy, Mineral, and Land Resources. A copy of the North Carolina Dam Safety Law of 1967 is enclosed for your information.

If you wish to contest this Dam Safety Order, you must request a contested case hearing within 10 days after receiving this notice. This request must be in the form of a written petition that conforms to the requirements set forth in North Carolina General Statute (NCGS) 150B-23. The original petition and one copy must be filed as follows:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, North Carolina 27699

Any questions about filing a petition may be directed to the Clerk of the Office of Administrative Hearings by telephone at (919) 431-3000.

A copy of the petition must also be served on the Department as follows:

Mr. John Evans, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

Division of Energy, Mineral, and Land Resources
Energy Section • Geological Survey Section • Land Quality Section
1612 Mail Service Center, Raleigh, North Carolina 27699-1612 • 919-707-9200 / FAX: 919-715-8801
512 North Salisbury Street, Raleigh, North Carolina 27604 • Internet: <http://portal.ncdenr.org/web/lr/>
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Ms. Watson (Woodlake Partners, LLC)
December 15, 2014
Page Two

Please note that failure to comply with this Dam Safety Order may result in:

1. The assessment of a civil penalty of not less than \$100.00 nor more than \$500.00. In the case of a willful failure to comply with this Dam Safety Order, a civil penalty may be imposed in an amount up to \$500.00 for each day of violation. This penalty will begin to run from the deadline established in the Dam Safety Order; and/or
2. A request to the Attorney General's Office for injunctive relief.

If you have any questions, please contact either:

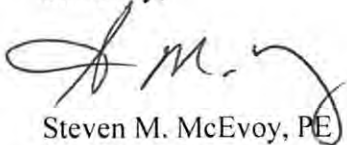
Mr. Brad Cole, PE
Regional Supervisor
Land Quality Section
225 Green Street, Suite 714
Fayetteville, North Carolina 28301
Telephone: (910) 433-3300

Or

Mr. Steven M. McEvoy, PE
State Dam Safety Engineer
Land Quality Section
1612 Mail Service Center
Raleigh, North Carolina 27699-1612
Telephone: (919) 707-9220

We would appreciate your calling us as soon as you receive this notice so that we can be aware of your plans and schedule.

Sincerely,



Steven M. McEvoy, PE
State Dam Safety Engineer

Enclosure

cc: Dr. B. Dan Marks, PE, Marks Enterprises
Surface Water Protection Regional Supervisor - FRO
Mr. Brad Cole, PE, Land Quality Regional Supervisor
Mr. Scot Brooks, CEM, Moore County Emergency Management

DAM SAFETY ORDER

FINDINGS AND ORDER OF THE DIRECTOR DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES

Woodlake Partners, LLC
c/o Woodlake Country Club
Attn: Ms. Julie Watson, Registered Agent
150 Woodland Boulevard
Vass, North Carolina 28394

Woodlake Partners, LLC
Attn: Ms. Julie Watson, Registered Agent
Post Office Box 648
Vass, North Carolina 28394

RE: Woodlake Dam
Moore County
MOORE-040
Cape Fear River Basin

Order No. DS 14-05

Pursuant to the authority contained in North Carolina General Statute (NCGS) 143-215.32 as delegated to the Director in the North Carolina Administrative Code, Title 15A, Subchapter 2K, Section .0302 (15A NCAC 2K.0302), I find the following:

1. Woodlake Partners owns a dam on Crains Creek in Moore County. The dam is located approximately 2450 feet northwest of the intersection of Lobelia Road (SR 690) and McGill Road (SR 2017).
2. The dam is approximately 23 feet in height and has an impoundment capacity of approximately 10,000 acre-feet at the top of dam elevation.
3. The dam has the following deficiencies that threaten its integrity:
 - A. Several cracks were noted in the concrete of the principal spillway of the dam. Areas of concern are located along the right side (as viewed facing downstream) subsurface drain outlets. All joints in the principal spillway are in need of maintenance or repair. In addition, large areas of spalling concrete are present at the entrance and outfall of the spillway.
 - B. A void of unknown size is present at the bottom of the principal spillway. Unsuccessful attempts have been made to fill and stabilize these voids with concrete debris.
 - C. Voids are present along the right side (as viewed facing downstream) wing wall as well as at the subsurface drain outlet locations.
 - D. Seepage was noted at various locations on the downstream slope of the dam.
4. The dam is classified in the high hazard category because failure of the dam poses a threat to human life and property downstream from the dam that includes downstream single-family residences at 3862 Lobelia Road and 1484, 1492, and 1494 McGill Road, as well as State

Road 690 (Lobelia Road) and State Road 2017 (McGill Road). State Road 690 is a public roadway with a traffic count of approximately 4000 vehicles per day (AADT). State Road 2017 is a public roadway with a traffic count of approximately 330 vehicles per day (AADT).

5. Woodlake Partners was notified of the deficiencies of the dam in a letter dated April 22, 2014. This letter requested that a registered professional engineer be retained to make a study, and to prepare plans and specifications for the repair of the dam based on the results of the study.

A repair plan was submitted by a registered professional engineer that identified and addressed various structural and other deficiencies at the dam. A response letter was issued requiring revisions and additional information be provided prior to approval of the repair plan by the Division of Energy, Mineral, and Land Resources. Except for a proposed project work schedule received on December 6, 2014, none of the required additional information or revisions has been submitted to this Division. The option to submit a new and different repair plan is also available.

As of the date of last inspection, April 4, 2014, there has been no improvement in the conditions at the dam.

Therefore, by the authority of NCGS 143-215.32(b) and 15A NCAC 2K.0302, it is hereby Ordered that:

1. The reservoir shall be immediately lowered not less than 3 feet from normal pool elevation and maintained in that lowered condition until repair, alteration, reconstruction or breaching is accomplished pursuant to plans and specifications developed by a licensed engineer and approved by Tracy E. Davis, PE, Director, Division of Energy, Mineral, and Land Resources. Re-impoundment will also require the issuance of an Approval to Impound.
- 2.a. Woodlake Partners shall within 91 days of the issue of this order, to wit March 16, 2015 submit a revised application to repair the deficiencies of the dam in accordance with 15A NCAC 2K.0200 for approval by Tracy E. Davis, PE, Director, Division of Energy, Mineral, and Land Resources. A construction schedule prepared in accordance with 15A NCAC 2K.0213 including a date for initiation of repair activities shall be submitted for approval as part of this application. Strict adherence to the approved construction schedule will be required once approval is issued;

or

- 2.b. Woodlake Partners shall within 91 days of the issue of this order, to wit March 16, 2015 submit an application to breach the dam in accordance with 15A NCAC 2K.0200 for approval by Tracy E. Davis, PE, Director, Division of Energy, Mineral, and Land Resources. A construction schedule prepared in accordance with 15A NCAC 2K.0213 including a date for initiation of breach activities shall be submitted for

Ms. Watson (Woodlake Partners)

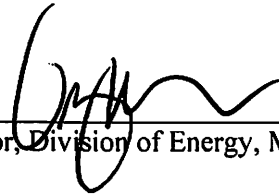
Order No. DS 14-05

Page Three

approval as part of this application. Strict adherence to the approved construction schedule will be required once approval is issued. Breach of this dam shall be done in a manner that will preclude the washing of sediment downstream.

12/15/2014

Date



Director, Division of Energy, Mineral, and Land Resources



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald van der Vaart
Secretary

Certificate of Approval

May 15, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Approval to Repair – Phase 1
Woodlake Dam
Moore County
State Dam ID: MOORE-040

Dear Sir or Madam:

This is in response to your submission dated December 4, 2014 and January 28, 2015, received on December 8, 2014, and February 2, 2015, of plans, specifications, design data, and construction schedule for repair of the subject dam in compliance with the Dam Safety Law of 1967. This dam is of high hazard classification. The plans, specifications, and design data submitted were prepared under the supervision of Dr. B. Dan Marks, PE, of Marks Enterprises of NC, PLLC.

This letter constitutes approval of the proposal to repair the subject dam according to the plans and specifications received by this Division on February 2, 2015, with the following stipulations:

1. A minimum flow equal to inflow or 16 cubic feet per second whichever is less must be released from the dam site at all times, even during construction. Monitoring equipment in accordance with 15A NCAC 2K .0504 must be approved by this Division and installed.

2. Project construction shall be supervised by Dr. B. Dan Marks, PE. Dr. B. Dan Marks, PE, shall be responsible for field observation of construction as necessary to ensure compliance with approved plans.
3. During construction, the Division of Energy, Mineral, and Land Resources may require such progress reports as are deemed necessary.
4. In accordance with GS 143-215.29 and NCAC 15A-2K .0203, .0212, .0215, and .0216, within 30 days of completion of the project, Dr. B. Dan Marks, PE, shall inspect the completed work and upon finding that the work has been done as specified, that minimum stream flow requirements have been satisfied, and the dam is safe, shall file with the Division of Energy, Mineral, and Land Resources two sets of record drawings and a certificate stating that the work has been completed in accordance with approved plans, specifications, and other requirements.
5. The water level within the impoundment shall be maintained at a maximum plan elevation of 214.0 feet for the duration of Phase 1 repair activities. This elevation was specified by the engineer on Plan Sheet 15 of 18, Section 100.3 - Sequence of Construction, Note 1.

In accordance with GS 143-215.30 and NCAC 15A-2K .0220, final written consent must be issued by the Director of the Division of Energy, Mineral, and Land Resources for impoundment to normal pool elevation and operation of this dam pursuant to these repairs. Also, draining of the lake shall be performed in such a manner as to preclude off-site sedimentation.

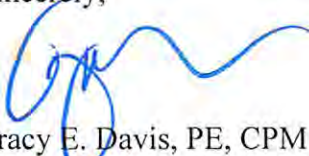
6. Prior to issuance of final written consent for use of this dam pursuant to these repairs, the requirements of Session Law 2014-122, Section 8, revised by Session Law 2015-7 must be met. Session Law 2015-7 requires all owners of high and intermediate hazard dams to submit an Emergency Action Plan (EAP) to the Department of Environment and Natural Resources (DENR) and the Department of Public Safety (DPS) no later than December 31, 2015. More detailed information may be found at the Division of Energy, Mineral, and Land Resources website noted on page one of this letter.
7. An operation and maintenance (O&M) plan is required for all high hazard dams. The O&M plan should address routine maintenance, frequency of piezometer readings, frequency of inspections by the owner or the owner's representative, and annual operation of the bottom drain to ensure that it is functional. The O&M plan must be received prior to issuance of final written consent for operation of the dam pursuant to these repairs.
8. This approval does not convey the right to access the private property of others. Any required access to perform the approved work must be secured prior to initiation of construction activities.
9. You must notify Mr. Brad Cole, PE, Regional Supervisor, Land Quality Section, 225 Green Street, Suite 714, Fayetteville, North Carolina 28301-5094, telephone number (910) 433-3300 ten days before the start of construction.

The U.S. Army Corps of Engineers and the Division of Water Resources of this Department should be contacted to determine if additional permits are required. Also, the erosion and sediment control program having jurisdiction should be contacted to determine permit requirements. In any case, sediment must be prevented from entering the waters of the state or flowing onto neighboring property.

Because the subject dam has known deficiencies and has been subject to previous enforcement action by this Division, it is essential that the approved repairs are implemented as soon as possible to protect public safety and eliminate the need for further enforcement actions. The repair schedule and impoundment elevation approved herein may be revised should further enforcement action be initiated.

For assistance you may contact the Fayetteville Regional Office at (910) 433-3300 or a staff member of the Dam Safety Program in the Raleigh Central Office at telephone number (919) 707-9220.

Sincerely,



Tracy E. Davis, PE, CPM
Director

TED/smm

Attachment

cc: Dr. B. Dan Marks, PE, Marks Enterprises of NC
Ms. Julie Watson, Woodlake Country Club
Mr. Brad Cole, PE, Land Quality Regional Supervisor
Surface Water Protection Regional Supervisor - FRO

Filename: MOORE-040_20150515_COAR_Repair_Woodlake Dam - Ph. I



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald van der Vaart
Secretary

July 27, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Woodlake Dam
Moore County
State Dam ID: MOORE-040
Cape Fear River Basin

Dear Sir or Madam:

Attached is an order, issued under the authority of the North Carolina Dam Safety Law of 1967, requiring that within 91 days the plans for repairs approved by this Division by letter dated May 15, 2015 be initiated or plans and schedule for breaching the subject dam located on Crains Creek in Moore County be developed by a North Carolina registered professional engineer and submitted to the Director of the Division of Energy, Mineral, and Land Resources. A copy of the North Carolina Dam Safety Law of 1967 is enclosed for your information.

If you wish to contest this Dam Safety Order, you must request a contested case hearing within 10 days after receiving this notice. This request must be in the form of a written petition that conforms to the requirements set forth in North Carolina General Statute (NCGS) 150B-23. The original petition and one copy must be filed as follows:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, North Carolina 27699

Any questions about filing a petition may be directed to the Clerk of the Office of Administrative Hearings by telephone at (919) 431-3000.

Division of Energy, Mineral, and Land Resources
Energy Section • Geological Survey Section • Land Quality Section
1612 Mail Service Center, Raleigh, North Carolina 27699-1612 • 919-707-9200 / FAX: 919-715-8801
512 North Salisbury Street, Raleigh, North Carolina 27604 • Internet: <http://portal.ncdenr.org/web/lr/>
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Woodlake CC Corp.

July 27, 2015

Page Two

A copy of the petition must also be served on the Department as follows:

Mr. Sam M. Hayes, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

Please note that failure to comply with this Dam Safety Order may result in:

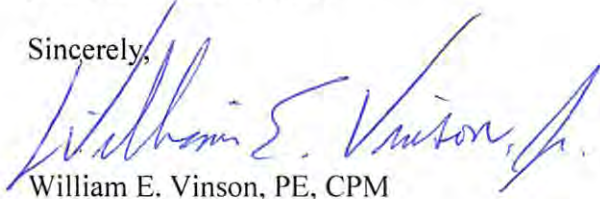
1. The assessment of a civil penalty of not less than \$100.00 nor more than \$500.00 for each day of violation. This penalty will begin to run from the deadline established in the Dam Safety Order; and/or
2. A request to the Attorney General's Office for injunctive relief.

If you have any questions, please contact me in writing or by telephone at:

Mr. William E. Vinson, PE, CPM
Section Chief
Land Quality Section
1612 Mail Service Center
Raleigh, North Carolina 27699-1612
Telephone: (919) 707-9220

We would appreciate your calling us as soon as you receive this notice so that we can be aware of your plans and schedule.

Sincerely,



William E. Vinson, PE, CPM
Section Chief
Land Quality Section

Enclosure

cc: Dr. B. Dan Marks, PE, Marks Enterprises of NC
Mr. Nick Mills, Land Quality Environmental Specialist – FRO
Surface Water Protection Regional Supervisor
Mr. Scot Brooks, CEM, Emergency Manager – Moore County
Ms. Julie Watson

DAM SAFETY ORDER

FINDINGS AND ORDER OF THE DIRECTOR DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Woodlake Dam
Moore County
MOORE-040
Cape Fear River Basin

Order No.: DS 15-01

Pursuant to the authority contained in North Carolina General Statute (NCGS) 143-215.32 as delegated to the Director in the North Carolina Administrative Code, Title 15A, Subchapter 2K, Section .0302 (15A NCAC 2K.0302), I find the following:

1. Woodlake CC Corp. owns a dam on Crains Creek in Moore County. The dam is located approximately 2,450 feet northwest of the intersection of Lobelia Road (SR 690) and McGill Road (SR 2017).
2. The dam is approximately 23 feet in height and has an impoundment capacity of approximately 10,000 acre-feet at the top of the dam elevation.
3. The dam has the following deficiencies that threaten its integrity:
 - A. Several cracks were noted in the concrete of the principal spillway of the dam. Areas of concern are located along the right side (as viewed facing downstream) subsurface drain outlets. All joints in the principal spillway are in need of maintenance or repair. In addition, large areas of spalling concrete are present at the entrance and outfall of the spillway.
 - B. A void of unknown size is present at the bottom of the principal spillway. Unsuccessful attempts have been made to stabilize these voids with concrete debris at the end of the spillway.
 - C. Voids are present along the right side (as viewed facing downstream) wing wall as well as at the subsurface drain outlet locations.
 - D. Seepage was noted at various locations on the downstream slope of the dam.
4. The dam is classified in the high hazard category because failure of the dam poses a threat to human life and property downstream from the dam that includes downstream single-family residences at 3862 Lobelia Road and 1484, 1492, and 1494 McGill Road, as well as State Road

690 (Lobelia Road) and State Road 2017 (McGill Road). State Road 690 is a public roadway with a traffic count of approximately 4,000 vehicles per day (AADT). State Road 2017 is a public roadway with a traffic count of approximately 330 vehicles per day (AADT).

5. A Certificate of Approval to Repair for the subject dam was issued May 15, 2015, to Woodlake CC Corp, and was received by Woodlake CC Corp. on May 26, 2015. As part of that approval, Woodlake CC Corp. was notified that adherence to the approved construction schedule and impoundment drawdown elevation would be required to avoid further enforcement action by this Division. To date, no substantial site work has been performed to implement the approved repair plans.
6. As an elevation reference datum, the elevation at the top of the spillway gates is plan elevation 224.5 according to the repair plans approved by this Division by letter dated May 15, 2015.

Therefore, by the authority of NCGS 143-215.32(b) and 15A NCAC 2K.0302, it is hereby Ordered that:

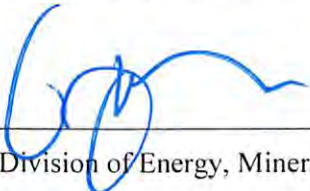
1. The reservoir surface elevation shall be immediately drawn down to a maximum plan elevation of 218 feet and maintained at or below that elevation until repair, alteration, reconstruction, or breaching is accomplished pursuant to plans and specifications developed by a licensed engineer and approved by Tracy E. Davis, PE, CPM, Director, Division of Energy, Mineral, and Land Resources. Any devices necessary to control erosion and prevent discharge of sediment shall be installed in the interim. Re-impoundment will also require the issuance of a Certificate of Approval to Impound.
- 2.a. October 27, 2015 Woodlake CC Corp. shall within 91 days of the issue of this order, to wit October 27, 2015 initiate construction of the repairs approved by Tracy E. Davis, PE, CPM, Director, Division of Energy, Mineral, and Land Resources by letter dated May 15, 2015, in accordance with 15A NCAC 2K.0200. Task 2 of the approved construction schedule shall be completed no later than 90 calendar days after initiation of construction activities;

or

- 2.b. October 27, 2015 Woodlake CC Corp. shall within 91 days of the issue of this order, to wit October 27, 2015 submit an application to breach the dam in accordance with 15A NCAC 2K.0200 for approval by Tracy E. Davis, PE, CPM, Director, Division of Energy, Mineral, and Land Resources. A construction schedule prepared in accordance with 15A NCAC 2K.0213 including a date for initiation of breach activities shall be submitted for approval as part of this application. Strict adherence to the approved construction schedule will be required once approval is issued. All breach activities at this dam shall be conducted in a manner that will preclude the washing of sediment downstream.

7/28/2015

Date


Director, Division of Energy, Mineral, and Land Resources

Memorandum

Date: 28 October 2016

To: Shane Cook, P.E., L.S.I.T.

Copies to: Julie Watson, Woodlake CC Corporation

From: Beau Hodge, P.G., Njoroge Wainaina, P.E., Robert Bachus, Ph.D., P.E.,
Matthew Bardol, P.E., Peter de Haven, P.E.

Subject: Preliminary Design for Interim Remedy, Woodlake Dam, Moore County, NC

INTRODUCTION

On behalf of Woodlake CC Corp. (Woodlake), Geosyntec Consultants of NC, PC (Geosyntec) has prepared this memorandum to document the preliminary design for the Interim Remedy for Woodlake Dam. Woodlake Dam sustained damage to its primary spillway during and after Hurricane Matthew passed through North Carolina, bringing heavy rains and resulting runoff to the area beginning on 8 October 2016. To minimize the potential for flow across the spillway, Woodlake developed and implemented an immediate response, including the following actions: (i) implementation of the approved Emergency Action Plan (EAP) for the dam (Geosyntec, 2016); and (ii) continuous drainage of the lake using pumps and the two emergency spillways' low-level discharge pipes to lower the water level to an elevation significantly below the crest elevation of the spillway. Currently, the water level in the lake is over 8 ft. below the spillway crest.

In consultation with the North Carolina Department of Environmental Quality Dam Safety Program (NCDEQ), Woodlake has developed a two-phased remedy approach to rehabilitate the dam to meet current NCDEQ requirements for a new dam and restore Surf Lake to productive use. The first phase, which is the Interim Remedy described herein, entails a partial breach of the dam and expedited modifications to the dam to maintain the lake stage at a sufficiently low level to safely manage likely storm events until a Final Remedy can be designed, permitted, and constructed. After implementation of the Interim Remedy, Woodlake proposes to work cooperatively with NCDEQ to develop and implement a Final Remedy for the dam.

This preliminary design memorandum contains preliminary calculations, drawings, and narrative plans to describe the Interim Remedy. It is submitted to communicate Woodlake's general plans to NCDEQ and outside stakeholders for review and comment. Geosyntec recognizes that several technical details (e.g., elevations, construction specifications, hydraulic model simulations, etc.) may need to be refined and submitted to NCDEQ prior to formal approval of this Interim Remedy. As such, none of the materials submitted with this memorandum have been sealed by a Professional Engineer (P.E.), although all the technical activities referenced herein have been prepared by or under the direction of a licensed North Carolina P.E. The process for completing the Interim Remedy and formal submittal of this remedy to NCDEQ will be discussed in the conclusion of this memorandum.

The remainder of this memorandum addresses the following: (i) objectives and design basis for the Interim Remedy; (ii) preliminary design details; (iii) implementation considerations; and (iv) the design completion process.

OBJECTIVES AND DESIGN BASIS

The Interim Remedy for Woodlake Dam includes a partial breach of the dam and design of a temporary lowered primary weir crest and armored rundown to achieve the following objectives:

- maintaining a sustained baseline¹ lake level at a stage that will safely pass a 100-yr storm (i.e., 8.21 in. of rainfall in 24 hrs.) through the breached section while providing a minimum of 5 ft. of freeboard from the crest of the dam; and
- providing sufficient lake storage to limit peak lake outflows that are less than those assumed from the 10- and 100-year storm events in existing Federal Emergency Management Agency (FEMA) flood modeling for Crane Creek.

Woodlake desires to meet these objectives while allowing the lake level to remain as high as possible during normal operating conditions to maximize lake benefits during the time between implementation of the Interim Remedy and Final Remedy. Attaining the first objective requires a substantial reduction of the primary spillway crest elevation; as such, the Interim Remedy will entail a temporary partial breach of the dam. For ease of implementation and to address the primary spillway damage caused by Hurricane Matthew, the crest elevation reduction will be achieved by excavating a trapezoidal "window" through the existing spillway. Hydrology and

¹ Baseline lake levels refer to the lake stage at the crest of the partially breached spillway that can be maintained during normal weather conditions.

hydraulics (H&H) modeling has been performed to select the dimensions of the window that meet the two design objectives stated above.

PRELIMINARY DESIGN DETAILS

The H&H analyses that were performed as part of this Preliminary Design are presented in Appendix A. These analyses primarily considered routing the 100-yr and 10-yr design storm through the lake and the new temporary primary spillway at the partially breached section of the dam. These analyses assumed the following: (i) the two existing emergency spillway low-level discharge pipes remained open and functional during the entire period of the Interim Repair; however, to be conservative the entire 100-year and 10-year design flow is routed over the spillway; and (ii) the lake level was at the elevation of the new temporary primary spillway when the 100-year storm occurred. Using the analysis results, the shape of the trapezoidal window was selected to pass the 100-year storm flow of 6,959 cfs that had previously been used by FEMA as the discharge from Surf Lake to establish the downstream 100-year floodplain (H&H Calculation Package attached). As shown in Figure 1, the trapezoidal breach for the Preliminary Design was sized with the following considerations and dimensions, recognizing the condition of the current primary spillway:

- **Overall Width:** The existing primary spillway is 273 ft wide. The damage caused by Hurricane Matthew occurred in the middle section of primary spillway. On either side of the damaged section are 54-ft wide concrete slabs which appear to be uncompromised. Sidewalls exist on the outsides of the spillway, and these also appear to be uncompromised. To minimize erosion damage to the embankment, the concrete sidewalls and the 54-ft. wide concrete slabs on either side of the damaged portion of the spillway are to remain intact and will remain part of the temporary primary spillway. The temporary breach will be located in the same area of the spillway that was damaged. Therefore, the overall width of the temporary primary spillway will remain at approximately 273 ft.
- **Top Width:** As described above, the existing spillway is 273 ft wide, and the two 54-ft wide panels on either end of the spillway will remain intact. The damaged central portion will be removed to create the breach, resulting in a top width of the breached portion of the dam of approximately 165 ft.
- **Bottom Width:** Considering the use of 4.0 horizontal to 1.0 vertical (4.0 H:1.0 V) sideslopes commencing downward from the existing edge of each 54-ft. wide concrete spillway and el. 216 ft as the spillway crest elevation for the new spillway, the bottom

width of the temporary spillway is will be approximately 121 ft. at an elevation that is nearly 14 ft. lower than the crest of Woodlake Dam. The H&H analysis assumed a bottom weir width of 100 ft, which would provide conservative design calculations (resulting in higher velocities and a higher high water level within the lake).

- Freeboard: Analysis results estimate that the temporary primary spillway through the breached portion of the dam, in companion with a portion of the minimally damaged existing primary spillway, will pass the 100-year design flow with approximately 5 ft. of freeboard from the crest of Woodlake Dam.

As mentioned above, the sidewall slopes of the partially breached dam will be constructed at 4.0 H: 1.0 V and will be lined with the appropriate size of rip-rap to maintain geotechnical stability. Plan Sheet Number 6 presents two typical sections showing the geometry of the partial breach (i) along the length of the temporary spillway and (ii) transverse to the dam.

The results of the H&H analyses were used to size the riprap liner materials used to line the breach. Specifically, the sidewalls of the breach and the new drainage spillway will be covered with riprap with a nominal size of 24 inches.

IMPLEMENTATION DETAILS

It is anticipated that excavation for the temporary partial dam breach and construction of the temporary spillway described above will require approximately 3 to 4 weeks of field effort. The subgrade within the breach area (i.e., the subgrade beneath the compromised portion of the spillway) will be excavated to the design grades for the temporary spillway. Due to observed and suspected voids in the existing subgrade, the subgrade will be inspected during the construction process. Portions of the subgrade that are soft and unsuitable will be over-excavated and replaced as necessary prior to final placement of riprap. All field activities will be monitored by experienced personnel under the direction of a North Carolina registered P.E.

DESIGN COMPLETION PROCESS

While NCDEQ commences its review of this submittal, Woodlake is continuing with the refinement and completion of this Interim Remedy design. The refinements are anticipated to include the following: (i) confirming breach and drainage corridor geometry and elevations, (ii) modeling calculations to assess flood stages both within the dam and downstream in Crane Creek, and (iii) material specifications. We anticipate completion of a final design package sealed by a North Carolina P.E. within approximately 5 business days of approval of the Interim Design concept described in this memorandum. To expedite the NCDEQ review, Woodlake

Mr. Shane Cook, NCDEQ
28 October 2016
Page 5

proposes a teleconference or in-person meeting with NCDEQ personnel in advance of final package submittal, ideally on or about 1 November 2016. In addition, Woodlake has commenced discussions with qualified contractors to be able to immediately mobilize and be ready to commence excavation activities when the Interim Remedy is approved by NCDEQ.

REFERENCES

2016, August. Geosyntec. *Woodlake Dam Emergency Action Plan*.

* * * * *



Energy, Mineral
and Land Resources
ENVIRONMENTAL QUALITY

PAT MCCRORY

Governor

DONALD R. VAN DER VAART

Secretary

TRACY DAVIS

Director



Approval to Complete Interim Emergency Repairs

November 2, 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street; Suite 1000
Charlotte, North Carolina 28281

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Woodlake CC Corp.
401 South Tryon Street; Suite 3000
Charlotte, North Carolina 28202

RE: Approval to Repair – Temporary Breach
Woodlake Dam
Moore County
State Dam ID: MOORE-040

Dear Sir or Madam:

This letter is in response Geosyntec Consultants' memorandum dated October 28, 2016 submitted on your behalf with regards to the subject high hazard dam recently damaged by Hurricane Matthew. The letter serves as an approval to perform emergency repairs under the authority of §143-215.27(b) of the North Carolina General Statutes. The scope of the emergency repairs is limited to a partial temporary breach of the dam and design of temporary lowered primary weir crest and armored spillway.

The memorandum received by this office on October 28, 2016 provides a description and supporting engineering documents for performing emergency repairs, which includes the scope of work outlined above. The plans, specifications and design data submitted to this office were prepared under the supervision of Mr. Njoroge Wainaina, PE.

This letter constitutes approval of the proposal to perform the emergency repairs to the subject dam according to the plans and specifications received by this Division on October 28, 2016, with the following stipulations:

1. A minimum flow of 16 cubic feet per second must be released from the dam site at all times, even during construction.
2. Project construction shall be supervised by Mr. Njoroge Wainaina, PE. Mr. Njoroge Wainaina, PE, shall be responsible for field observation of construction as necessary to ensure compliance with approved plans [GS 143-215.29].
3. The impoundment shall be completely drained and remain in a drained state at all times until an approval to impound is issued by this division.
4. During construction, the Division of Energy, Mineral, and Land Resources may require such progress reports as are deemed necessary. Continued submittal of written status reports on an at least weekly basis is required.
5. In accordance with GS 143-215.30 and NCAC 15A-2K .0203, .0212, .0215, and .0216, within 30 days of completion of the project, Mr. Njoroge Wainaina, PE, shall inspect the completed work and upon finding that the work has been done as specified and that minimum stream flow requirements have been satisfied and the dam is safe, shall file with the Division of Energy, Mineral, and Land Resources two sets of record drawings and a certificate stating that the emergency repair work has been completed in accordance with approved plans, specifications and other requirements.
6. In accordance with GS 143-215.30 and NCAC 15A-2K .0220, final written consent must be issued by the Director of the Division of Energy, Mineral, and Land Resources for use of this dam pursuant to these repairs.
7. Prior to issuance of final written consent for use of this dam pursuant to these repairs, the requirements of Session Law 2014-122, Section 8, as revised by Session Law 2015-7 must be met. Session Law 2015-7 requires all owners of high and intermediate hazard dams to submit an Emergency Action Plan (EAP) to the Department of Environment and Natural Resources (DENR) and the Department of Public Safety (DPS) no later than December 31, 2015. **As such, a revised Emergency Action Plan (EAP) will be required by this office prior to final approval of the completed emergency repairs.**
8. This approval does not convey the right to access the private property of others. Any required access to perform the approved work must be secured prior to initiation of construction activities.
9. You must notify Mr. Brad Cole, PE, Chief of Regional Operations, Land Quality Section, 512 N Salisbury Street, Raleigh, North Carolina 27604, telephone number (919) 707-9221 before the start of construction.
10. The designs of the temporary breach are considered a preliminary design for this emergency remedy as per the letter submitted on October 28, 2016. Therefore, the final designs for the

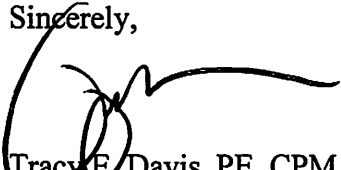
temporary breach must be submitted to this office by 5:00 pm on Tuesday, November 8, 2016. Construction per the preliminary design as approved by this letter may commence before the final plans have been submitted as long as this Division is notified.

The engineer-of-record or his qualified representative shall provide continuous on-site observations from the time construction commences until the time construction concludes. Weather forecasts shall be monitored by the engineer-of-record or his qualified representative to ensure that no accidental breach of the dam occurs during construction by a rain event. All safeguards shall be taken to ensure that the reservoir is completely drained and remains in a drained state during and after construction until notified otherwise by this Division. If a rain event should occur during construction, all resources shall be implemented to ensure that the reservoir stays in a drained state. Should a rain event be forecasted, or other conditions of concern arise, the owner or his representative shall take immediate steps to: (a) drain the reservoir, (b) notify their engineer, and (c) notify this Division of the conditions at the site.

The Army Corps of Engineers and the Division of Water Resources of this Department should be contacted to determine if additional permits are required. Also, the erosion and sediment control program having jurisdiction should be contacted to determine permit requirements. In any case, sediment must be prevented from entering the waters of the state or flowing onto neighboring property.

Please contact Mr. Nick Mills at the Fayetteville Regional Office at (910) 433-3300 or a staff member of the Dam Safety Program in the Raleigh Central Office at telephone number (919) 707-9220.

Sincerely,



Tracy E. Davis, PE, CPM

Director

TED/bsc

cc: Mr. Njoroge Wainaina, PE, Geosyntec Consultants of NC, PC
Ms. Julie Watson, Woodlake Country Club
Mr. Brad Cole, PE, DEMLR Chief of Regional Operations
Mr. Nick Mills, DEMLR Fayetteville Regional Office
Surface Water Protection Regional Supervisor - FRO

Memorandum

Date: 8 November 2016

To: Shane Cook, P.E., L.S.I.T.

Copies to: Julie Watson, Woodlake CC Corporation

From: Beau Hodge, P.G., Njoroge Wainaina, P.E., Matthew Bardol, P.E., Brianna Wallace, P.E., Peter de Haven, P.E.

Subject: Design for Bidding of Interim Remedy, Woodlake Dam, Moore County, NC

INTRODUCTION

On behalf of Woodlake CC Corp. (Woodlake), Geosyntec Consultants of NC, PC (Geosyntec) has prepared this memorandum to document the Design for Bidding of the Interim Remedy for Woodlake Dam. Woodlake Dam sustained damage to its primary spillway during and after Hurricane Matthew passed through North Carolina, bringing heavy rains and resulting runoff to the area beginning on 8 October 2016. To minimize the potential for flow across the spillway, Woodlake developed and implemented an immediate response, including the following actions: (i) implementation of the approved Emergency Action Plan (EAP) for the dam (Geosyntec, 2016); and (ii) continuous drainage of the lake using pumps and the two emergency spillways' low-level discharge pipes to lower the water level to an elevation significantly below the crest elevation of the spillway. As of 2 November 2016, the water level in the lake is over 11 ft. below the spillway crest.

In consultation with the North Carolina Department of Environmental Quality Dam Safety Program (NCDEQ), Woodlake has developed a two-phased remedy approach to rehabilitate the dam to meet current NCDEQ requirements for a new dam and restore Surf Lake to productive use. The first phase, which is the Interim Remedy described herein, entails (i) expedited modifications to the emergency spillway structures to maintain the lake stage at a sufficiently low level, and (ii) reconstruction of the primary spillway structure to prepare it for permanent re-use. The planned modifications will meet the objectives for protectiveness as discussed below

and safely manage likely storm events until a Final Remedy can be designed, permitted, and constructed.

The approach presented herein constitutes a refinement to the proposed approach submitted on 28 October 2016. Plan refinements stem from discussions with NCDEQ held in person on 2 November 2016 and via telephone on 4 November 2016. The updated approach has the advantage of rebuilding the primary spillway structure in a manner that is anticipated to be sufficient for use in both interim and final operational regimes. Hence, unlike the Preliminary Design submittal, it will not be necessary to re-mobilize construction equipment to this spillway for additional rebuilding during implementation of the Final Remedy. This modification in the approach will reduce the potential for weather-related construction risks and overall make the remedy more cost-effective.

After implementation of the Interim Remedy, Woodlake proposes to work cooperatively with NCDEQ to develop and implement a Final Remedy for the dam.

This Design memorandum contains updated calculations, drawings, and narrative plans to describe the Interim Remedy. It is submitted to communicate Woodlake's specific plans to NCDEQ, prospective contractors, and outside stakeholders for review and comment. It is also sealed by North Carolina registered Professional Engineers. While we anticipate that this Design will be ready for construction in its current form, pending the addition of contractor specifications, an additional calculation package concerning spillway seepage potential is necessary as discussed with NCDEQ on 2 November. We do not anticipate that a cutoff wall to mitigate seepage is necessary; however, the basis for this will be documented in a forthcoming addendum.

The remainder of this memorandum addresses the following: (i) objectives and design basis for the Interim Remedy; (ii) preliminary design details; (iii) implementation considerations; (iv) the design completion process.

OBJECTIVES AND DESIGN BASIS

The Interim Remedy for Woodlake Dam includes two major components: (i) retrofitting of the two emergency spillway outlets to effect a lower outlet level; and (ii) reconstruction of the dam spillway and armored rundown to achieve the following objectives:

- maintaining a sustained baseline¹ lake level at a stage that will safely pass a 100-yr storm (i.e., 8.21 in. of rainfall in 24 hrs.) through a combination of the rebuilt primary spillway and emergency spillway outlets while providing a minimum of 4 ft. of freeboard from the crest of the dam; and
- providing sufficient lake storage to limit peak lake outflows that are less than those assumed from the 10- and 100-year storm events in existing Federal Emergency Management Agency (FEMA) flood modeling for Crane Creek, assuming the same inflows to the lake as were assumed in the FEMA modeling.

Woodlake desires to meet these objectives while allowing the lake level to remain as high as safely practical during normal operating conditions to maximize lake benefits during the time between implementation of the Interim Remedy and Final Remedy. Attaining the first objective requires a reduction of the emergency spillway upper outlet elevation; as such, the Interim Remedy will entail a truncation of the current emergency spillway risers to a lower level (el. 216 ft) to force lake drainage at a relatively low stage. Additionally, the primary spillway will be substantially rebuilt through (i) removal of remaining concrete, (ii) excavation of the underlying embankment material as needed to remove potentially compromised foundation subgrade, and (iii) rebuilding of the embankment and spillway surface.

DESIGN DETAILS

The H&H analyses that were performed as part of this Preliminary Design are presented in Appendix A. These analyses primarily considered routing the 100-yr and 10-yr design storm through the lake and (i) the reconstructed primary spillway and (ii) the retrofitted emergency spillway outlets. These analyses assumed the following: (i) the two existing emergency spillway low-level discharge pipes remained open and functional during the entire period of the Interim Repair; and (ii) the lake level was at the elevation of the retrofitted emergency spillway outlets (el. 216 ft) when the 100-year storm occurred.

Using the analysis results, the dimensions and stage of the reconstructed primary spillway were selected to pass approximately 5,000 cfs which, in combination with outflow from the emergency spillway outlets, is sufficient to pass flow from the 100-year storm.

¹ Baseline lake levels refer to the lake stage at the crest of the partially breached spillway that can be maintained during normal weather conditions.

The existing primary spillway is 273 ft wide and 165 ft long. The reconstructed spillway will retain the same dimensions as before. The scope of the reconstruction work includes the following:

- cutting off the risers of the two existing emergency spillway at elevation 216 ft;
- removing all 10 of the spillway gates;
- removing all of the slabs (intact and damaged);
- excavating to grades shown on Plan Sheet Number 6;
- backfilling to grades shown on Plan Sheet Number 7;
- installation of geotextile material on top of the reconstructed embankment;
- Installation of a granular base and drainage layer consisting of North Carolina Department of Transportation (NCDOT) Class 78M aggregate;
- Installation of a 2 feet thick layer of roller compacted concrete (RCC),
- Installation of a toe drain (Plan Sheet No. 7), and
- Installation of NCDOT Class II rip rap downstream of the toe wall to minimize future erosion.

IMPLEMENTATION DETAILS

It is anticipated that reconstruction of the spillway as described above will require approximately 12 weeks of field effort. All field activities will be monitored by experienced personnel under the direction of a North Carolina registered P.E.

DESIGN COMPLETION PROCESS AND CONTRACTOR SELECTION

At the request of NCDEQ, Woodlake is performing seepage modeling to evaluate the sufficiency of the current design from the standpoint of seepage management. No further design enhancement is anticipated as a result of this effort; however, this consideration will be evaluated in a calculation package to be submitted as an addendum to this design package. While NCDEQ commences its review of this submittal, Woodlake is continuing with the advertisement of the

Mr. Shane Cook, NCDEQ
8 November 2016
Page 5

project for bids, selection of the contractor, and award of the contract. The bid documents are requiring the contractor to mobilize to the site no later than Monday November 21, 2016.

FINAL REMEDY DEVELOPMENT

During and after construction of the Interim Remedy, Woodlake will work with NCDEQ to develop and complete engineering designs for a final remedy for the dam. The current scope of construction for the Interim Remedy is intended to include elements that can remain unchanged for the Final Remedy.


The final remedy for Woodlake Dam will likely include the following elements: (i) the rebuilt primary spillway, to be constructed in Fall/Winter 2016/2017, serving as the final primary spillway; (ii) a new emergency spillway structure to be built in a new excavation in the embankment, separate from the primary spillway; and, potentially, (iii) one or more box culverts as an integral component of the new spillway construction to enhance long-term drawdown capacity.

REFERENCES

2016, August. Geosyntec. *Woodlake Dam Emergency Action Plan*.

* * * * *



SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY																
<ul style="list-style-type: none"> Complete items 1, 2, and 3. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. <p>1. Article Addressed to:</p> <p>Woodlake CC Corp. c/o National Corporate Research, Ltd. 212 South Tryon Street, Suite 1000 Charlotte, North Carolina 28281</p>  <p>9590 9403 0730 5196 3245 97</p> <p>2. Article Number (Transfer from service label)</p> <p>7014 1200 0001 3434 8860</p>	<p>A. Signature <input checked="" type="checkbox"/> <i>Tui Maersk</i> <input type="checkbox"/> Agent <input type="checkbox"/> Addressee</p> <p>B. Received by (Printed Name) <i>Tui Maersk</i></p> <p>C. Date of Delivery <i>11/25</i></p> <p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below <input checked="" type="checkbox"/> No</p> <p style="text-align: center;">NOV 30 2016</p> <p style="text-align: center;">RECEIVED</p> <p style="text-align: center;">LAND QUALITY SECTION <i>MOORE-090</i></p> <p>3. Service Type</p> <table border="0"> <tr> <td><input type="checkbox"/> Adult Signature</td> <td><input type="checkbox"/> Priority Mail Express®</td> </tr> <tr> <td><input type="checkbox"/> Adult Signature Restricted Delivery</td> <td><input type="checkbox"/> Registered Mail™</td> </tr> <tr> <td><input type="checkbox"/> Certified Mail®</td> <td><input type="checkbox"/> Registered Mail Restricted Delivery</td> </tr> <tr> <td><input checked="" type="checkbox"/> Certified Mail Restricted Delivery</td> <td><input checked="" type="checkbox"/> Return Receipt for Merchandise</td> </tr> <tr> <td><input type="checkbox"/> Collect on Delivery</td> <td><input type="checkbox"/> Signature Confirmation™</td> </tr> <tr> <td><input type="checkbox"/> Collect on Delivery Restricted Delivery</td> <td><input type="checkbox"/> Signature Confirmation Restricted Delivery</td> </tr> <tr> <td><input type="checkbox"/> Registered Mail</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Registered Mail Restricted Delivery (over \$500)</td> <td></td> </tr> </table>	<input type="checkbox"/> Adult Signature	<input type="checkbox"/> Priority Mail Express®	<input type="checkbox"/> Adult Signature Restricted Delivery	<input type="checkbox"/> Registered Mail™	<input type="checkbox"/> Certified Mail®	<input type="checkbox"/> Registered Mail Restricted Delivery	<input checked="" type="checkbox"/> Certified Mail Restricted Delivery	<input checked="" type="checkbox"/> Return Receipt for Merchandise	<input type="checkbox"/> Collect on Delivery	<input type="checkbox"/> Signature Confirmation™	<input type="checkbox"/> Collect on Delivery Restricted Delivery	<input type="checkbox"/> Signature Confirmation Restricted Delivery	<input type="checkbox"/> Registered Mail		<input type="checkbox"/> Registered Mail Restricted Delivery (over \$500)	
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NCDEQ Dam Safety Program
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 1612 Mail Service Center
 Raleigh, North Carolina 27699

MOORE-090

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9590 9403 0730 5196 3245 97

From: cook, Shane <Shane.Cook@ncdenr.gov>
Sent: Tuesday, December 06, 2016 10:40 AM
To: Beau Hodge; nwainaina@geosyntec.com; Julie Watson (juliewatson260@gmail.com)
Cc: Davis, Tracy; Vinson, Toby; Cole, Brad; Mills, Nick
Subject: Final submittal of the final design of the interim emergency remedy

Good morning all,

We have not yet received the final submittal of the final design of the interim emergency remedy for Woodlake Dam. I am notifying you in case you have forgotten that this was supposed to be submitted yesterday as per the DSO sent on November 17, 2016. Please respond and let me know your progress on this and when you plan to submit it.

Thanks,
Shane

Brian Shane Cook, PE, LSIT
State Dam Safety Engineer
NC DEQ - Land Quality Section
Telephone: (919) 707-9217
E-mail address: shane.cook@ncdenr.gov
NC Dam Safety web address: <http://portal.ncdenr.org/web/lr/dams>



From: cook, Shane <Shane.Cook@ncdenr.gov>
Sent: Friday, December 09, 2016 3:10 PM
To: Beau Hodge; nwainaina@geosyntec.com; Julie Watson (juliewatson260@gmail.com)
Cc: Davis, Tracy; Vinson, Toby; Cole, Brad; Denton, Bill; Munger, Bridget; Mills, Nick
Subject: FW: Woodlake Dam DSO deadlines
Attachments: subchapter k rules 12.9.16.pdf; Dam Safety Law 12.9.16.pdf

Good afternoon all,

We have not yet received the final submittal of the final design of the interim emergency remedy for Woodlake Dam that was due in this office by December 5, 2016 as per the Dam Safety Order that was sent to you on November 17, 2016. The Dam Safety Order also specified that construction of the interim emergency remedy must be initiated by December 8, 2016. I am notifying you to let you know that you have missed both of these important deadlines.

I have attached in this email a copy of the North Carolina Dam Safety Law as well as a copy of the Administrative Code for your reference. Title 15A NCAC 02K .0302 of the Administrative Code outlines Dam Safety Orders and GS 143-215.36 of the Dam Safety Law outlines Enforcement procedures.

To preclude further enforcement actions, please respond to me in writing within 5 business days regarding your schedule for submittal of the final design of the interim emergency remedy for Woodlake Dam and initiating repairs and otherwise complying with the November 17, 2016 Dam Safety Order.

Please note that failure to comply with this Dam Safety Order may result in:

1. The assessment of a criminal penalty;
2. The assessment of a civil penalty of not less than \$100.00 nor more than \$500.00 for each day of violation. This penalty will begin to run from the deadline established in the Dam Safety Order;

and/or

3. A request to the Attorney General's Office for injunctive relief.

Thanks,
Shane

Brian Shane Cook, PE, LSIT
State Dam Safety Engineer
NC DEQ - Land Quality Section
Telephone: (919) 707-9217
E-mail address: shane.cook@ncdenr.gov
NC Dam Safety web address: <http://portal.ncdenr.org/web/lr/dams>



From: cook, Shane

Sent: Tuesday, December 06, 2016 10:40 AM

To: 'Beau Hodge' <BHodge@Geosyntec.com>; nwainaina@geosyntec.com; Julie Watson (juliewatson260@gmail.com) <juliewatson260@gmail.com>

Cc: Davis, Tracy <tracy.davis@ncdenr.gov>; Vinson, Toby <toby.vinson@ncdenr.gov>; Cole, Brad <brad.cole@ncdenr.gov>; Mills, Nick <nick.mills@ncdenr.gov>

Subject: Final submittal of the final design of the interim emergency remedy

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Thanks,
Shane

Brian Shane Cook, PE, LSIT

State Dam Safety Engineer

NC DEQ - Land Quality Section

Telephone: (919) 707-9217

E-mail address: shane.cook@ncdenr.gov

NC Dam Safety web address: <http://portal.ncdenr.org/web/lr/dams>





Geosyntec Consultants of NC, PC
2501 Blue Ridge Rd, Suite 430
Raleigh, North Carolina 27607
PH 919.870.0576
www.geosyntec.com

20 December 2016

Ms. Julie Watson
Woodlake CC Corp.
c/o National Corporate Research, Ltd.
212 South Tryon Street, Suite 1000
Charlotte, North Carolina 28281

Mr. Frank Waschwill
Mr. Daniel Tost
Steiner + Company GmbH & Co. KG
Fuhlentwiete 14
20355 Hamburg, Germany

**Subject: Contract Termination
Emergency Response Support and Repair Planning Services
Woodlake Dam, Vass, North Carolina**

Dear Ms. Watson and Messrs. Waschwill and Tost:

Please be advised that Geosyntec Consultants of NC, P.C. ("Geosyntec") hereby provides notice of termination for cause of the Professional Services Agreement between Geosyntec and Woodlake CC Corp. ("Woodlake") pursuant to Section 15 of the agreement. As provided therein, this termination for cause is effective twenty (20) days after receipt.

As we have previously advised, the reason for termination is the non-payment of outstanding invoices in the amount of approximately \$270,000, and Woodlake's apparent inability to pay for the further services required to conform to the Dam Safety Order issued by the NCDEQ on November 17, 2016. In addition to the issues relating to non-payment for services to date, it appears that Woodlake is insolvent as to its ability to fund the work required by the Dam Safety Order.

As you know, we have previously communicated with Woodlake regarding these issues by letter dated 12 December 2016, and then again by copy of the email dated 16 December 2016 to the NCDEQ. We are also sending a copy of this letter to the NCDEQ as we must take steps to remove ourselves from the position of project engineer with respect to the work under the Dam Safety Order.

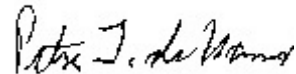
As provided in Section 15 of our agreement, we are prepared to cooperate in good faith to cure the foregoing causes for termination, provided that a mutually satisfactory solution is agreed upon within

Woodlake/Geosyntec_Woodlake_Contract_Termination_Letter_20161220.docx

Messrs. Waschwill and Tost
20 December 2016
Page 2

twenty (20) days, that is, on or before 9 January 2016. Such solution must include both the payment of outstanding invoices and evidence of sufficient solvency to carry out the work required by the Dam Safety Order.

Sincerely,



Peter J. de Haven, PE
Senior Principal

Copies to: Illya Steiner, Steiner Group
Ingolf B6x
Beau Hodge, P.G.
Paul Sanner
Majdi Othman, P.E.
Shane Cook, P.E., L.S.I.T., NCDEQ
Tracy Davis, P.E., C.P.M., NCDEQ