



Memorandum

To: ACL Board

Date: June 10, 2022

From: Megan Shamp

Memo #: 2022-67

Topic: June committee/commission changes

Recommendation: To appoint Mike Yorke as Chair, Laura Pratt as Vice Chair, and Steve Tribbey as Secretary of the of the GM Search Ad Hoc Commission; Al Zobbeck as Chair, Bill Becker as Vice Chair, and Laura Pratt as Secretary of the Zebra Mussel Ad Hoc Commission; Katie Thomas to the Budget/Audit Commission; Barb Hendren to the Nominating Committee and Rules & Regulations Commission; and Gordon Williams to the Deer Management Commission.

Plan on a Page: High Performing Operations and Management – Long Range Goals and Measures – To operate at full efficiency and effectiveness for the benefit of the Association.



Memorandum

To: ACL Board

Date: June 10, 2022

From: Ashlee Miller

Memo #: 2022-59 (2)

Topic: Approval of the K&S Marine Service Center Lease Contract

Issue & Analysis: The lease for K&S Marine expires at the end of 2022. A new proposal has been drafted by the ACLPOA legal counsel with input from the Association's insurance agent. This draft was given to Kevin Drane for review and suggested changes. The contract for approval is a new 5-year lease with K&S Marine, Inc. starting in January 2023 and running until December 2027.

The lease was submitted to the Board of Directors at their May meeting, but approval of the lease was tabled due to Henry Doden's questions regarding the disposal of hazardous waste. Ashlee met with Kevin Drane and drums of hazardous waste are picked up by a disposal company. He also has a tank as required by EPA.

Recommendation: To approve the proposed contract with K&S Marine Inc. 11A267 Nicklaus Court, Apple River, IL 61001.

*Plan on a Page: High Performing Operations and Management –
OYAP – Develop and implement timeline for issuing RFP's for professional services*

13.1

Memo will be
provided next
week.



Memorandum

To: ACL Board

Date: June 10, 2022

From: Strategic/Long Range Planning Commission

Memo #: 2022-68

Topic: Approval of the 2023 Plan on a Page

Issue & Analysis: The Strategic/Long Range Planning Commission is charged to “formulate, evaluate, and suggest recommendations to the Board of Directors for additions and deletions in the existing Strategic/Long Range Plan.”

They have revised their Plan on a Page for 2023 and are seeking approval in order to be in alignment with the 2023 budget planning process.

Changes proposed in the 2023 Plan on a Page are identified on the marked-up copy. A clean copy is also provided in the Board packet.

The commission will continue to communicate the progress of the plan in the Apple Core. The “dashboard” keeps the membership informed on the progress of the one-year action items.

Recommendation: To approve the 2023 Plan on a Page as presented by the Strategic/Long Range Planning Commission.

Plan on a Page: High Performing Operations and Management: To operate at full efficiency and effectiveness for benefit of the Association.

Apple Canyon Lake Property Owners Association
Board Motion Card

5/13/22
~~9/19/20~~

CATEGORY: UNFINISHED BUSINESS
AGENDA ITEM: 11.
SUBJECT:

MOTION:

To recommend the proposed 2023 POAP to the Board of Directors.

A motion was made by Kate Paul. Carmel Cottrell seconded the motion. The vote was 5 ayes and 0 nays.

Action Taken

MOTION MADE BY: _____	VOTE RECORDED:
MOTION SECONDED BY: _____	YEA: <u>5</u>
PRESIDENT: _____	NAY: <u>0</u>

Received 5/14

Apple Canyon Lake Property Owners' Association Plan-on-a-Page

2023-2027

The Apple Canyon Lake Property Owners Association Board of Directors shall act in a fiscally responsible manner, as a fiduciary, while exercising all powers and authority vested in the Association, so as to preserve its values and amenities, and promote health, safety and welfare for the common benefit and enjoyment of its membership while maintaining its not-for-profit status.

Vision	Long Range Goals and Measures	One Year Action Plans
<p>High Performing Operations and Management</p> <p>To operate at full efficiency and effectiveness for the benefit of the Association</p>	<ul style="list-style-type: none"> Utilization of office management software data efficiencies for analysis and decision making Annually study and conduct cost analysis on financial operations including contracting, purchasing, and utility costs Assure the knowledge and understanding of roles, responsibilities, and Governing Documents by the membership Review and update, if necessary, all Governing Documents on an annual basis Find best ways to communicate operational changes to property owners 	<ul style="list-style-type: none"> Continue Develop training programs to promote, educate, and support the membership on options for allowing each property owner to utilize create the ACL owners' portal (Northstar) with an emphasis to increase membership usage a digital file using Northstar property management system. Continue to share information and collaborate with ILAC and with other lake associations as needed, on common interests that are appropriate for ACL Through an IALC collaboration, monitor and challenge USI on utility pricing Cooperate with other lake associations on common interest issues, legislation, or events by lobbying on issues not appropriate for ACLPGA Communicate with membership regarding on voting on changes to the Governing Documents through printed and digital platforms in 2023 Declaration and reach a quorum The Board of Directors will create and monitor the Continue with new General Manager's transition action plan Continue with ongoing training, development, and cross training of employees for operational efficiency
<p>Improvement of Infrastructure</p> <p>To develop, maintain and improve the existing infrastructure</p>	<ul style="list-style-type: none"> Create a long-range capital development plan to include but not limited to flood mitigation, clubhouse area and offices, watershed management, dry dam improvements, dredging programs, and campground expansion With help from consultants, provide consistent lake and environmental management Initiate concept plan for lower 80 acres, development and design Effectively communicate Improvement of Infrastructure plans to property owners Review all reserved properties for functionality and purpose 	<ul style="list-style-type: none"> Review Study of office/meeting room expansion designs within the clubhouse footprint for addressing the needs of space footprint to include Memorial Pavilion Develop a master design and location for the Memorial Pavilion Continue to monitor, and measure Continue monitoring/controlling zebra mussel infestation utilizing s with the use of staff, volunteers, and consultants Implement the plan of action, timeline, and communication plan for Coordinate the logistics to preparing the lake for the start of the spillway renovation Execute a contract with a dredging company to dredge the entire lake Monitor Continue with the implementation of the watershed plan of action, including the filing of the Water Quality Grant (319) focusing on grant funds for the Winchester Bay project Retain and utilize consulting services for lake, dam, and watershed management Retain and utilize consulting services for lake, dam and watershed management Develop the engineering concept, plan of action and implementation timeline for flood mitigation Continue with implementation of the watershed plan of action Continue Dry Dam Action Plan for sub-watersheds surrounding the lake Continue with dredging program and explore commercial dredging options Develop plan for disposing of silt from our dredge ponds, including promotional campaign to raise awareness Increase capacity of cellular service to members Improve and maintain existing trail system Review on an annual basis all reserve properties for functionality and purpose

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**Apple Canyon Lake Property Owners' Association Plan-on-a-Page
2023-2027**

The Apple Canyon Lake Property Owners Association Board of Directors shall act in a fiscally responsible manner, as a fiduciary, while exercising all powers and authority vested in the Association, so as to preserve its values and amenities, and promote health, safety and welfare for the common benefit and enjoyment of its membership while maintaining its not-for-profit status.

Vision	Long Range Goals and Measures	One Year Action Plans
<p align="center">High Performing Operations and Management</p> <p>To operate at full efficiency and effectiveness for the benefit of the Association</p>	<ul style="list-style-type: none"> Utilization of office management software data efficiencies for analysis and decision making Annually study and conduct cost analysis on financial operations including contracting, purchasing, and utility costs Assure the knowledge and understanding of roles, responsibilities, and Governing Documents by the membership Review and update, if necessary, all Governing Documents on an annual basis Find best ways to communicate operational changes to property owners 	<ul style="list-style-type: none"> Continue to promote, educate, and support the membership to utilize the ACL owners' portal (Northstar) with an emphasis to increase membership usage Continue to share information and collaborate with ILAC and other lake associations, as needed, on common interests that are appropriate for ACL Communicate with membership regarding changes to the Governing Documents through printed and digital platforms The Board of Directors will create and monitor the General Manager's transition plan Continue with ongoing training, development, and cross training of employees for operational efficiency
<p align="center">Improvement of Infrastructure</p> <p>To develop, maintain and improve the existing infrastructure</p>	<ul style="list-style-type: none"> Create a long-range capital development plan to include but not limited to flood mitigation, clubhouse area and offices, watershed management, dry dam improvements, dredging programs, and campground expansion With help from consultants, provide consistent lake and environmental management Effectively communicate Improvement of Infrastructure plans to property owners Review all reserved properties for functionality and purpose 	<ul style="list-style-type: none"> Review office/meeting room expansion designs within the clubhouse footprint for addressing the needs of space Develop a master design and location for the Memorial Pavillion Continue to monitor, and measure zebra mussel infestation utilizing staff, volunteers, and consultants Implement the plan of action, timeline, and communication plan for spillway renovation Execute a contract with a dredging company to dredge the entire lake Monitor the implementation of the watershed plan, including the filing of the Water Quality Grant (319) focusing on the Winchester Bay project Retain and utilize consulting services for lake, dam, and watershed management Continue Dry Dam Action Plan for sub-watersheds surrounding the lake Improve and maintain existing trail system
<p align="center">Amenities and Services</p> <p>To study, develop, implement, and maintain existing and new amenities</p>	<ul style="list-style-type: none"> Develop ways to expand high demand amenities like the campground & the Association docks Initiate concept plan for lower 80 acres, development and design Create a long-range plan on adding additional amenities and services throughout the ACLPOA properties Effectively communicate amenity changes to the property owners 	<ul style="list-style-type: none"> Conduct member surveys to find interest levels of all current and any future amenities Study location options for additional Association docks and campsites
<p align="center">Growth and Value Enhancement of Association</p> <p>To promote membership and property of the Association</p>	<ul style="list-style-type: none"> Develop an efficient and effective marketing plan Study opportunities for land acquisition by the Association in the surrounding Area, primarily to protect the watershed or expand amenities Support a fully operational and sustainable ACL Charitable Foundation Better communication of Growth Plans and Value Enhancement to property owners Study and assess the viability of bringing alternative utility sources to ACL Facilities 	<ul style="list-style-type: none"> Develop plan of action for image and branding of Apple Canyon Lake Study and assess the viability of land acquisition or partnership in the surrounding area Support and promote ACL Charitable Foundation and their fundraising activities for ACL enhancements Assess the viability of Natural Gas to Apple Canyon Lake Study viability of converting ACL facilities to utilize solar power



Memorandum

To: ACL Board

Date: June 10, 2022

From: Recreation Commission

Memo #: 2022-69

Topic: Recreation Commission Designated Fund request

Issue & Analysis: The Recreation Commission is requesting that the Board approve use of their Designated Fund to purchase four 13' umbrellas and bases for the bocce ball courts, at a cost not to exceed \$650. The current balance in their Designated Fund is \$26,589.41.

Recommendation: To approve the Recreation Commission's request for up to \$650 from their Designated Fund to be spent to purchase four 13' umbrellas and bases for the bocce ball courts.

Apple Canyon Lake Property Owners Association
Committee Motion Card

Recreation Committee

Date 5/19/22

Move: To purchase four 13 ft umbrellas and bases for the ACL Bocce Ball Courts, not to exceed \$650⁰⁰.

Action Taken

MOTION MADE BY: John Anderson

MOTION SECONDED BY: LeAnne Killeen

PRESIDENT: Emil Misichko Emil Misichko

VOTE RECORDED:

YEA: 6

NAY: 0

ABSTAIN: 0



Memorandum

To: ACL Board

Date: June 10, 2022

From: Ashlee Miller

Memo #: 2022-73

Topic: AECC Liaisons

Analysis: The majority of the AECC must be comprised of Board members. Current liaisons to the AECC are Bob Ballenger and Nolan Mullen. Mike Harris, John Anderson, and _____ have volunteered to serve as liaisons to replace former Board members Barb Hendren, Tom Ohms, and Gordon Williams.

Recommendation: To appoint Bob Ballenger, Nolan Mullen, Mike Harris, John Anderson, and _____ as Board Liaisons to the AECC.



Memorandum

To: ACL Board

Date: June 10, 2022

From: Flood Mitigation Ad Hoc Commission

Memo #: 2022-71

Topic: Flood Mitigation Spillway Option

Analysis: At their June 2, 2022, meeting, the Flood Mitigation Ad Hoc Commission made two motions for the Board to consider, the first was to alert the Board of their recommendation of Alternate 2 (A2) option for the spillway which will be an approximate total cost of \$2 million. These costs will include the cost of their second motion, which is to approve \$249,000 for final design and permitting for the spillway project, construction costs of approximately \$1,550,000 plus additional costs of around \$100,000 for hiring CMT to perform the RFP and bidding process and be hired as onsite engineers during construction. The Ad Hoc Commission is not asking you to approve the expenditure of \$2 million at your June meeting, but they wanted you to be aware of the total cost of this project once the Board approves design and permitting.

Recommendation: To approve moving forward with Alternative 2 for a labyrinth spillway concept as described in the June 2020 Planning Report from CMT.

Apple Canyon Lake Property Owners Association Committee/Commission Motion Card

FLOOD MITIGATION ADHOC Committee/Commission

Date 6/2/22

I move:

THE EM AD HOC COMMITTEE RECOMMENDS TO BOB TO PURSUE ALTERNATE #2 FROM CMT WITH AN EXPECTED COST OF APPROXIMATELY TWO MILLION DOLLARS.

Action Taken

MOTION MADE BY: <u>RON CARPENTER</u>	VOTE RECORDED: YEA: <u>5</u> NAY: <u>0</u> ABSTAIN: <u>0</u>
MOTION SECONDED BY: <u>STEVE NELSON</u>	
CHAIR: <u>HANNON/NELSON</u>	

Date Received _____ Given to _____ Date Completed _____

At their June 2, 2022, meeting, the Flood Mitigation Ad Hoc commission made two motions for the Board to consider, the first was to alert the Board of their recommendation of Alternate 2 (A2) option for the spillway which will be an approximate total cost of \$2 million. These costs will include the cost of their second motion, which is to approve \$249,000 for final design and permitting for the spillway project, construction costs of approximately \$1, 550,000 plus additional costs of around \$100,000 for hiring CMT to perform the RFP and bidding process and be hired as onsite engineers during construction. The Ad Hoc commission is not asking you to approve the expenditure of \$2 million at your June meeting, but they wanted you to be aware of the total cost of this project once the Board approves design and permitting.

The second recommendation is to proceed with design and permitting of A2 for the spillway. The Flood Mitigation Ad Hoc commission has been meeting since July 2021, in that time they have met with CMT Engineer Ted LaBelle four times and PSI Geotechnical Engineer Kevin Miller once. From the June 2020 Dam and Spillway Planning Report, the January 2022 Preliminary Design report and now, the May 2022 Labyrinth Spillway and Dam Crest Raise Design Engineering Proposal, the commission has considered the best options for the spillway project to reduce the risk of flooding during the next one-hundred-year flood.

In their June 2020 report, CMT introduced ACL to a labyrinth weir. A zigzag shape that would increase the amount of water going over the spillway during a heavy rain event by four times the current spillway. In their report, CMT gave two options, both with the labyrinth spillway, but different options for the spillway shoot. Alternative 1 (A1) widened the spillway shoot, which would reduce some of the bottleneck of the additional water going over the new spillway and improve the risk of flooding during a one-hundred-year flood, but it was not the only option and A1, although improved the efficiency of the spillway, did not get our spillway into compliance with IDNR standards for a spillway. Alternative 2 still proposed the labyrinth spillway, but this design widened the spillway shoot even more and also lowered the spillway floor (page 5). This reduced the bottleneck after the new spillway and reduced the flooding levels in the models to levels where flooding would be reduced drastically. A2 also improved the spillway into compliance with IDNR.

As far as compliance, I spoke to our IDNR contact for dams, Paul Mauer, he stated that compliance is important, but any progress on our spillway would be an improvement, so either option would most likely be permitted by IDNR. This information allowed us to consider both options. So, then the question for the Ad Hoc was which option is best for ACL?

Alternative 1 is less expensive, before the estimated cost increases, the difference was just under \$400,000, but for a project of this importance and with the occurrence of flooding in NW Illinois in the past 10-15 years, would \$400,000 not spent, make us regret a decision in the future? The new estimated costs of A2 are now closer to \$1.55 million, the Ad Hoc wanted to make sure that we were not planning without considering inflation as well as material costs and labor increases. The updated May 2022 estimates do include a 20% contingency in the amount of \$259,000. There is also an increase in the rock removal. This is found during the survey work of the upstream ledge in front of the spillway. To increase efficiency of the spillway, the upstream channel of the spillway should be the same level as the bottom of the spillway. This ledge is currently about 18" below pool, so rock will need to be removed. Ted commented that this rock could be dropped back into the lake since it is already in the lake, not affecting depths. This would be the most efficient way to remove the rock. If ACL wanted to keep this

rock for rip rap or other armoring, it could also be moved to shore and then moved to a location where the rock could be used. An updated cost estimate for A1 was not obtained by the Ad Hoc.

If you look at the models supplied in the June 2020 report (pages 13 & 14), A2 offers the best protection for the dam, only overtopping in the event of a 100% Probable Maximum Flood, which is a 24-hour rainstorm that drops over 31" of rain in that time. In a 60% Probable Maximum flood A2 does not overtop the spillway and has a maximum lake level that is 2.8 feet lower than the existing spillway. A1 would be overtopped in the 60% Probable Maximum flood.

The recommendation from CMT from the June 2020 report is as follows (page 20) –

The Planning Report presents two alternatives to ACLPOA to increase spillway capacity and reduce peak water levels on Apple Canyon Lake during major flood events. Alternative No. 2 with labyrinth spillway and deeper spillway channel is recommended. Alternative No. 2 will bring the dam into compliance with the current INDR regulations for existing dams having High Hazard Classification and Intermediate Size except for insufficient freeboard on the dam. Further analysis of the design flood would be performed during the design phase if ACLPOA proceeds with the project. Alternative No. 1 with labyrinth spillway and wider spillway channel is a secondary alternative which will significantly reduce the peak water level during the 100-year frequency flood, although it will not bring the dam into compliance with current dam regulations for existing High Hazard dams. Alternative No. 1 has a lower project cost in comparison to Alternative No. 2. The dam could meet IDNR regulations for 60% PMF with adequate freeboard if a new labyrinth spillway of greater length is constructed. The cost for the larger spillway would be greater than Alternative No. 2

The January 2022 Preliminary Design Report looks into four areas that the BOD had requested from CMT

1. Should the channel downstream of the waterfall be widened?
2. What are the regulatory requirements related to increased downstream flooding?
3. Can rock removal for the new spillway be done without impact of the dam?
4. What is the estimated cost of adding fill to level the crest of the dam?

CMT conducted an onsite survey to determine what impact the additional discharge of water over the spillway would have on the downstream channel, the bridge abutment, and the road. CMT met with the Township Road Commissioner and County Engineer at the site to discuss the bridge and historic damage caused from the floods of 2010, 2011 and 2017. It was determined that the additional discharge could be handled and no changes would be necessary. A Geotechnical Engineer was brought on site to review the spillway channel and determine how rock removal could be performed and whether the removal could impact the integrity of the dam. The Engineer explained different methods for rock removal and educated us on blasting and the low impact of blasting on the dam as well as neighboring houses.

The crest of the dam should be level, the BOD determined to wait on this project until construction of the spillway, but to include the project in the bidding process, so this will be included in the final design.

The Ad Hoc Commission has taken all of this information into consideration for their recommendations. They recommend to the Board to proceed with approval of the Labyrinth Spillway and Dam Crest Raise Design Engineering Proposal for an amount not to exceed \$249,000. The information provided in the reports from CMT show that Alternative 2 is the best solution for ACL spillway to assure that the next

flood event will not impact the Marina, docks, and shoreline in the same way that the previous floods have. A2 will be in compliance with IDNR dam standards and although not required, will allow piece of mind during the next flood event, that the spillway is better equipped to disposing of water faster. With approval, the timeline for CMT is 8 – 10 months for design and permitting. Any delays will most likely come from permitting and when IDNR and Army Corps has time to look at the plans and give us approval for the required permits. With our relationship with IDNR, I am hopeful that any delays will not be lengthy. We will include in the bidding process options for construction to not lower the lake or to only lower the lake after a set date or at a set elevation. The purpose of this to not reduce lake use after Labor Day weekend and to also eliminate the need for removing the majority of the boats, docks and shore stations prior to construction. If the cost to start construction without lowering the lake is too much, construction will most likely not be considered until 2024, due to the amount of time needed to educate owners on lake use after the lake is lowered. If the construction bid is awarded with the provision of not lowering the lake or delaying the lowering of the lake, construction could start in August 2023.

APPLE CANYON LAKE
 ALTERNATIVE NO. 2 - NEW LABYRINTH SPILLWAY - WIDEN & DEEPEN CHANNEL - NEW APPROACH CHANNEL - RAISE TOP OF DAM
 PRELIMINARY OPINION OF CONSTRUCTION COST
 COSTS AS OF MAY 2022

Item of Construction	Units	ORIGINAL CONSTRUCTION COST OPINION			UPDATED CONSTRUCTION COST OPINION FOR MAY 2022 FOR ORIGINAL QUANTITIES			UPDATED CONSTRUCTION COST OPINION FOR MAY 2022 WITH INCREASED ROCK EXCAVATION FOR 10 FOOT DEEP APPROACH CHANNEL				
		Calculated Quantity	Estimated Quantity 10% Incr.	Original Unit Prices	Amount	Estimated Quantities	Updated Unit Prices	Amount	Increase	Estimated Quantities	Updated Unit Prices	Amount
Mobilization					\$ 50,000			\$ 65,000			\$ 65,000	
Rock anchors	each	56	56	283	\$ 15,848	56	340	\$ 19,040	56	340	\$ 19,040	
Apron Slab on Grade (floor under labyrinth walls)	c.y.	211	232.1	600	\$ 139,260	232.1	750	\$ 174,075	232.1	750	\$ 174,075	
Labyrinth wall - Reinforced Concrete 10 feet tall	c.y.	167	183.7	750	\$ 137,775	183.7	1,200	\$ 220,440	183.7	1,200	\$ 220,440	
Removal of Existing Channel Walls and Floor	c.y.	118	129.8	350	\$ 45,430	129.8	450	\$ 58,410	129.8	450	\$ 58,410	
Outlet Channel Floor Slab	c.y.	152	167.2	600	\$ 100,320	167.2	750	\$ 125,400	167.2	750	\$ 125,400	
Side walls at labyrinth	c.y.	30	33	750	\$ 24,750	33	900	\$ 29,700	33	900	\$ 29,700	
Downstream channel side walls	c.y.	67	73.7	750	\$ 55,275	73.7	900	\$ 66,330	73.7	900	\$ 66,330	
Upstream approach side wall	c.y.	10.5	11.55	750	\$ 8,663	11.55	900	\$ 10,395	11.55	900	\$ 10,395	
Removal of Existing Spillway	c.y.	59	64.9	350	\$ 22,715	64.9	450	\$ 29,205	64.9	450	\$ 29,205	
Removal of Rock for New Spillway and Channel	c.y.	5400		50	\$ 270,000	5400	60	\$ 324,000	5400	60	\$ 468,000	
Raise Dam Crest					\$ 8,000			\$ 25,000			\$ 25,000	
Datalogger (WORK COMPLETED)					\$ 5,000			\$ -			\$ -	
Subtotal - Construction					\$ 884,000			\$ 1,147,000			\$ 1,291,000	32%
Contingency - 20%					\$ 177,000			\$ 230,000			\$ 259,000	32%
Subtotal Construction					\$ 1,061,000			\$ 1,377,000			\$ 1,550,000	32%

NOTE:
 Rock Removal for Approach Channel
 Estimated in Jan 2020
 6 feet deep based on April 2022 survey
 10 feet deep based on April 2022 survey

**Apple Canyon Lake
Preliminary Design Report
Jo Daviess County Illinois**

January 2022



Crawford, Murphy & Tilly

Engineers and Consultants

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APPLE CANYON LAKE DAM

PRELIMINARY DESIGN REPORT

Executive Summary

The report provides responses to questions raised by the Property Owners Association following the completion of the Planning Report in 2020. Summary of the questions:

- 1) Should the channel downstream of the waterfall be widened?
- 2) What are regulatory requirements related to increased downstream flooding?
- 3) Can rock removal for the new spillway be done without impact on the dam?
- 4) What is the estimated cost of adding fill to level the crest of the dam?

The proposed labyrinth spillway will result in increased discharge in comparison to the existing spillway for the same storm event across the watershed. For the 100-year flood, the channel will have a peak water level 3 feet higher. For Alternative No. 1 (30% PMF flood event) in the Planning Report, the peak water level will be 9 feet below the bridge deck. For Alternative No. 2 (60% PMF flood event), the peak water level will be 2 feet below the bridge deck.

The channel downstream of the waterfall does not need to be widened. The bridge downstream of the waterfall will not be overtopped by the design flood required by IDNR. The rock walls of the channel can withstand higher velocities of the increased discharge. The three design floods discuss in the report are rare events. Bridges and county roads are typically designed for flood events of 100-year or less.

The proposed labyrinth spillway will require a construction permit from IDNR and Jo Daviess County. IDNR will not object to the increased discharges from the new spillway which afford better protection of the dam from being overtopped. Jo Daviess County will issue a construction permit if IDNR issues a construction permit.

Rock removal for the labyrinth spillway can be done without impacting the existing dam. Alternative techniques of rock removal such as rock excavating equipment, hydraulic rams and controlled blasting can be specified. Requirements for each technique can be tailored to minimize vibration and other impacts outside the spillway vicinity. Creation of seepage paths through rock not removed is to be considered during design. Soil borings of the dam embankment may be recommended during design.

The estimated cost to raise the dam crest with compacted clay is \$44,000. The estimated cost to raise the dam crest with general fill is \$33,000.

An additional item was noted in the site visit. The lake depth upstream of the spillway is relatively shallow - 1 to 2 feet deep near spillway and gradually sloping down toward the lake. Rock removal in this area is recommended for increased flow over the labyrinth spillway. Rock removal can be done while the lake is lowered for construction.

1. Introduction

Following the completion of the Planning Report for the Apple Canyon Lake spillway, the Property Owners Association (POA) authorized further investigation into the proposed project to construct a new labyrinth spillway. The areas of investigation are as follows.

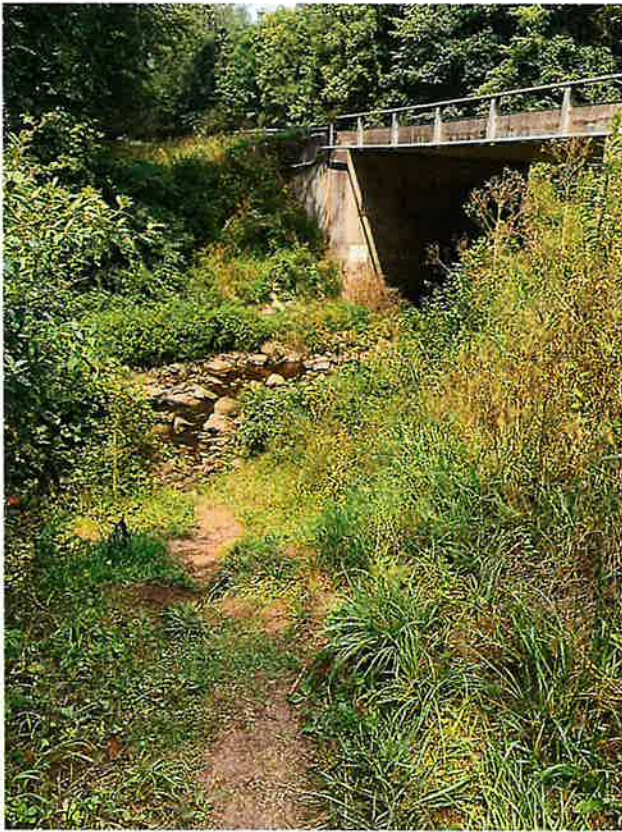
- Evaluation of the flow in the channel downstream of the waterfall
- County and State regulatory requirements for spillway replacement
- Removal of rock for the spillway (Report by Rubino Engineering included)
 - Impact of rock removal methods on the dam
 - Recommendations on rock removal methods
 - Geotechnical aspects of the rock removal for the proposed spillway
- Cost Opinion to raise the crest of the dam to be level

2. Hydraulic Analysis of Downstream Channel

The proposed labyrinth spillway will release water from Apple Canyon Lake at a higher rate than the existing spillway will for the same rainfall event across the watershed. The concern is whether the channel downstream of the waterfall has adequate flow capacity or if additional rock removal from the channel will be needed.



View upstream of
bridge on South
Apple Canyon
Lake Road



Channel downstream of bridge
on South Apple Canyon Road

The channel downstream of the waterfall was analyzed hydraulically from the waterfall to 300 feet downstream of the bridge. The channel was field surveyed to develop cross sections. The HEC-RAS hydraulic software developed by the U.S. Army Corps of Engineers was utilized for calculations. The following information was input to the computer model:

- Ten cross sections of the channel
- Dimensions of the bridge opening under South Apple Canyon Road
- Peak flow rates for four storm events taken from the Planning Report
 - 100-year flood with existing spillway – Flow 2,827 cfs
 - 100-year flood with proposed labyrinth spillway - Flow 5,026 cfs
 - 30% of the Probable Maximum Flood (PMF) – Flow 6,926 cfs
 - 60% of the Probable Maximum Flood – Flow 14,407 cfs
- Estimation of the channel roughness factor (n value)

The Planning Report prepared in June 2020 includes two alternatives for the proposed spillway. Alternative No. 1 is a labyrinth spillway and channel capable of handling a flood of 30% of the PMF without overtopping the dam. Alternative No. 2 is a labyrinth spillway and channel capable of handling a flood of 60% of the PMF without overtopping the dam. The 60% PMF flood is the current requirement of the IDNR regulations for existing dams with High Hazard downstream .

The results of the hydraulic analysis are summarized as follows.

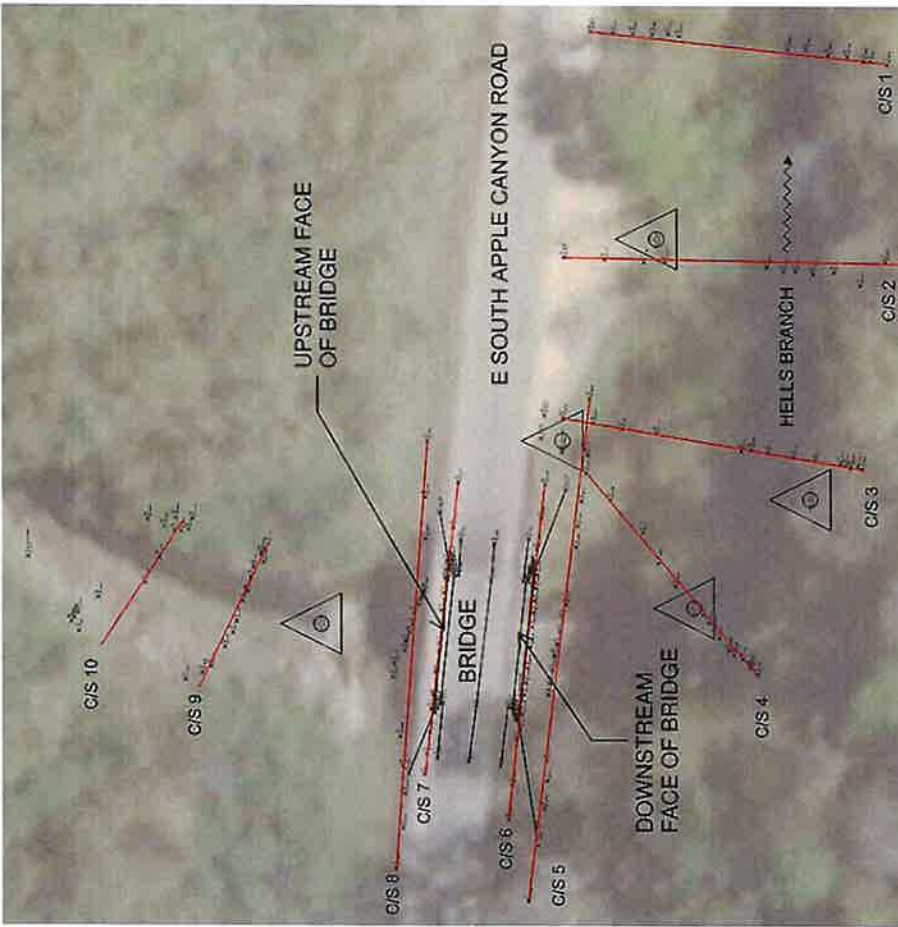
- For the 100-year flood, the water level under the South Apple Canyon Road bridge will be 3 feet higher with the labyrinth spillway than with the existing spillway.
- For Alternative No. 1 with the 30% PMF flood, the peak water level will be 9 feet below the underside of the bridge deck. The bridge will not be overtopped in this flood scenario.
- For Alternative No. 2 with the 60% PMF flood, the peak water level will be 2 feet below the underside of the bridge deck. The bridge will not be overtopped in this flood scenario.


The results of the hydraulic analysis are presented in Exhibits 1 – 5. Exhibit 1 shows the location of the cross sections of the downstream channel. Exhibit 2 shows the peak water surface profile of the four flood events. The peak water surface is defined as the highest water level predicted during the flood event. Exhibits 3 – 5 show the peak water levels in the downstream channel at three cross sections: between the bridge and the waterfall; at the upstream side of the bridge; and 200 feet downstream of the bridge.

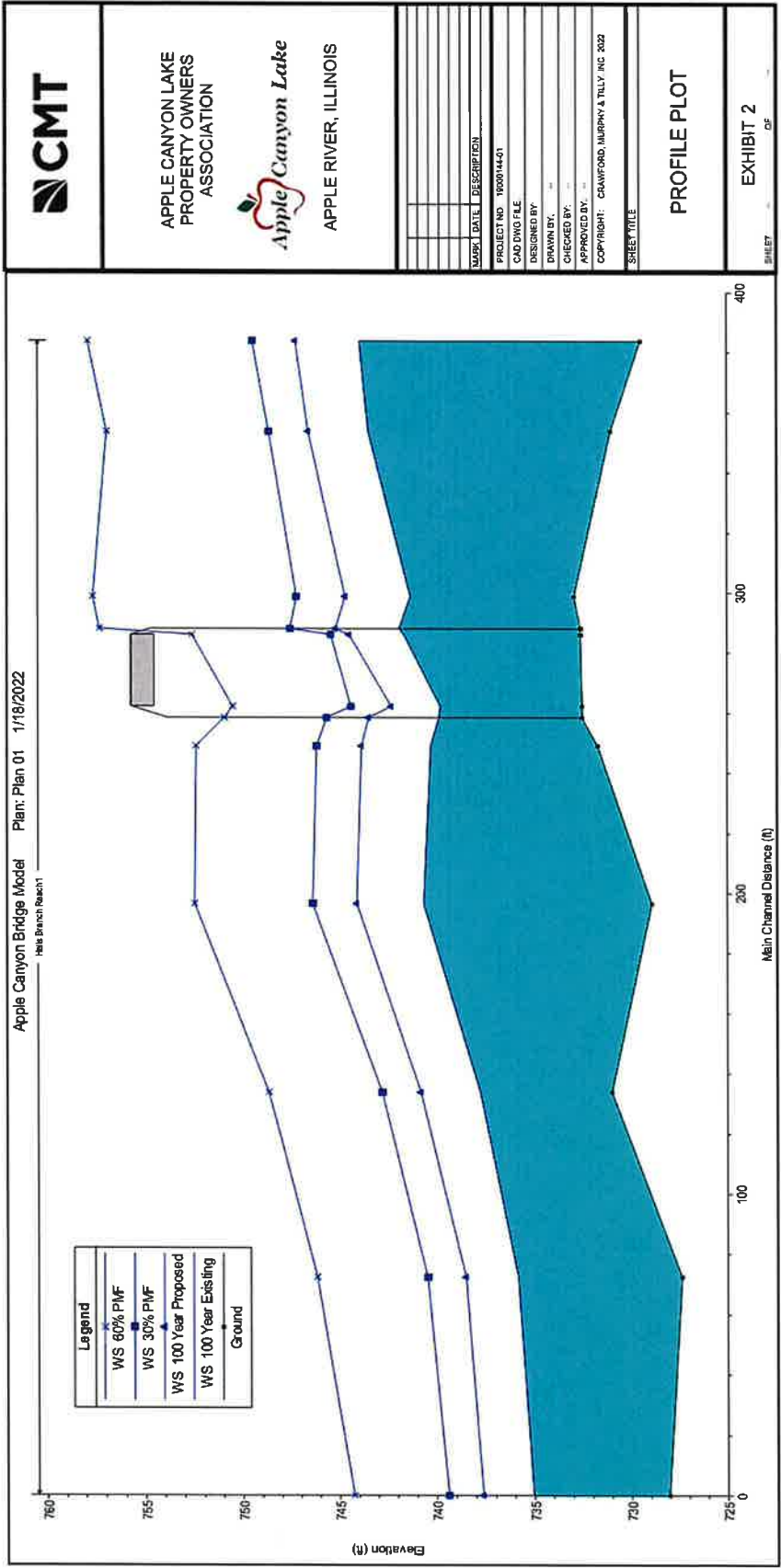
The flow in the downstream channel between the waterfall and 300 feet downstream of the bridge will not be backed up by flooding in Hells Branch Creek which is 700 feet east of the bridge. The conclusion was determined as follows. First, the flow through the downstream channel is in critical flow stage at the end which means that the water surface profile is not affected by the downstream water levels based on principles of open channel hydraulics.

Second, the report prepared by IDOT in November 1983 (Hydrologic, Hydraulic and Dam Breach Analysis for Apple Canyon Lake Dam Jo Daviess County) shows a peak water level of El. 728 in Hells Branch Creek on the downstream side of the dam for the 100% PMF flood with no dam breach. The water level El. 728 is 7 feet lower than the water level in the downstream channel analyzed for this report for the 60% PMF. Therefore, the water level in Hells Branch Creek will not cause a backwater effect on the flow in the downstream channel.

The higher flow rates from the labyrinth spillway may result in overtopping of South Apple Canyon Road for a certain range of flood events which would not have overtopped the road with the existing spillway.



CMT	
APPLE CANYON LAKE PROPERTY OWNERS ASSOCIATION	
 APPLE RIVER, ILLINOIS	
MARK	DESCRIPTION
PROJECT NO.	18020144-01
CAD DWG FILE	
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
COPYRIGHT: CRAWFORD, MURPHY & TULLY, INC. 2022	
SHEET TITLE	
AERIAL WITH CROSS SECTIONS	
SHEET 1 OF 1	





APPLE CANYON LAKE
PROPERTY OWNERS
ASSOCIATION



APPLE RIVER, ILLINOIS

NO.	DATE	DESCRIPTION

PROJECT NO. 1000144-01

CAD DWG FILE

DESIGNED BY

DRAWN BY

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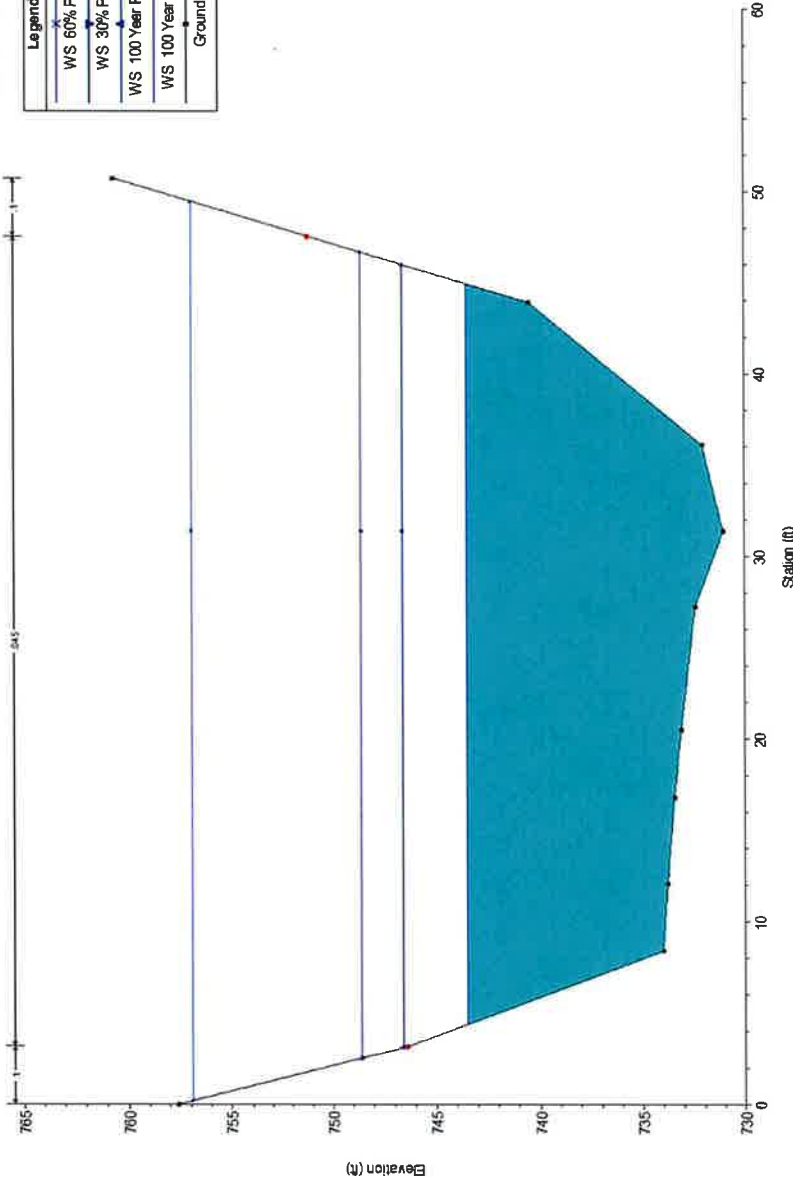
UPSTREAM CROSS
SECTION

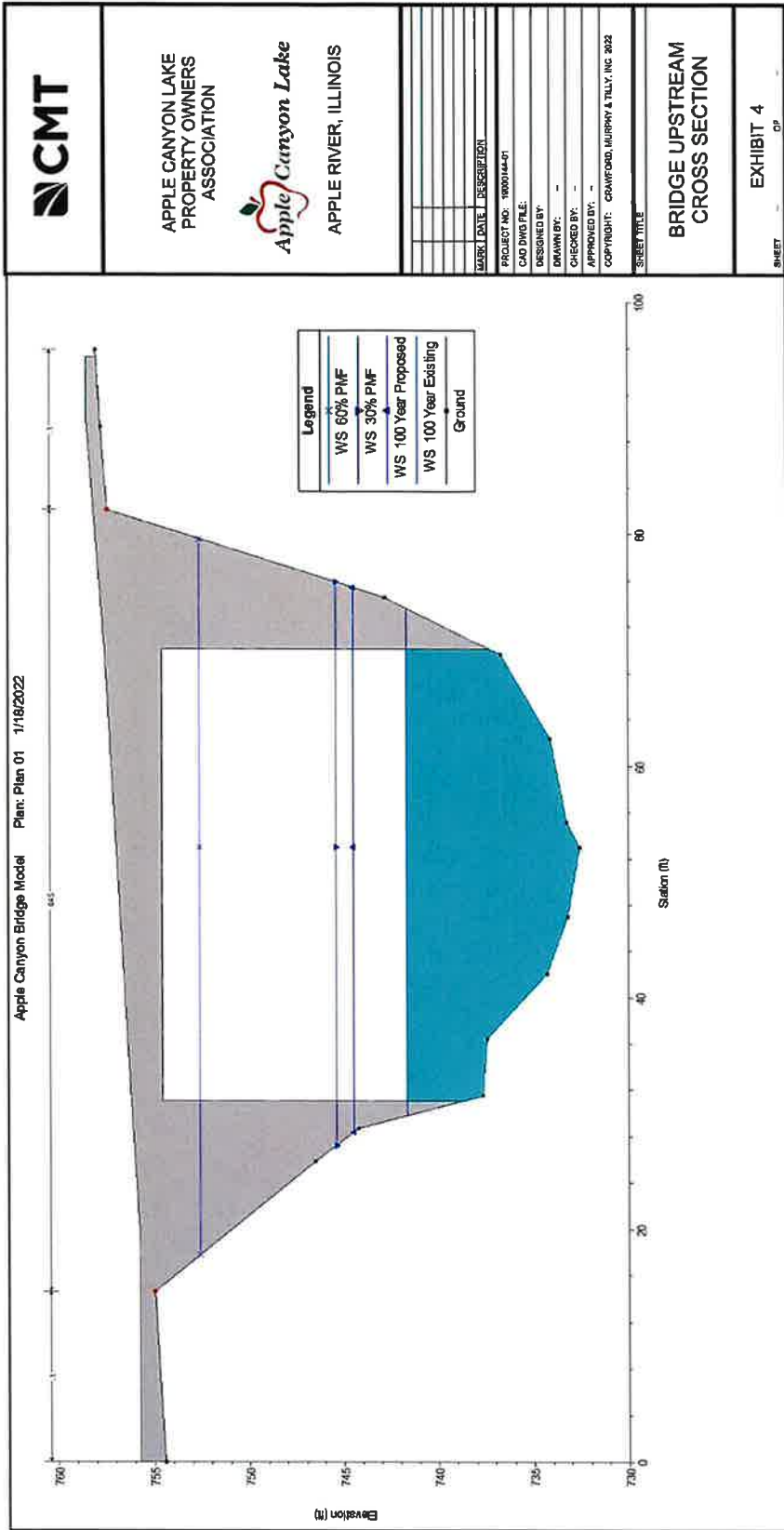
SHEET EXHIBIT 3
OF

Apple Canyon Bridge Model Plan: Plan 01 1/18/2022

CROSS SECTION 9

Legend
WS 60% PMF
WS 30% PMF
WS 100 Year Proposed
WS 100 Year Existing
Ground





Rock Removal in Downstream Channel

The increased flow rates in the downstream channel raise the question of whether the downstream channel should be widened by removal of rock along the channel. The higher flow rates will result in higher velocities under the bridge and in the channel.

The hydraulic analysis shows that the velocities through the bridge opening will be between 13 and 16 feet per second (fps) for the 100-year flood. The velocities will be between 21 and 23 fps for the design flood of 60% PMF. The velocities in the channel upstream and downstream of the bridge are lower because the channel is wider than the bridge.

The rock surfaces of the channel will be able to withstand the higher velocities. The higher velocities may result in movement of the loose rocks on the bottom of the channel and erosion of the earth banks of the channel downstream of the bridge.

The channel and bridge do not need to be widened in our opinion because they are capable of passing the discharge flows without overtopping the bridge. Furthermore, the flood events analyzed herein are extremely rare events. Roadway bridges and drainage channels for counties and townships in Illinois are typically designed for floods equal to or smaller than the 100-year frequency flood.

The bridge plans dated 1969 show that the bridge foundation is in a trench excavated into the native rock. The bottom of the foundation is 2 to 4 feet below the creek bottom. The condition around the bridge foundation should be checked after major flood events for undermining of the bridge.

During the site visit on August 6, 2021, a Thompson Township employee mentioned that the riprap on the upstream side of the bridge base has been replenished following a few high flow events in the past. It is recommended that larger riprap pieces be placed at the base of the bridge to prevent scour during future floods.

3. Downstream Flooding Hazard - Regulatory Requirements

The replacement of the existing spillway with a labyrinth spillway will require governmental permits from Illinois Department of Natural Resources (IDNR) and from Jo Daviess County. One concern raised about the new spillway is that the discharges downstream will be greater than the existing spillway for the same storm across the watershed.

The question of increased discharge was presented to IDNR Division of Water Resource Management who issues the construction permits for dams. IDNR stated that increased discharge does not violate any provision of the regulations that apply to the project. IDNR regulations have a primary intent to protect the dam from overtopping and being breached. The dam does not meet current IDNR regulations because the dam was constructed before the regulations were enacted. The proposed

spillway Alternative No. 2 would bring the dam into compliance with current state regulations which have changed since the dam was constructed. IDNR commented that local floodplain regulations would apply also.

Although the flow in Hell's Branch Creek will increase if the spillway is replaced, the peak flow rate from the new spillway will be less than would occur if the dam did not exist. The lake detains the natural flooding surge which reduces peak flows and water levels downstream of the dam.

The spillway project construction will be regulated by Jo Daviess County ordinance Title 10 Flood Control, Section 10-1-6: Preventing Increased Flood Heights and Resulting Damages. The Jo Daviess County Engineer stated that a county construction permit would be issued if the IDNR issues a construction permit. The response agrees with the wording in Paragraph B.1 of the county ordinance.

4. Raising the Dam Crest

It is recommended to add earth fill to make the crest of the dam level at El. 807.81. The raising of the crest will increase the freeboard above the lake level for all flood scenarios because freeboard is defined as the vertical difference between the water level and the lowest point on the crest of the dam. The east end of the dam crest is 1.05 feet lower in elevation than the west end of the dam based on the survey of the four control points on the crest. It is not known why the crest of the dam is not level from end to end.

There are two options to raising the crest of the dam.

Option 1

Remove vegetation and roots. Place compacted clay fill up to El. 807.81 for the full length of the dam. The dam will be considered capable of retaining water to the crest elevation if the fill is placed in accordance with IDNR requirements for an earthen dam. The estimate includes adding riprap to the upstream side of the fill. A construction permit will be required from IDNR for Option 1.

The total project cost opinion for Option 1 is \$44,000 in Table 1. The delivery cost of the clay fill in Option 1 is based on a quotation from Stagecoach Trails Limestone quarry located northeasterly of Apple Canyon Lake.

Option 2

Remove vegetation and roots. Place lightly compacted general dirt fill up to El. 807.81. The material would not be considered capable of retaining water. The top of dam will be considered to be the lowest point of the existing crest at El. 806.76. The estimate includes adding riprap to the upstream side of the fill. It is unknown at this time if IDNR will require a construction permit for Option 2 based on communication with IDNR about the matter.

The total project cost opinion for Option 2 is \$33,000 in Table 2. The delivery cost of the general dirt fill in Option 2 earth is based on a quotation from the Helm Group quarry located southwest of the Apple Canyon Lake.

Option 1 is recommended because the peak water level of Apple Canyon Lake for the design flood of 60% PMF is El. 807.7 which is 0.1 foot below the crest in Option 1. The dam will have less freeboard than recommended by IDNR but would be capable of retaining the peak water level of the design flood.

Table 1
Apple Canyon Lake Dam
Option 1 - Raise the Dam Crest with Compacted Clay

OPINION OF PROJECT COST

	Quantity	Unit	Unit Price	Amount
Mobilization				\$ 3,000
Strip 3" topsoil & vegetation	111	C.Y.	11.90	\$ 1,320
Haul away topsoil	111	C.Y.	5.44	\$ 603
Loosen soil disk	1685	S.Y.	1.15	\$ 1,938
Clay fill delivered to site	380	C.Y.	\$16.50	\$ 6,272
Spread soil	380	C.Y.	11.90	\$ 4,525
Compact soil	380	C.Y.	2.15	\$ 817
Soil testing in lab		L.S.		\$ 1,000
Soil testing on site		L.S.		\$ 1,500
Filter Fabric	140	S.Y.	2.30	\$ 323
Riprap on upstream face	140	S.Y.	36.23	\$ 5,087
Fertilize & seed	0.35	acre	1,810	\$ 630
Total Construction Cost				\$ 25,000
Geotechnical Engineering				\$ 1,500
Field Survey				\$ 4,000
Prepare Request for Construction Proposal				\$ 5,000
IDNR Permit Application & Response				\$ 2,000
Construction Observation (3 days part time)				\$ 3,000
Reset Four Survey Monuments on Crest				\$ 3,000
Total Non-construction Cost				\$ 18,500
Total Project Cost				\$ 44,000

Table 2
Apple Canyon Lake Dam
Option 2 - Raise the Dam Crest with General Fill

OPINION OF PROJECT COST

	Quantity	Unit	Unit Price	Amount
Mobilization				\$ 3,000
Strip 3" topsoil & vegetation	0	C.Y.	-	\$ -
Haul away topsoil	0	C.Y.	-	\$ -
Loosen soil disk	1685	S.Y.	1.15	\$ 1,938
General fill delivered to site	269	C.Y.	13.61	\$ 3,665
Spread soil	269	C.Y.	11.90	\$ 3,205
Compact soil		C.Y.		\$ -
Soil testing in lab		L.S.		\$ -
Soil testing on site		L.S.		\$ -
Filter Fabric	140	S.Y.	2.30	\$ 323
Riprap on upstream face	140	S.Y.	36.23	\$ 5,087
Fertilize & seed	0.35	acre	1,810.12	\$ 630
Total Construction Cost				\$ 15,000
Geotechnical Engineering				\$ 1,500
Field Survey				\$ 4,000
Prepare Request for Construction Proposal				\$ 5,000
IDNR Permit Application & Response				\$ 2,000
Construction Observation (2 days part time)				\$ 2,000
Reset Four Sruvey Monuments on Crest				\$ 3,000
Total Non-construction Cost				\$ 17,500
Total Project Cost				\$ 33,000

GEOTECHNICAL ENGINEERING REPORT BY RUBINO ENGINEERING IS ON THE FOLLOWING PAGES

PROJECT UNDERSTANDING - DAM HISTORY

The purpose of this geotechnical report is to discuss rock removal for the spillway channel, raising the Dam crest, and potential impacts on the Dam itself.

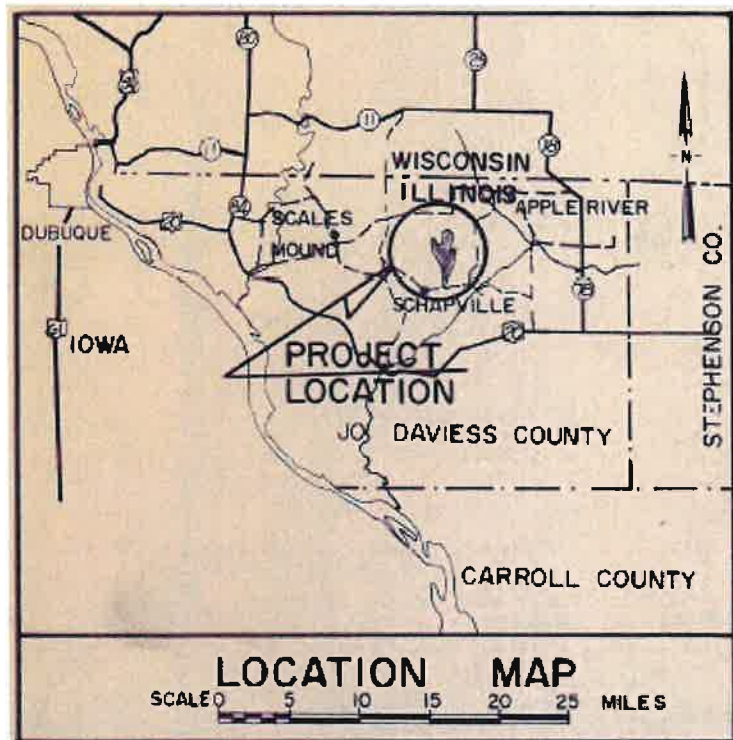
Mr. Ted LaBelle, P.E. with Crawford Murphy & Tilly (CMT) provided the project information to PSI through multiple emails from December 15, 2020 through January 27, 2021. Attached to the emails, PSI received the following documents which were then passed on to Rubino.

- Apple Canyon Lake Dam and Spillway Planning Report by CMT dated June 2020
- Apple Canyon Lake Dam and Spillway Construction Plans with completed soil borings at the Dam and Lake site, prepared by Bauer Engineering, Inc. dated April 1969
- Army Corp of Engineering Inspection Report dated July 1978
- Apple Canyon Lake Dam and Spillway Phase-II investigation Report by Hanson Engineering Inc. dated 10/1/1982

Based on the provided information, Rubino and PSI Intertek understand that the Apple Canyon Lake Dam is an 80-foot high and 1,100 feet in length, earth and rock fill Dam. The Dam was constructed during 1969 and was classified as the "high hazard potential", intermediate size Dam under Illinois Department of Natural Resources (IDNR) regulations.

The Dam is owned by Apple Canyon Lake Property Owner's Association and the reservoir is used by the Association members for recreational purposes. The appurtenant work consists of a concrete broad-crested weir chute spillway cut in rock and discharging into a vertical drop plunge pool located at the right abutment and a steel-lined concrete conduit outlet works located at the approximate midpoint of the Dam. The weir is a concrete wall with overall length of 95.7

feet long and height of 4 feet. The crest of the wall has an elevation 800.00 for a length of 82 feet and a low flow notch at elevation 799.42 for a length of 13.7 feet long. The spillway channel is a combination of natural rock floor and walls, followed by concrete floor and walls.



Apple Canyon Lake has reportedly experienced three unusually high flood levels since 2010 with the highest level occurring in July 2017. The peak water level was within 1 to 2 feet of the top of the Dam according to information from Apple Canyon Lake Property Owners Association (ACLPOA).

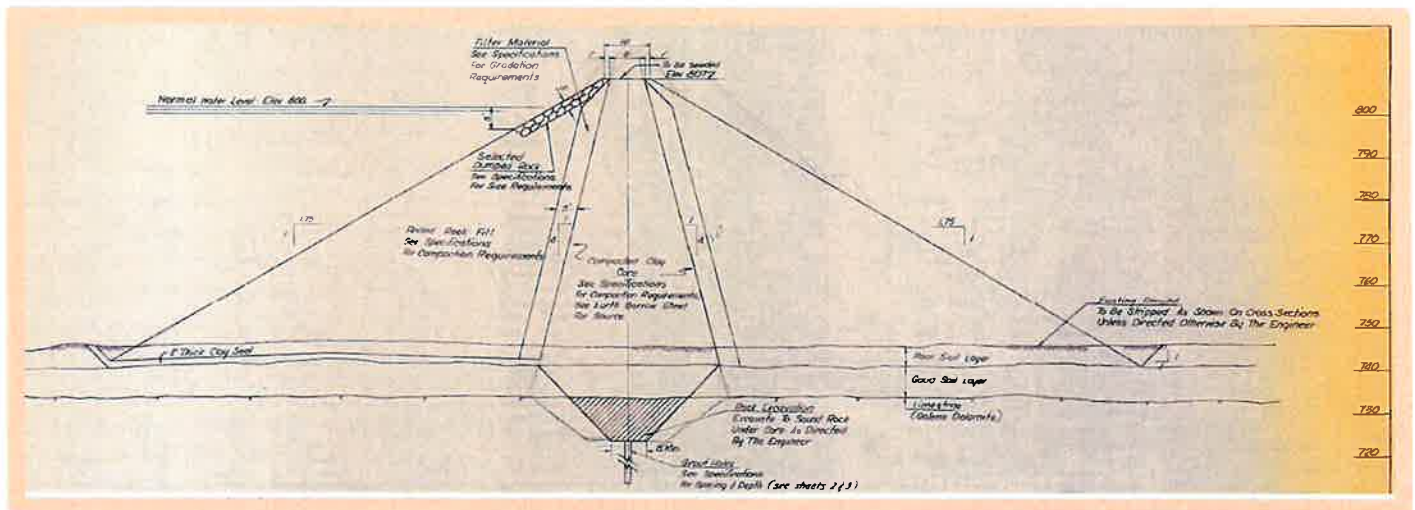
Photo: Panoramic View



Based on recently completed planning report by CMT, it was discussed that if water had over topped the Dam, erosion of the Dam could have occurred with the risk of washing out and breaching the Dam. Such an occurrence would have been more detrimental than the property damage which occurred around the lake. A report titled Flood Mitigation Investigation Summary was prepared in June 2019 with options to reduce peak lake levels during flood events. This Planning Report provides additional alternatives to consider which will result in lower peak lake levels for the same flood events. The results of flood modeling of the existing spillway and proposed changes to the spillway are presented in the June 2019 report to demonstrate the changes that would occur for various degrees of flooding.

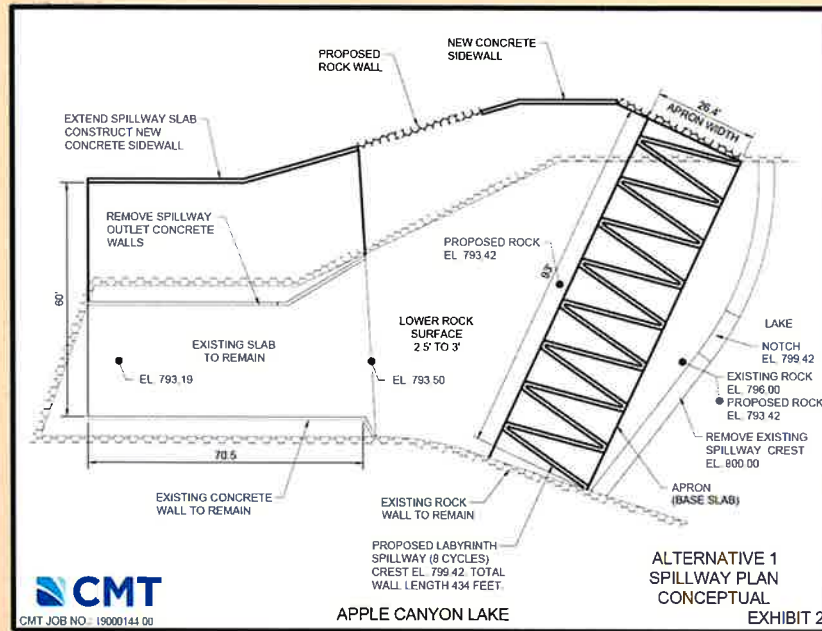
PROJECT UNDERSTANDING - PLANNING PHASE

Rubino and PSI Intertek understand that CMT is in the planning phase and proposing two spillway alternatives to increase the discharge capacity, and these alternatives are discussed below:



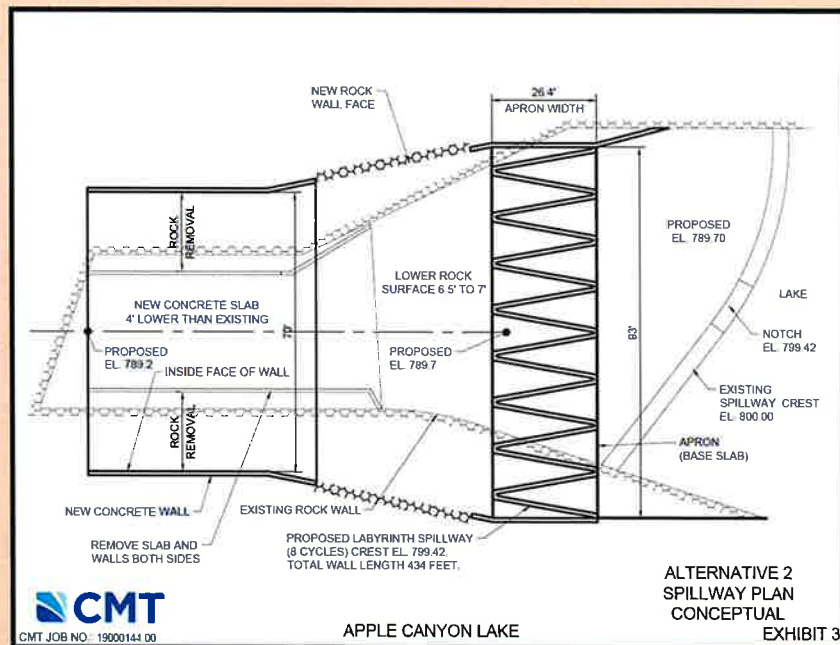
↑ Typical Section of Dam ↑

Alternative No. 1 is a labyrinth spillway with a total wall length of 434 feet, overall length of 93 feet and height of 6 feet. The existing spillway channel will be widened from 28 feet to 60 feet and extending primarily into the north-western bank of the existing rock cut. The channel floor would potentially remain at the same elevation.



↑ Alternative 1, Proposed by CMT ↑

Alternative No. 2 is a labyrinth spillway with a total wall length of 434 feet, overall length of 93 feet and height of 10 feet. The spillway channel will be widened from 28 feet to 70 feet on both the south-eastern and north-western sides of the existing channel and lowered by 4 feet.



↑ Alternative 2, Proposed by CMT ↑

SITE VISIT SUMMARY – DECEMBER 3, 2021

On December 3, 2021, Michelle Lipinski of Rubino Engineering and Kevin Miller of PSI Intertek met with Ted LaBelle of CMT and Sean Nordlie of the Apple Canyon Dam POA at the Apple Canyon Dam site in Jo Daviess County near Woodbine, Illinois.

The purpose of the meeting was to visually observe the dam and spillway to make geotechnical recommendations to aid in future improvements to the dam. Future improvements could include:

- Adding fill to restore the original design elevations of the dam
- Widening the concrete mouth of the spillway to increase the hydraulic flow capacity of the existing spillway.

Soil was sampled at the crest of the dam and taken back to Rubino’s laboratory with the following results:

Rubino Project No. G21.236			
Apple Canyon Lake Dam – Jo Daviess County, Illinois			
Sample Location	West End	Middle	East End
Atterberg Results	LL: 41 PL: 25 PI: 16	---	---
Loss on Ignition (Organic Content)	3 %	3 %	3 %
Moisture Content	13 %	19 %	21 %
Visual Classification	Brown Clayey Sand with gravel	Brown Silty Clay	Brown Silty Clay



Photo: Downstream Face of Dam looking NW



Spillway Wall Options and on-site discussions:

- Widening the existing spillway channel at least an additional 10 feet is anticipated.
- Lowering the channel floor by 0 - 3 feet (Alternative #1) or by 4 to 7 feet (Alternative #2)
- Freeze/Thaw cycles as well as roots that are growing through natural jointing and layering of the existing rock wall may have resulted in the loosening up of the surficial rock. Weathering of the rock should make first 2-3 feet of rock excavation easier.



The POA Board members have voiced concern for the potential degradation of the integrity of the Dam as a result of rock removal in the spillway. Removal of rock in the existing spillway could potentially impact the Dam in the following ways:

- The excavation processes could fragment the rock in the vicinity of the rock/dam embankment contact area, increasing potential seepage
- The excavation process could induce vibration which could result in additional settlement of the existing dam embankment
- The excavation of rock could reduce overburden on the rock in the spillway channel which could cause existing fractures and layers to open up and cause an increase in seepage.

Typically, rock excavation is executed with equipment that has sufficient power to bend and break rock material. Hydraulic Rams can be used to break rock with high impact point loads. Rock Excavators can be used to break rock with their high strength teeth, shovels, and hydraulic breakout pressures. Controlled Blasting is a viable alternative to using an excavator.

With either the machine excavator or blasting method, the embankment of the existing dam can be isolated from vibrations and expanding fractures by using a technique known as pre-splitting. This technique involves a straight row of tightly spaced holes (typically 2 feet on center) located between the embankment dam and the rock excavation work. If the option is selected to widen the rock face to the Southeast, the presplit line may be shot with a light load to create a crack along the pre-split alignment. This produces a smoother rock face, but also creates a plane fracture that mitigates fractures and vibrations from being transmitted through the pre-split zone. The same pre-split zone can be used to mitigate machine-induced vibrations to avoid impacting the embankment dam.

As discussed later in this report, in blasting, the primary control will be in limiting the amount of explosive per delay. Controlled blastings will require planned drilling depths, spacing of holes, and planning sequences of delays to successfully remove the rock with limited overbreaking and minimal ground vibrations. The blast or rock excavation plan can include ground vibration monitoring to document actual motion in the dam embankment and pipe structures. Therefore, the rock excavation should be able to be completed with minimal and controlled ground vibration and fracture control.

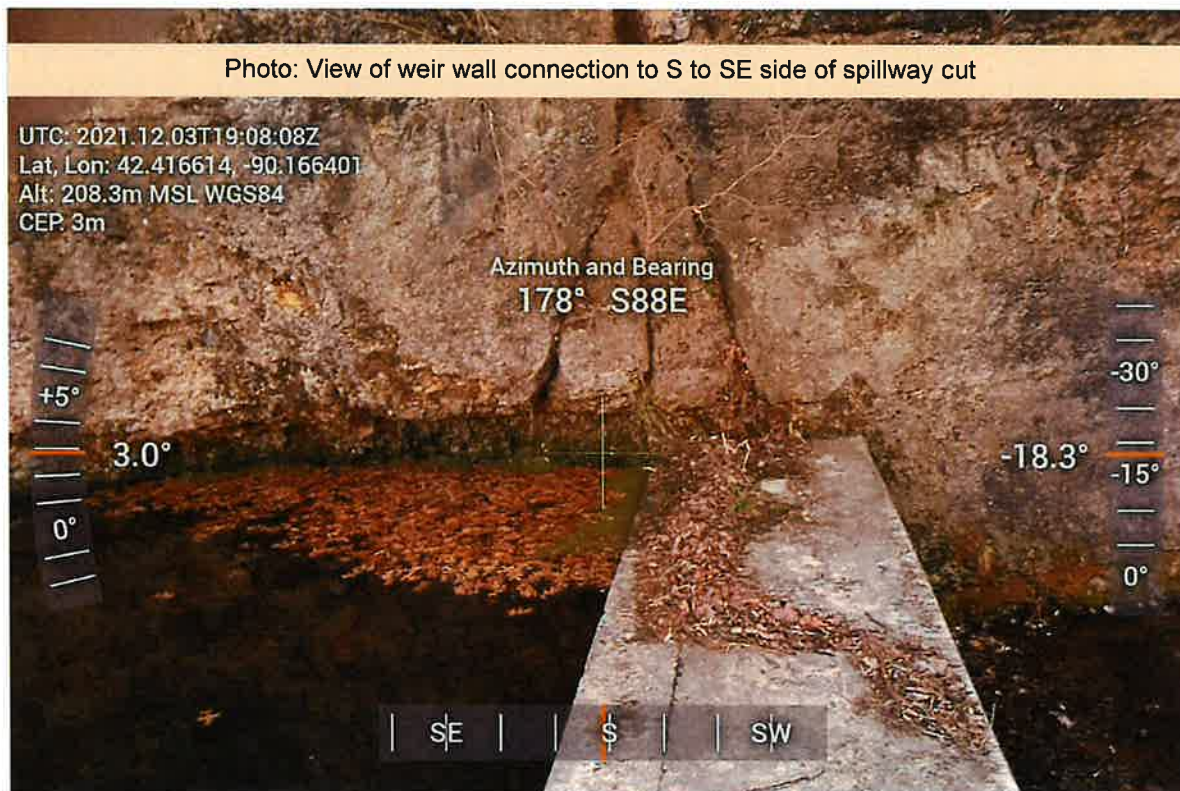


- Removal or repair of existing concrete training walls appears to be needed (Distress on the southeastern training wall needs some repair (see photo above))
- Shot Crete can be applied on the exposed rock walls instead of constructing a higher concrete training wall to create a combination of formed training walls and higher anchored shotcrete walls
- Fixing cracks in the rock face down stream of the waterfall is not necessary. Noted in the on-site meeting is that there is desire by the residents to retain the drop high wall at the downstream end of the rock cut spillway.



Photo: View of Plunge Pool below existing spillway discharge point

- CMT is considering a Labyrinth spillway to lengthen the weir length of the spillway to increase the outflow and reduce the head fluctuation in the pool during storm events. NOTE: shallow water depth within the reservoir upstream of the proposed labyrinth spillway can cause some inefficiencies in the spillway.
- During transport to the spillway, it was observed that the rock in front of the spillway was very shallow. It may be necessary to excavate a sloping channel into the approach to the spillway control section to improve the hydraulic characteristic of the spillway. A shallow approach could substantially reduce the flow capacity of the spillway.
- Rock removal in the approach channel can be considered in the design phase in order to improve the hydraulic deficiency.

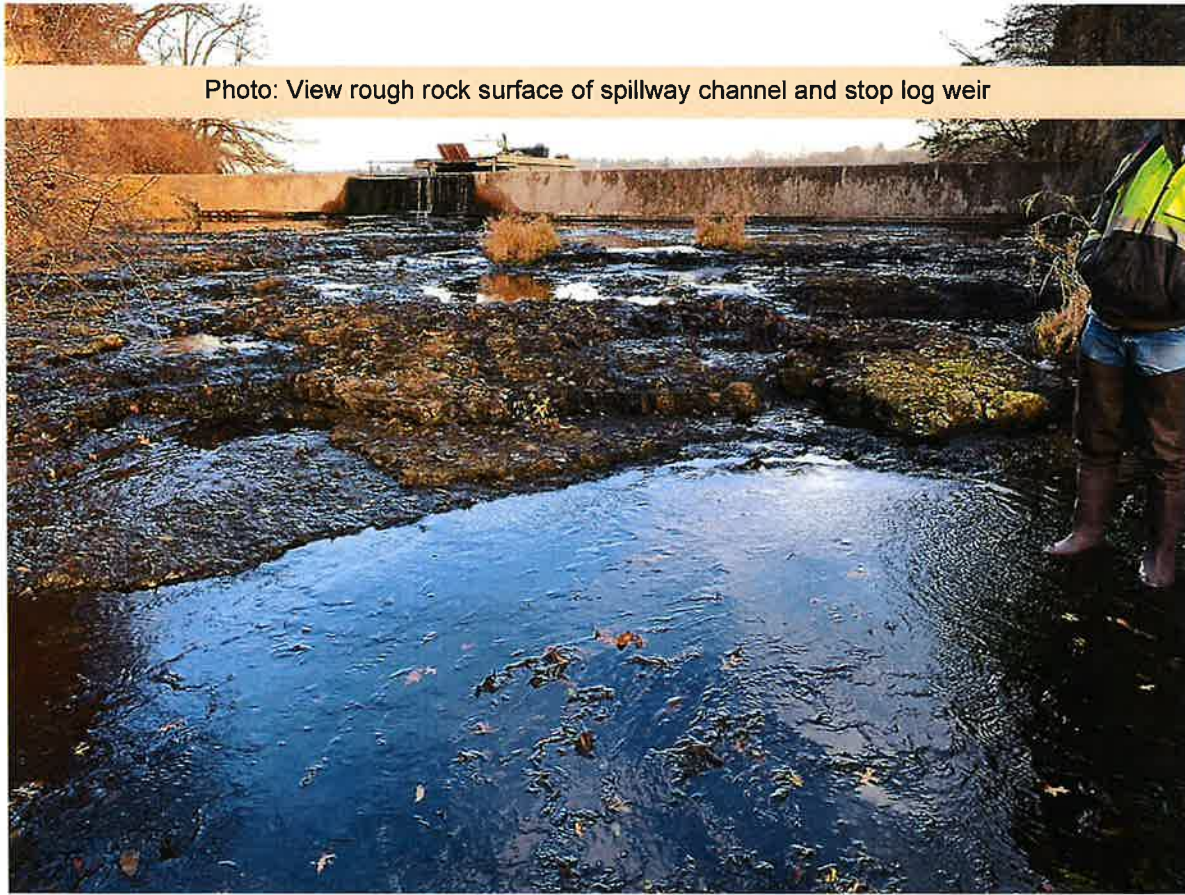




- The current lake drain, which consists of a pressurized, lined, cylinder concrete pipe, has a valve on the downstream end that maintains a full reservoir head pressure throughout the pipe penetrating the earthen embankment. It is anticipated that this pressure head in the lake drain may be as high as 35 to 40 psi.

Estimate of how the spillway was constructed:

It appears that the rock channel was excavated to its current configuration with either conventional rock excavation equipment or may have been blasted. Once the channel was excavated it appears that a concrete weir was installed near the upstream edge of the spillway to control the pool of the reservoir with a notch to control low flow conditions. The weir wall was reported to have been widened at some later time. The water down stream of the concrete weir wall traverses a rock channel until it engages wing wall and training walls downstream of the control weir. The wing walls are connected to the highwalls at different lengths from the weir wall. The training walls then appear to focus the discharge through a concrete lined pathway that ends with pinch walls before dumping into the overflow high wall. It was reported by Shaun Nordlie, General Manager, that extreme flows during historical events had overtopped the training walls in the spillway. Evidence of erosion above the wall and along the outside edges of the spillway appeared to confirm the overtopping. A HEC-RAS analysis run by CMT has demonstrated the need for a wider and possible deeper channel to route the currently required design storm event safely through the spillway channel.



Estimate of Spillway adjustment / Hydraulic needs

Discussions on the adjustment to improve the flow capacity of the spillway included the following items:

- Determine the extent of widening the spillway channel.
- Creating training walls at a wider width that would convey up to a specific storm (such as the 100-year storm or greater) within the training walls and provide erosion protection above that level with an anchored shotcrete wall on the exposed rock surface to an elevation required to route the maximum design storm.
- Limited discussion was held on staging the size of the spillway and whether or not there was a possibility of utilizing the existing walls and adding wider wall widths above that. These options would likely require widening in both directions.
- The current spillway configuration has multiple convergence points that are not particularly symmetric, which can be improved upon to increase the flow of water throughout the channel.
- During future construction excess excavated rock can be "placed" in the pool area of the highwall below the current discharge point of the spillway.
- Discussions were held concerning the labyrinth spillway having secondary gates in for drawdown, but having a lake drain likely negates the need for that.

ROCK BLASTING DISCUSSION

Discussions were held on the potential methods of rock excavations. It is believed that much of the excavation can be performed with conventional rock removal equipment such as a backhoe with a rock ram attachment. Blasting was discussed and that also is a viable excavation technique. Ground vibrations will be controlled by how much blasting agent is set off per delay with breakage controlled by spacing of blastholes, depth of overdrilling, and pre-drilling/pre-splitting defined limits to the spillway expansion in the rock. Blast monitoring would be performed to document actual vibrations experienced by the dam and other defined structures.

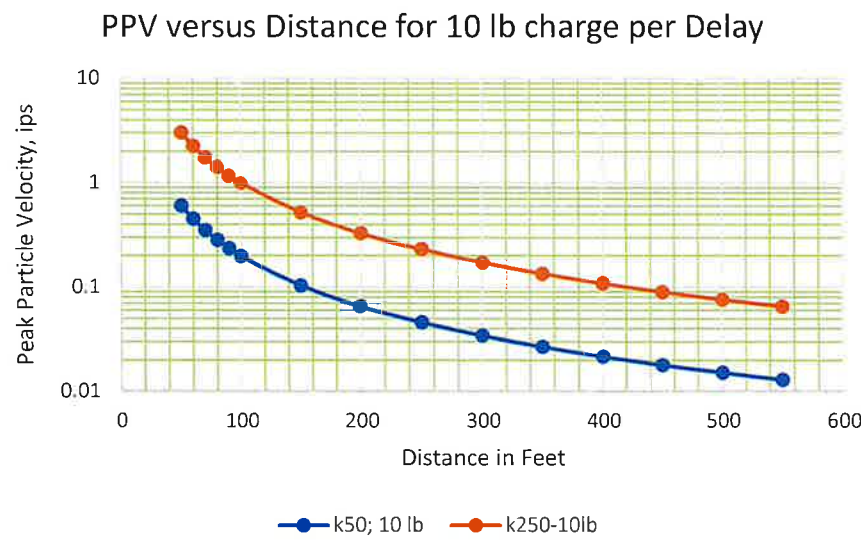
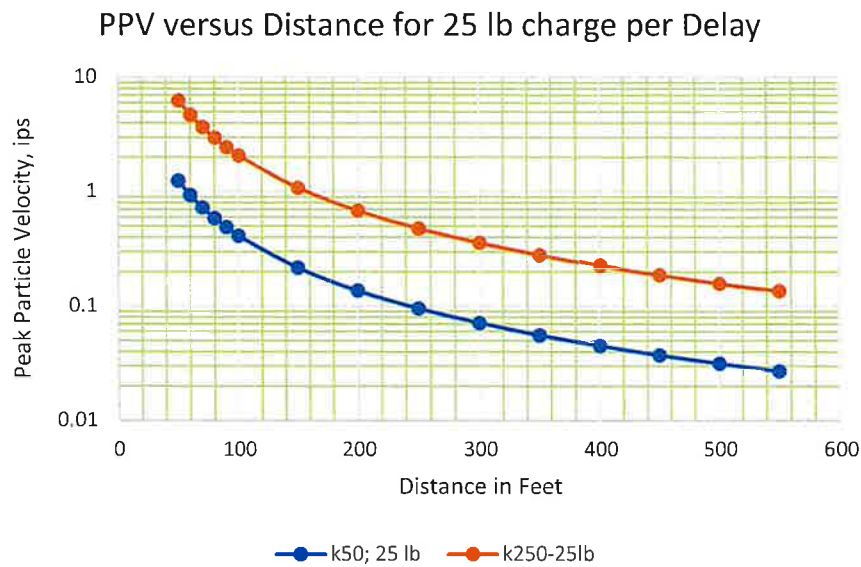
Based on the CalTrans Manual on transportation and construction generated ground vibrations, the prediction of blast vibrations uses a scaling method that is based on the energy released, the distance to the blast and the relationship between then variables at a specific site. Square-root scaled distance is a scale that divides the distance from the point of interest to the blast by the square root of the largest charge weight detonated on one delay period. Explosives detonating within any given 8-millisecond time period are typically counted as having been detonated on the same delay. One of the more commonly accepted blast vibration prediction curves in use today were developed by Lewis L. Oriard and are based on data collected from a large number of blasts in various geological settings.

Using Oriard's basic formula for calculating peak particle velocity (PPV) attenuation with distance:

$$PPV = K * (D_s)^{-1.6}$$

$$\text{where } D_s = (\text{distance from blast}) / \sqrt{\text{charge weight in pounds}}$$

K would be developed for this site based on the physical information obtained for the rock units, but would be expected to be in a range between 50 and 250. Typically, we would target to keep the PPV below 0.5 inch per second. Using these relationships the following curves show what the expect range of Peak Particle Velocity (PPV) would be expected per delayed blast of a specific weight of charge over a distance from the charge:



The blasting contractor would then determine the depth of rock to be removed and prepare a blast spacing based on the depth and diameter of the blasthole. Typically, these blastholes will be drilled 30 to 50% deeper than the desired depth of removal with the charge initiated at the depth of removal. Based on the pattern of the blasthole and loading factors, this would determine how many blastholes could be placed on a delay and have the anticipated vibration PPV shown on the above charts.

This work could also be performed with rock excavation equipment. Rock excavators with buckets designed for rock excavation combined with hydraulic rock breaking rams can be used in this type of rock excavation. As in the blasting option, Rubino would likely recommend a pre-splitting technique to limit the extent of the rock breakage and give a more defined surface to the rock excavation. The technique chosen is typically part of the contract bidding process and allows the contractor to bid with the technique that they are most comfortable with and thereby the more economical choice.

To provide contractors with the information for them to provide an economical rock excavation estimate, Rubino would need to explore the rock unit near the spillway channel. A rock core on the northern side of the channel, if accessible, could provide a continuous core of the units that would need to be excavated. If

slope is too large for vehicle access, a rock core maybe taken adjacent to the removal area in an area with the same or similar surface elevation. The type, density, RQD and unconfined compressive strength would provide the contractors with the information they need to develop an excavation plan. It may also be possible to perform a core on the southern side of the spillway which would be closer to the dam structure, but it may not extend high enough to define the rock units on the northern side to be excavated. Based on the option chosen for the shape of the dam and accessibility, the northern side may be the best side to explore. Furthermore, Alternative #2 would involve the widening of both sides of the channel so if this option is desired, Rubino recommends that two borings/rock cores are taken (one on the south and one on the north side of the spillway).

RECOMMENDATIONS FOR ADDITIONAL TESTING / CONSTRUCTION PHASE

Rubino also plans to explore the existing dam to assist in the leveling of the crest of the dam to the design elevation. Additional exploration borings would be performed to evaluate the embankment's ability to resist rock removal for the spillway and to gather data for a slope stability analysis (if IDNR requires one or if the Owner requests one). Rubino plans to perform conventional geotechnical exploration borings with SPT testing and Shelby tube samples combined with CPT probes of the clay core materials. The CPT will provide an insitu shear strength measurement of the in-place soils and allow our geotechnical evaluation of proposed configuration changes to the shell of the dam. Both the conventional and CPT probes will be used in the evaluation of the dam. It should be noted that during the exploration of the dam embankment, it would be a good time to place instrumentation in the dam to measure the phreatic (water) surface that exists in the dam. This type of instrumentation can be installed in a conventional exploration borehole if desired by the Owner or State Agency.

Possible Contractors: Contractors to perform this work will likely come out of eastern Iowa. Rubino and PSI can be of assistance in the location of potential bidders for this work if needed.

Apple Canyon Lake Dam and Spillway Planning Report Jo Daviess County Illinois

June 2020



Crawford, Murphy & Tilly

Engineers and Consultants

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APPLE CANYON LAKE DAM PLANNING REPORT

Executive Summary

Apple Canyon Lake experienced a few unusually high lake levels during flood events since 2010.

Two alternatives are proposed to increase the capacity of the spillway and to increase the freeboard on the dam during major flood events. Both alternatives utilize a new spillway of a labyrinth style which will increase discharge from the lake for the same lake level compared to the existing spillway.

Alternative No. 1 is to construct a 6-foot tall labyrinth spillway with 434 feet of crest length and to widen the existing spillway channel. Alternative No. 2 is to construct a 10-foot tall labyrinth spillway with 434 of crest length and to widen and deepen the spillway channel.

Alternative No. 1 will lower the peak water level of the 100-year storm by 2.5 feet. Alternative No. 1 will pass approximately 30% of the Probable Maximum Flood without overtopping the dam. Alternative No. 2 will lower the peak water level of the 100-year storm by 2.5 feet and will allow the spillway to pass 60% of the Probable Maximum Flood without overtopping the dam. Alternative No. 2 will result in compliance with current IDNR regulations for existing High Hazard Dams except that there will be near zero freeboard on the dam.

Two other improvements are recommended. One is to modify the top of the dam so that the crest is level. Currently one end of the dam is one foot lower than the other end. The second improvement is to install an electronic datalogger to automatically record the lake level.

The Preliminary Opinion of Project Cost for Alternative No. 1 is estimated to be in the range of \$710,000 to \$860,000. The Preliminary Opinion of Project Cost for Alternative No. 2 is estimated to be in the range of \$1,060,000 to \$1,230,000.

The downstream impact of higher peak flows which result from changes to the spillway are not presented in this report and should be further considered in future planning if ACLPOA moves forward with spillway improvements.

Alternative No. 2 with the new labyrinth spillway and wider, deeper spillway channel is recommended because the dam will meet current IDNR regulations for existing High Hazard Dams except that freeboard on the dam will be less than required.

1. Introduction

Apple Canyon Lake dam and spillway were constructed about 50 years ago. Apple Canyon Lake has experienced three unusually high flood levels since 2010 with the highest level occurring in July 2017. The peak water level was within 1 to 2 feet of the top of the dam according to information from Apple Canyon Lake Property Owners Association (ACLPOA).

If water had run over the top of the dam, erosion of the dam could have occurred with the risk of washing out and breaching the dam. Such an occurrence would have been more detrimental than the property damage which occurred around the lake.

Apple Canyon Lake dam is classified as a High Hazard, Intermediate Size dam under Illinois Department of Natural Resources (IDNR) regulations.

A report titled Flood Mitigation Investigation Summary was prepared in June 2019 with options to reduce peak lake levels during flood events. This Planning Report provides additional alternatives to consider which will result in lower peak lake levels for the same flood events.

The results of flood modeling of the existing spillway and proposed changes to the spillway are presented in the report to demonstrate the changes that would occur for various degrees of flooding. The modeling utilizes recent aerial data for elevations around the lake and recently released rainfall projections from the Illinois State Water Survey.

If the spillway or dam is modified by ACLPOA, the Dam Safety Section of IDNR will consider it a major modification to the dam. A major modification will usually require that ACLPOA bring the facility into compliance with current regulations. One key issue will be meeting the current requirement for Total Spillway Design Flood for Apple Canyon Lake. This topic will be covered in the Planning Report.

Past reports and correspondence about the dam and spillway were obtained from the IDNR Dam Safety Section. ACLPOA provided the original construction plans for the dam and spillway as well as the Flood Mitigation Investigation Summary.

2. Available Documents and Information

The following information about the dam and spillway was obtained from ACLPOA and IDNR Dam Safety Section and reviewed for the preparation of the Planning Report.

- Dam and Spillway Construction Drawings – Dated 1969

- Hydrologic and Hydraulic Analysis Reports
 - Phase 1 Inspection Report – July 1978 (Corps of Engineers)
 - Phase II Investigation – Apple Canyon Dam 1982 (Hanson Engineers)
 - Hydrologic, Hydraulic and Dam Breach Analysis for Apple Canyon Lake Dam - November 1983 (IDOT Div. of Water Resources)
- Correspondence and calculations for IDNR dam permit application
- Apple Canyon Lake - Watershed Based Management Plan 2016 (Jo Daviess County Soil and Water Conservation District)
- LiDAR contour mapping from State of Illinois

3. Flood Modeling

Computer modeling of floods is used to predict the peak lake water level for various rainfall events in the Apple Canyon watershed. The goal of the modeling for this study is to determine how much the peak water level can be lowered with spillway configurations that are different from the existing spillway if the storm is the same.

Flooding for Apple Canyon Lake was modeled with HEC-HMS software available from the Army Corps of Engineers. Input data to HEC-HMS software are the characteristics for Apple Canyon Lake such as the watershed, rainfall, lake volume and spillway. Results from the software are inflow to the lake, peak lake water level, discharge from the lake and other data.

The first step was to calibrate the new HEC-HMS model to the previous modeling done 40 years ago. The IDOT DWR Report (1983) contains the most thorough analysis of the watershed and lake parameters in comparison to the three previous reports available. IDOT used the HEC-1 software which is the predecessor to HEC-HMS. The calibration event is the 100-year frequency rainfall of 8.14 inches with a 24-hour duration. The rainfall event was based on Illinois State Water Survey Contract Report 253 dated May 1981 which utilized previous rainfall records from the period of 1887 to 1980.

After the model was calibrated, the next step was to input current rainfall projections to forecast peak lake levels during flooding. The two types of storms are as follows. The rainfall amounts for each type of storm are shown in Table 1.

- *100-Year Frequency Flood Event*
Illinois State Water Survey Bulletin 75 dated March 2020 is the source of the 100-year rainfall data. Bulletin 75 is based on precipitation data from

1948 to 2017. The previous report (Flood Mitigation Investigation Summary) does not provide the rainfall amounts used in its analysis.

- Probable Maximum Precipitation*
 The Probable Maximum Precipitation (PMP) from the Hydrometeorological Report 51 (by National Weather Service) is entered as input data. The PMP value used for the Planning Report is greater than used in the IDOT DWR Report (1983) possibly due to an adjustment presented in HMR 52 which refines PMP values from HMR 51. The Probably Maximum Flood (PMF) is the flood which results from the occurrence of the PMP.

Table 1 shows the percentage increase in rainfall from the prior reports to 2020

Table 1 – Rainfall Values for HEC-HMS Modeling at Apple Canyon Lake

RAINFALL EVENT	IDOT DWR REPORT (1983) BASED ON ISWS CONTRACT REPORT 253 (1981)	2020 RAINFALL PROJECTIONS ISWS BULLETIN 75	PERCENT INCREASE
100-YEAR FLOOD			
6 HOUR DURATION	5.64 inches	6.19 inches	10%
12 HOUR DURATION	6.74 inches	7.18 inches	7%
24 HOUR DURATION	8.14 inches	8.25 inches	1%
PROBABLE MAXIMUM PRECIPITATION			
24 HOUR DURATION	29.76 inches	31.12 inches	5%

The capacity of the lake is updated for this report in comparison to IDOT DWR Report (1983). The data is based on recent LiDAR aerial survey data from the State of Illinois with one-foot elevation contours. The IDOT DWR Report (1983) was based on USGS mapping dated from the mid-1970's with 20-foot contour intervals.

The watershed characteristics for the 15.2 square mile watershed were the same as in the IDOT DWR Report (1983). There appears to be little new development in the watershed since 1983 which would significantly alter the runoff from a storm event. The watershed was divided into multiple sub-basins similar to the approach in IDOT DWR Report (1983).

Two different spillway designs were entered into the HEC-HMS model. The spillway is described further in the following section of the report.

- Existing spillway weir as shown in the IDOT DWR Report
- Proposed labyrinth spillway

4. Spillway

The existing spillway consists of weir wall, spillway channel and vertical drop from the end of the channel. The weir is a concrete wall with overall length of 95.7 feet long and height of 4 feet. The crest of the wall has an elevation 800.00 for a length of 82 feet and a low flow notch at elevation 799.42 for a length of 13.7 feet long. The spillway channel is a combination of natural rock floor and walls, followed by concrete floor and walls. The waterfall is a short distance downstream from the end of the concrete floor. A drawing of the existing spillway is shown as Exhibit 1.

The proposed spillway is a labyrinth spillway as shown conceptually on Exhibits 2 and 3. Labyrinth spillways have been used in the United States and around the world for many years to increase the discharge capacity. The Association of Dam Safety Officials organization estimates that 30% to 40% of projects that increase spillway capacity have installed labyrinth spillways. Photos of a labyrinth spillway at other locations are provided in Figures 1 and 2. A labyrinth spillway was recently installed for an expansion of Lake Winnebago in southwest Missouri. The lake surface area is similar to Apple Canyon Lake.

Two alternatives are proposed for the new labyrinth spillway.

- Alternative No. 1 is a labyrinth spillway with a total wall length of 434 feet, overall length of 93 feet and height of 6 feet. The spillway channel will be widened from 28 feet to 60 feet. The channel floor would remain at the same elevation.
- Alternative No. 2 is a labyrinth spillway with a total wall length of 434 feet, overall length of 93 feet and height of 10 feet. The spillway channel will be widened from 28 feet to 70 feet and lowered by 4 feet.

The labyrinth spillway has 8 cycles (8 points) from end to end. The proposed labyrinth spillway walls have an angle of 10 degrees to the flow direction. The angle of labyrinth spillways can range from 6 to 35 degrees. Seven different spillway angles and number of cycles were analyzed and evaluated before selecting the 10-degree weir for the Apple Canyon Lake spillway.

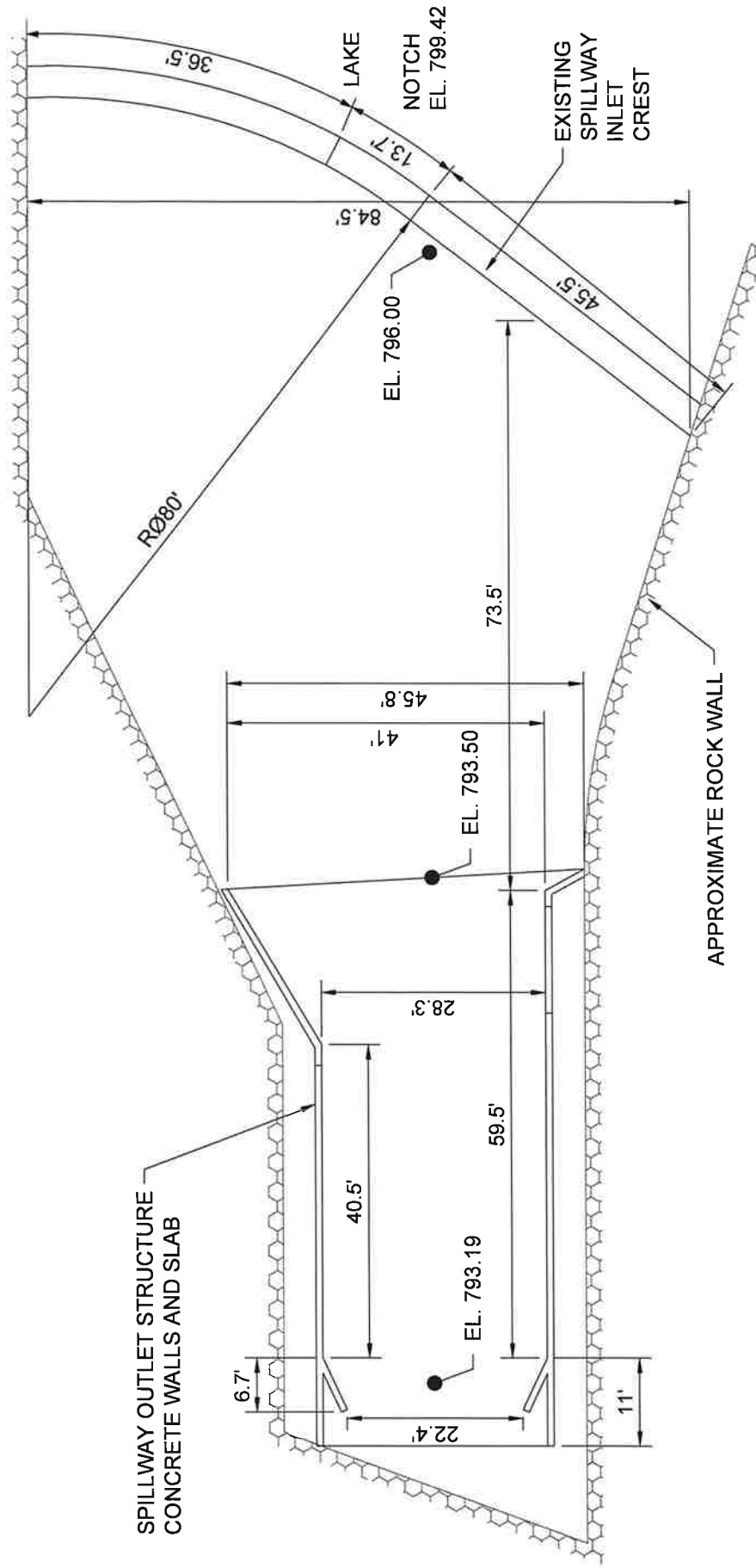
The crest of the labyrinth spillway is at Elevation 799.42 which is the elevation of the notch in the existing spillway. The elevation was selected to maximize the amount of flow through the spillway in the flood events. The labyrinth spillway could be designed with a notch at Elevation 799.42 and the remaining length at elevation

800.00. However, the peak water level during flood events would be somewhat higher than the values shown in Table 2.

The length of the labyrinth spillway is 93 feet and selected to fit in the opening where the existing weir is located. The labyrinth spillway can discharge 6,220 cubic feet per second (cfs) when the lake level is 4 feet above the spillway crest which is 3.5 times the discharge of 1,750 cfs for the existing concrete spillway. During a rainfall event, the Apple Canyon Lake level would rise much less with the new labyrinth spillway than it would with the existing spillway.

Downstream of the existing weir spillway, the width of the existing channel narrows drastically from about 84 feet near the weir to 23 feet upstream of the waterfall as shown on Exhibit 1. As a result, the capacities of both the existing and proposed spillways are restricted at higher flows. In order to achieve the higher discharge rates during a flood, it is recommended to widen and/or deepen the channel as shown on Exhibits 2 and 3. The side walls and floor of the channel will be altered by excavation of the native rock.

Drawings of the existing and proposed spillway alternatives are shown on the following three exhibits. Examples of other spillways are shown on Figures 1 and 2 following the exhibits.



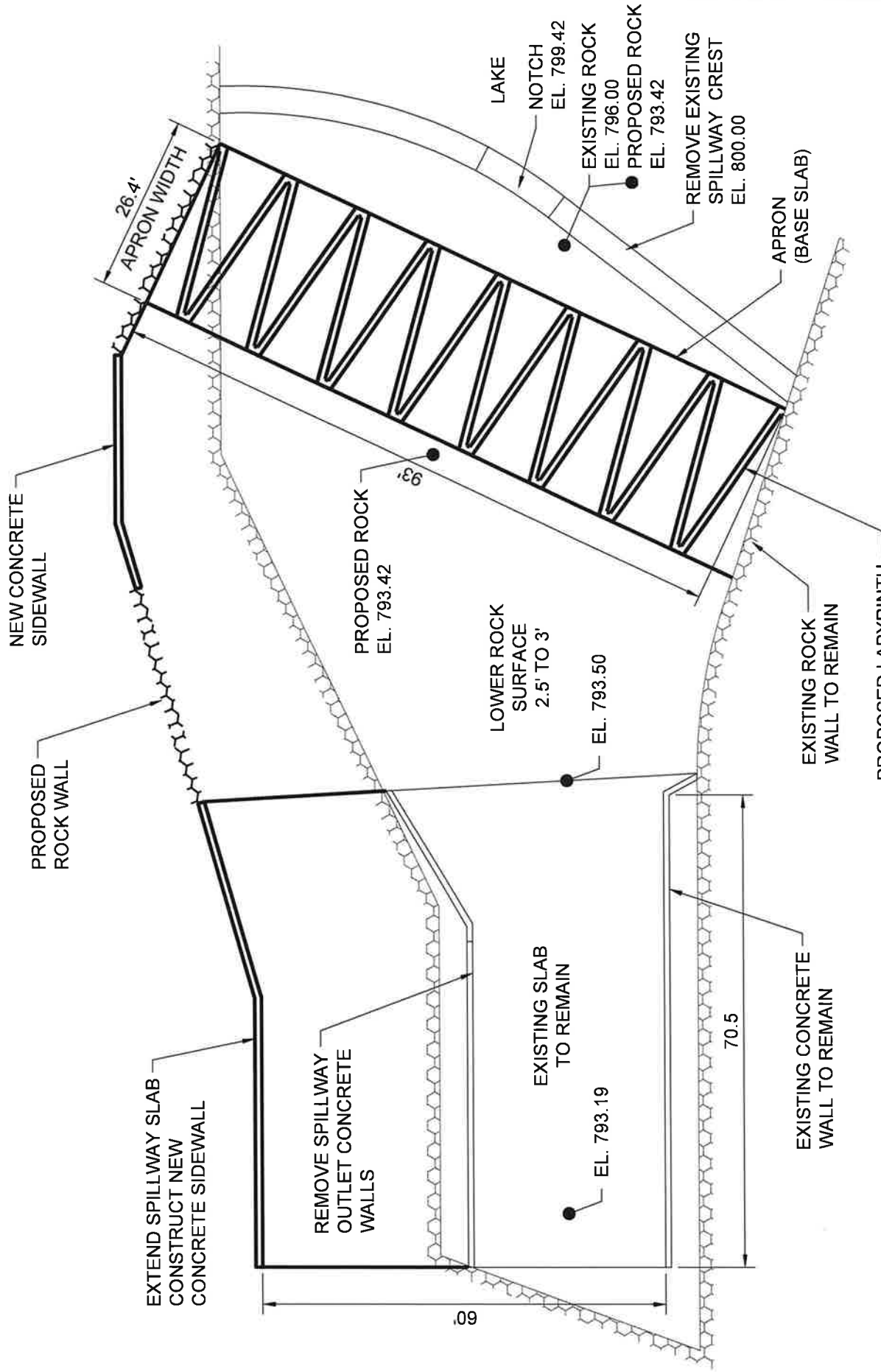
DRAWING AND DIMENSIONS
RE-DRAWN FROM IDOT DWR
REPORT DATED 1983



CMT JOB NO.: 19000144.00

EXISTING
SPILLWAY PLAN
EXHIBIT 1

APPLE CANYON LAKE



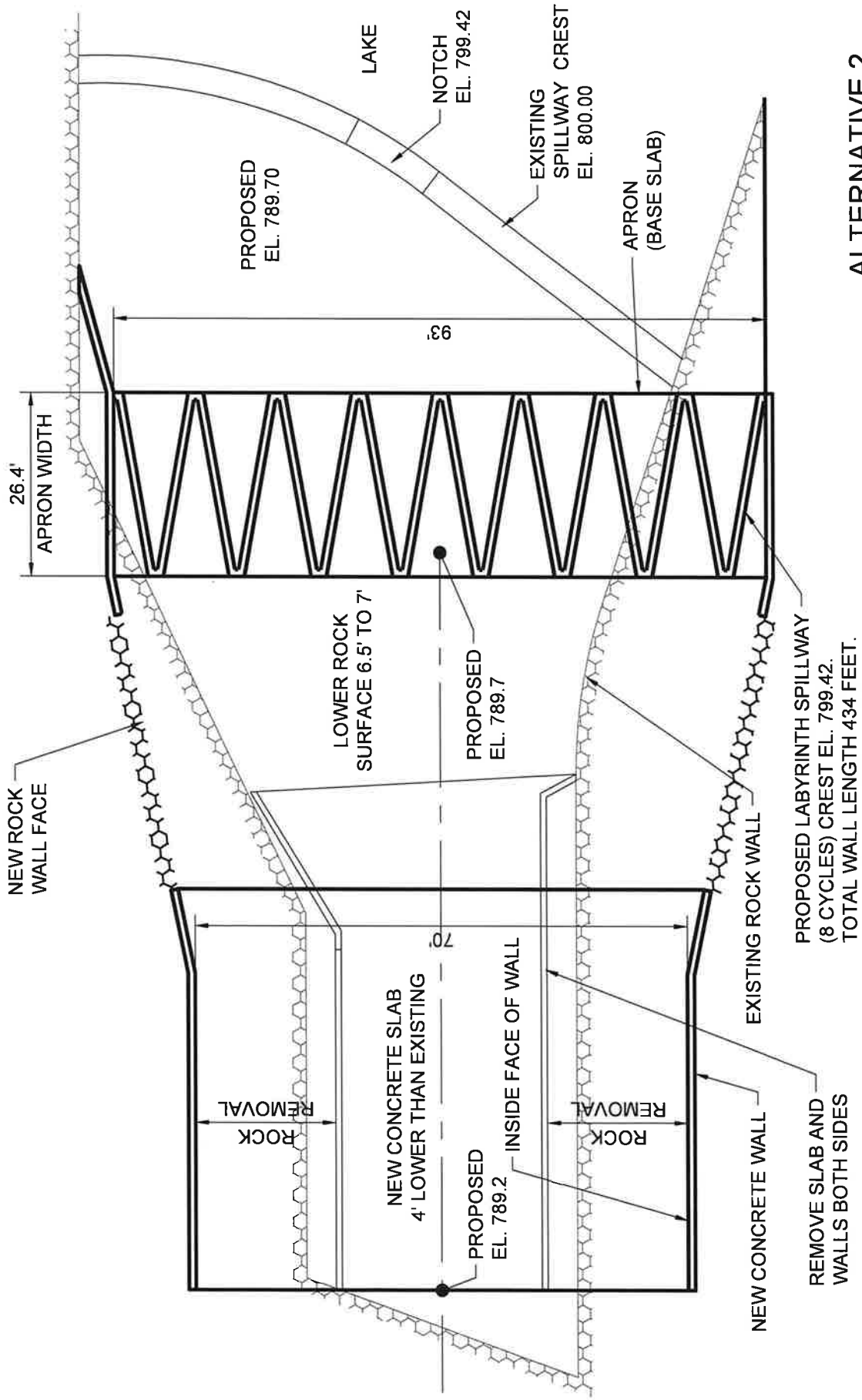
**ALTERNATIVE 1
 SPILLWAY PLAN
 CONCEPTUAL**

EXHIBIT 2

PROPOSED LABYRINTH
 SPILLWAY (8 CYCLES)
 CREST EL. 799.42. TOTAL
 WALL LENGTH 434 FEET.

APPLE CANYON LAKE





ALTERNATIVE 2
SPILLWAY PLAN
CONCEPTUAL

EXHIBIT 3

APPLE CANYON LAKE



CMT JOB NO.: 19000144.00

Figure 1 – Labyrinth Spillway Examples



Figure 2 – Labyrinth Spillway Example



5. Results of Flood Modeling

A comparison of the peak water levels of the 100-year flood by different engineers are presented in the first four lines of Table 2. The four engineers are the original plans (1960), the Corps of Engineers Phase 1 Inspection Report (1978), IDOT DWR Report (1983) and CMT (2020). The predicted peak lake levels vary by 1.2 feet.

For the calibration runs, the peak water level by CMT with HEC-HMS is 0.7 feet (8 inches) higher than the IDOT DWR Report (1983). The IDOT DWR Report is considered the most detailed of the three analyses in our opinion because it compares the three previous reports and explains its rationale for selecting its parameters to input. The source of the difference in peak water levels between IDOT DWR and CMT could not be determined even though the input parameters appear to be the same.

For design of the new spillway at Apple Canyon Lake, the capacity will be based on the IDNR requirements for an existing High Hazard (Class 1) dam with Intermediate Size which are presented in Table 3. Current regulations state that

an existing dam constructed before September 2, 1980 shall have a Spillway Design Flood equal or greater to the 100-year flood with adequate freeboard to the top of the dam. Existing dams constructed before September 2, 1980 shall have a Total Spillway Design flood which is equal to or greater than 60% of the Probable Maximum Flood (PMF) with adequate freeboard to the top of the dam. Freeboard is the vertical distance between the peak water level and the top of the dam. Apple Canyon Lake has only one spillway which has to meet both the Principal Spillway Design Flood and the Total Spillway Design Flood requirement.

The IDNR accommodates older dams by having less stringent requirements. For comparison, a new dam of the same size and High Hazard (Class 1) constructed after September 2, 1980, would have to pass 100% of the PMF with adequate freeboard on the dam.

For the Principal Spillway Design Flood (100-year frequency) with the new labyrinth spillway, the peak water level will be Elevation 803.1 with 4.7 feet of freeboard to the top of the dam. This will meet current IDNR regulations if the design freeboard is less than 4.7 feet which can be expected. The peak lake level with the new labyrinth spillway is projected to be 2.5 feet lower than the peak lake level with the existing spillway.

For the Total Spillway Design flood, 60% of the PMF, the peak water level is estimated to be Elevation 807.7 with 0.1 foot of freeboard on the dam. Water would not overtop the dam but there would be less than the design freeboard required by IDNR. The peak lake level with the labyrinth spillway is projected to be 2.8 feet lower than the peak lake level with the existing spillway as projected by the IDOT DWR Report (1983).

The three previous reports show that the existing spillway falls far short of being able to pass 60% of the PMF and that the dam would be overtopped.

The hydrologic analyses show that the addition of more spillway capacity will greatly reduce the peak lake levels during flooding.

The key results of the HEC-HMS computer modeling are shown below in Table 2 and Table 3. The tables show the improvement in lake level which results from a labyrinth spillway in place of the existing spillway.

Table 2 – Principal Spillway Design Flood - Peak Lake Levels

STORM EVENT	RAINFALL AMOUNT inches	SPILLWAY	PEAK LAKE LEVEL – ELEV. FEET	LAKE LEVEL LOWER BY
100-year Flood, 6-hour storm <i>Original Construction Plans (Prior to construction)</i>	7 or 4.74 *	Original Plans 100' length*	804.0	-----
100-year Flood, 24-hour storm <i>IDOT DWR Report (1983)</i>	8.14	Existing spillway	804.5	-----
100-year Flood, 24-hour storm <i>Corps Engineers 1978</i>	6.2	Existing spillway	804.1	-----
100-year Flood, 24-hour storm <i>CMT 2020 Calibration Run</i>	8.14	Existing spillway	805.2	-----
100-year Flood, 24-hour storm Bulletin 75. <i>CMT 2020</i>	8.25	New Labyrinth spillway 10 deg	802.7	2.5 Feet
100-year Flood, 12-hour storm Bulletin 75. <i>CMT 2020</i>	8.25	New Labyrinth spillway 10 deg	803.1	-----
Notes				
* Based on statement in IDOT DWR 1983 report and original construction plans.				
Existing spillway crest El. 799.42 and El, 800.00.				
New labyrinth spillway crest El. 799.42.				
Proposed peak lake water level applies to both Alternative No. 1 and Alternative No. 2.				

Table 3 – Total Spillway Design Flood - Peak Lake Levels

STORM EVENT	RAINFALL AMOUNT inches	SPILLWAY	PEAK LAKE LEVEL – ELEV. FEET	LAKE LEVEL LOWER BY
60% Probable Maximum Flood, 24-hour storm <i>IDOT DWR Report</i>		Existing spillway	810.5	-----
60% Probable Maximum Flood, 24-hour storm <i>COE REPORT 1978</i>		Existing spillway	808.7	-----
60% Probable Maximum Flood 24-hour storm (IDNR regulation requirement) <i>CMT 2020</i>		Alternative No. 2 New Labyrinth spillway 10 degree	807.7**	2.8 feet
100% Probable Maximum Flood 24-hour storm <i>CMT 2020</i>	31.1	Alternative No. 2 New Labyrinth spillway 10 degree	809.5	-----
20% Probable Maximum Flood 24-hour storm (to compare to 100-year flood) <i>CMT 2020</i>		Alternative No. 1 and 2 New Labyrinth spillway 10 degree	802.2	-----
<p>Notes</p> <p>** Dam not overtopped if dam crest is raised to uniform El. 807.81.</p> <p>Existing spillway crest El. 799.42 and El. 800.00. New labyrinth spillway crest El. 799.42. The 60% PMF for future condition is based on Spillway Alternative No. 2. Spillway Alternative No. 1 would pass approximately 30% of the PMF.</p>				

6. Potential Major Modification Items – IDNR Regulations

Dams in Illinois are regulated by the Dam Safety Section of IDNR Division of Water Resources. The regulation for dams is Part 3702 – Construction and Maintenance of Dams. Changes to a dam or spillway are considered a major modification which will require that the entire facility meet the current dam regulations.

If ACLPOA moves forward with increasing the capacity of the principal spillway, additional work may be required at the discretion of the IDNR if there are deficiencies. The following items may need to be addressed after CMT reviewed the current dam regulations and past inspection reports, and after CMT contacted the IDNR Dam Safety Section.

- a. Evaluate freeboard on dam during design storm events.
- b. Revise/update the Operation & Maintenance Plan.
- c. Update of dam breach analysis – IDNR to determine after review of spillway modifications.
- d. Update of Emergency Action Plan – IDNR to determine.
- e. Correct various deficiencies identified in annual inspection reports.
- f. Check adequacy of lake drawdown capacity.
- g. Add to dam upstream slope protection if needed.
- h. Slope stability analysis is not required. However, IDNR recommends a slope stability analysis because of improved methods of soil testing and computer analysis. Furthermore, IDNR has expressed concern with the interface of rock zones in the abutment and the embankment.

IDNR Dam Safety Section indicated to CMT that IDNR would consider issuing a construction permit for a spillway capacity which is less than 60% PMF, or has less than adequate freeboard than required, if construction cost for the full improvement becomes too costly for ACLPOA. In other words, IDNR wants to encourage ACLPOA to improve its spillway capacity.

7. Preliminary Opinions of Project Cost

Opinions of Project Costs are provided for the following project components to reduce the peak water level of flooding on Apple Canyon Lake.

Spillway Replacement – Two Alternatives to Consider

Alternative No. 1 – Shown on Exhibit 2
New labyrinth spillway. Widen spillway channel.

This alternative will lower the peak lake level for the 100-year flood by 2.5 feet. The dam would be overtopped by the Total Spillway Design Flood of 60% PMF.

Alternative No. 2 - Shown on Exhibit 3

New labyrinth spillway. Widen and deepen spillway channel.

This alternative will lower the peak lake level for the 100-year flood by 2.5 feet. The dam would NOT be overtopped by the Total Spillway Design Flood of 60% PMF based on preliminary HEC-HMS runs for the Planning Report and would meet IDNR regulations for existing High Hazard dams except that freeboard would be less than required.

Removal of Existing Spillway

The existing spillway would be removed under both Alternative No. 1 and Alternative No. 2. The existing spillway would remain in place during construction of the new spillway and the lake level would be drawn down by the manual dewatering valve.

Raise Crest of Dam to Uniform Elevation 807.81

The 2019 annual inspection report shows that the east end "Point E" ground is at El. 806.76 and the west end "Point B" ground is at El. 807.81. The crest should be raised to a uniform elevation 807.81 by either earth fill or structural wall on the crest of the dam. Raising the dam will increase the freeboard for all flood scenarios.

Installation of datalogger for lake level

Continuous recording of the Apple Canyon Lake level is recommended. Many major lakes record lake levels. One easy method is to install an electronic datalogger in the lake at a convenient location to periodically download readings. The information will be useful for recording peak water levels of flood events and well as other purposes. One model is the Solinst Levellogger Edge. The datalogger would be attached to a permanent structure under water. Data readings can be downloaded periodically to a handheld device. The device can record up to 40,000 readings and has a battery life on the order of 10 years. The device should be mounted permanently under water well below the expected lowest lake levels.

Items listed in Section 7 of the Planning Report

Implement the items listed in Section 7 to the extent they are required by IDNR or determined by ACLPOA to be done.

Preliminary opinions of project cost are presented in Tables 4 and 5 along with conditions included in the cost opinions. The cost opinions are based upon the information that CMT has at the time of the report. The cost opinions include a

significant contingency amount because detailed survey information is not available and the new spillway could be revised during the design phase. For more accurate cost opinions, the construction access to the site for construction and the effort to remove the existing rock will be evaluated in more detail.

The Preliminary Opinion of Project Cost for Alternative No. 1 is estimated to be in the range of \$710,000 to \$860,000 (Table 4). The Preliminary Opinion of Project Cost for Alternative No. 2 is estimated to be in the range of \$1,055,000 to \$1,230,000 (Table 5). Both cost opinions include a 20% contingency added to the construction cost for items that are not known at this preliminary stage of cost preparation.

During the design phase, it is recommended to evaluate certain aspects of the design for further value engineering and possible construction cost reduction.

- Choice of concrete or exposed rock walls and floor slab in the spillway channel. Concrete is included in the cost opinion because the existing spillway channel has concrete walls and floor at the downstream end.
- Rock removal is approximately 30% of the construction cost for each alternative. The geometry of the enlarged spillway can be optimized in the next phase to reduce the cost of rock removal. Unit cost for rock removal can be further refined in the next opinion of construction cost.
- Refinement of the labyrinth spillway dimensions and spillway channel alignment.

The impact of higher peak flows released by new spillway for the same storms to the downstream creek and culvert should be evaluated in a subsequent phase if ACLPOA moves forward with spillway improvements.

TABLE 3

Alternative No. 1

New Labyrinth Spillway. Widen Spillway Channel.

Raise Top of Dam to be Level. Install Lake Level Datalogger.

PRELIMINARY OPINION OF PROJECT COST

MOBILIZATION	\$ 50,000
LABYRINTH SPILLWAY	
Rock Anchors	\$ 16,000
Apron Slab on Grade	\$ 140,000
Labyrinth Walls - Reinforced Concrete 6 Feet Tall	\$ 79,000
OUTLET CHANNEL	
Removal of Existing Channel Wall	\$ 7,000
Outlet Channel Floor Slab - Reinforced Concrete	\$ 56,000
Outlet Channel Walls - Reinforced Concrete	\$ 24,000
Removal of Existing Spillway	\$ 23,000
OUTLET CHANNEL	
Removal of Rock for New Spillway and Channel	\$ 183,000
OTHER ITEMS	
Raise Dam Crest to El. 807.8 - Earth Fill	\$ 8,000
Datalogger	\$ 5,000
Flow Diversion	\$ -
Subtotal - Construction	\$ 591,000
Contingency - 20%	\$ 119,000
Subtotal Construction	\$ 710,000
PROFESSIONAL SERVICES	
Land and Hydrographic Survey of Spillway Area	\$ 8,000
Geotechnical Engineering	\$ 10,000
Preliminary Design (30% of design)	\$ 50,000
Final Design and Bid Documents	\$ 32,000
Application for IDNR Construction Permit	\$ 8,000
Bidding and Construction Engineering	\$ 40,000
Subtotal - Professional Services	\$ 148,000
Total Project Cost	\$ 863,000

TABLE 4

Alternative No. 2

New Labyrinth Spillway. Widen and Deepen Spillway Channel.

Raise Top of Dam to be Level. Install Lake Level Datalogger.

PRELIMINARY OPINION OF PROJECT COST

MOBILIZATION	\$ 50,000
LABYRINTH SPILLWAY	
Rock Anchors	\$ 16,000
Apron Slab on Grade	\$ 140,000
Labyrinth Walls - Reinforced Concrete 6 Feet Tall	\$ 138,000
OUTLET CHANNEL	
Removal of Existing Channel Wall	\$ 45,000
Outlet Channel Floor Slab - Reinforced Concrete	\$ 100,000
Outlet Channel Walls - Reinforced Concrete	\$ 89,000
Removal of Existing Spillway	\$ 23,000
OUTLET CHANNEL	
Removal of Rock for New Spillway and Channel	\$ 270,000
OTHER ITEMS	
Raise Dam Crest to El. 807.8 - Earth Fill	\$ 8,000
Datalogger	\$ 5,000
Flow Diversion	\$ -
Subtotal - Construction	\$ 884,000
Contingency - 20%	\$ 177,000
Subtotal Construction	\$ 1,061,000
PROFESSIONAL SERVICES	
Land and Hydrographic Survey of Spillway Area	\$ 8,000
Geotechnical Engineering	\$ 10,000
Preliminary Design (30% of design)	\$ 60,000
Final Design and Bid Documents	\$ 40,000
Application for IDNR Construction Permit	\$ 8,000
Bidding and Construction Engineering	\$ 45,000
Subtotal - Professional Services	\$ 171,000
Total Project Cost	\$ 1,237,000

Conditions of Cost Opinions

1. For rock removal, crushed rock and demolished concrete would be pushed beyond the outlet of the spillway channel to outlet channel below or into the lake.
2. Access for concrete trucks and construction equipment would be from the northwest (Nixon Lane) or pumped up from the bottom of the waterfall. An alternative to consider is access across the crest of the dam.
3. Datalogger is to be mounted to an existing structure which is accessible for downloading data.
4. During construction of the new spillway, lake would be drawn down and there would be no flow through the spillway.
5. Preliminary Design includes spillway footprint, preliminary structural design and hydrologic and hydraulic analysis. Does not include breach analysis or any work related to the dam embankment other than adjustment of the top of the dam.
6. Costs for Items in Section 7 of the Planning Report are not included except for the update of O&M Plan and evaluation of freeboard on dam.
7. The design phase would consider ways to minimize the quantity of rock removal.
8. Application for Corps of Engineers Section 404 permit may or may not be required and is not included in the cost opinion.

8. Conclusions and Recommendations

The Planning Report presents two alternatives to ACLPOA to increase spillway capacity and reduce peak water levels on Apple Canyon Lake during major flood events. Alternative No. 2 with labyrinth spillway and deeper spillway channel is recommended. Alternative No. 2 will bring the dam into compliance with the current INDR regulations for existing dams having High Hazard Classification and Intermediate Size except for insufficient freeboard on the dam. Further analysis of the design flood would be performed during the design phase if ACLPOA proceeds with the project.

Alternative No. 1 with labyrinth spillway and wider spillway channel is a secondary alternative which will significantly reduce the peak water level during the 100-year frequency flood, although it will not bring the dam into compliance with current dam regulations for existing High Hazard dams. Alternative No. 1 has a lower project cost in comparison to Alternative No. 2.

The dam could meet IDNR regulations for 60% PMF with adequate freeboard if a new labyrinth spillway of greater length is constructed. The cost for the larger spillway would be greater than Alternative No. 2.

END OF PLANNING REPORT

Megan Shamp

From: Ashlee Miller
Sent: Friday, June 10, 2022 11:19 AM
To: Megan Shamp
Subject: FW: Apple Canyon Lake Dam
Attachments: Spillway Profile.pdf; Spillway Plan no points.pdf; Dam Plan no points.pdf; Dam Profile.pdf

From: Shaun Nordlie <shaun.nordlie@applecanyonlake.org>
Sent: Friday, June 10, 2022 7:19 AM
To: Ashlee Miller <ashlee.miller@applecanyonlake.org>
Cc: sgnels00@gmail.com; Gary Hannon <grhannon@yahoo.com>; Shaun Nordlie <shaun.nordlie@applecanyonlake.org>
Subject: FW: Apple Canyon Lake Dam

Use these four attachments with Ted's explanation of each attachment -

From: Ted LaBelle <elabelle@cmtengr.com>
Sent: Friday, June 3, 2022 5:32 PM
To: Shaun Nordlie <shaun.nordlie@applecanyonlake.org>
Subject: Apple Canyon Lake Dam

Shaun

We spent more time this week refining the drawings of existing conditions from the survey data. Copies of the drawings are attached.

Attached are the following revised drawings.

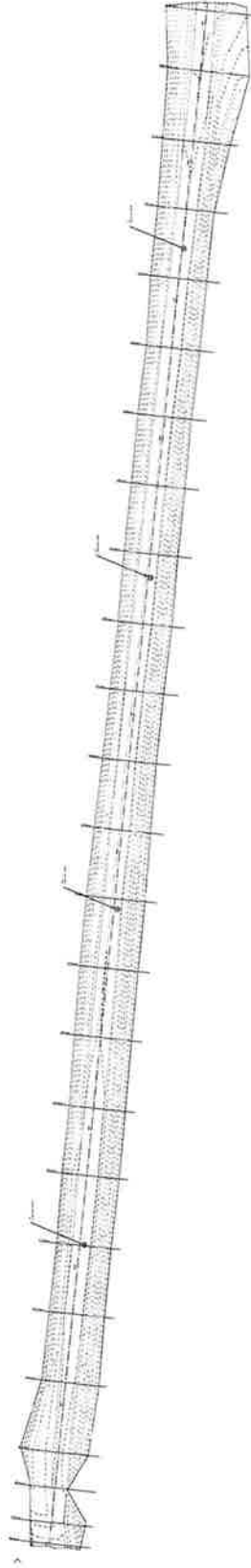
- 1) Dam crest plan. The west end of the baseline was shifted further west to begin where ground elevation is above 808.
- 2) New drawing: Profile view of the centerline of the dam. The dam cross sections was surveyed at 50-foot spacing. (We also developed sheets with the cross sections cut at the new locations.)
- 3) The spillway plan view. The boundary of the contours was revised to provide more accurate contours of existing conditions.
- 4) Profile of the existing ground along the baseline. Note that the lake depth is about 2.5 feet dep 75 feet away from the existing spillway. (We also developed sheets with the cross sections revised to reflect the revised elevation contours.)

We will end our work on the Spillway Survey agreement as of today. We have reached the not-to-exceed amount of the agreement. We developed base drawings of the existing conditions at the site and did some refinement of the drawings. The drawing work was not part of the original scope of the agreement. This effort will give us a head start on the design phase drawings.

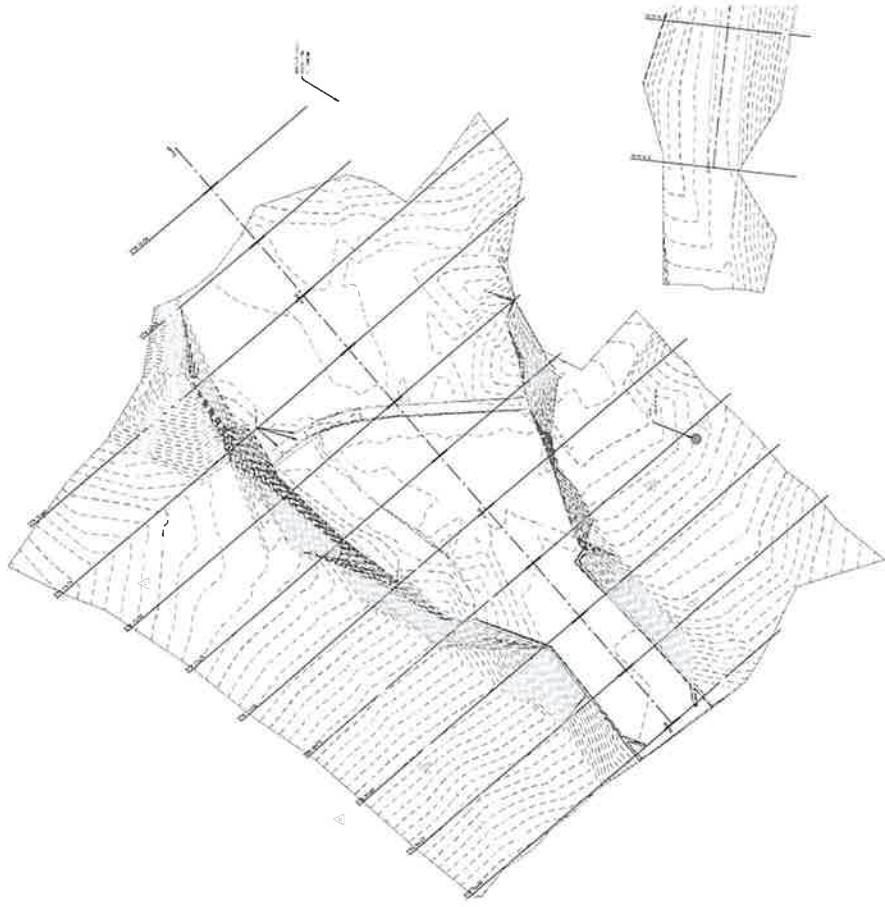
TED LABELLE PE CFM EnvSP | Project Engineer II



Dam Plan- No Points

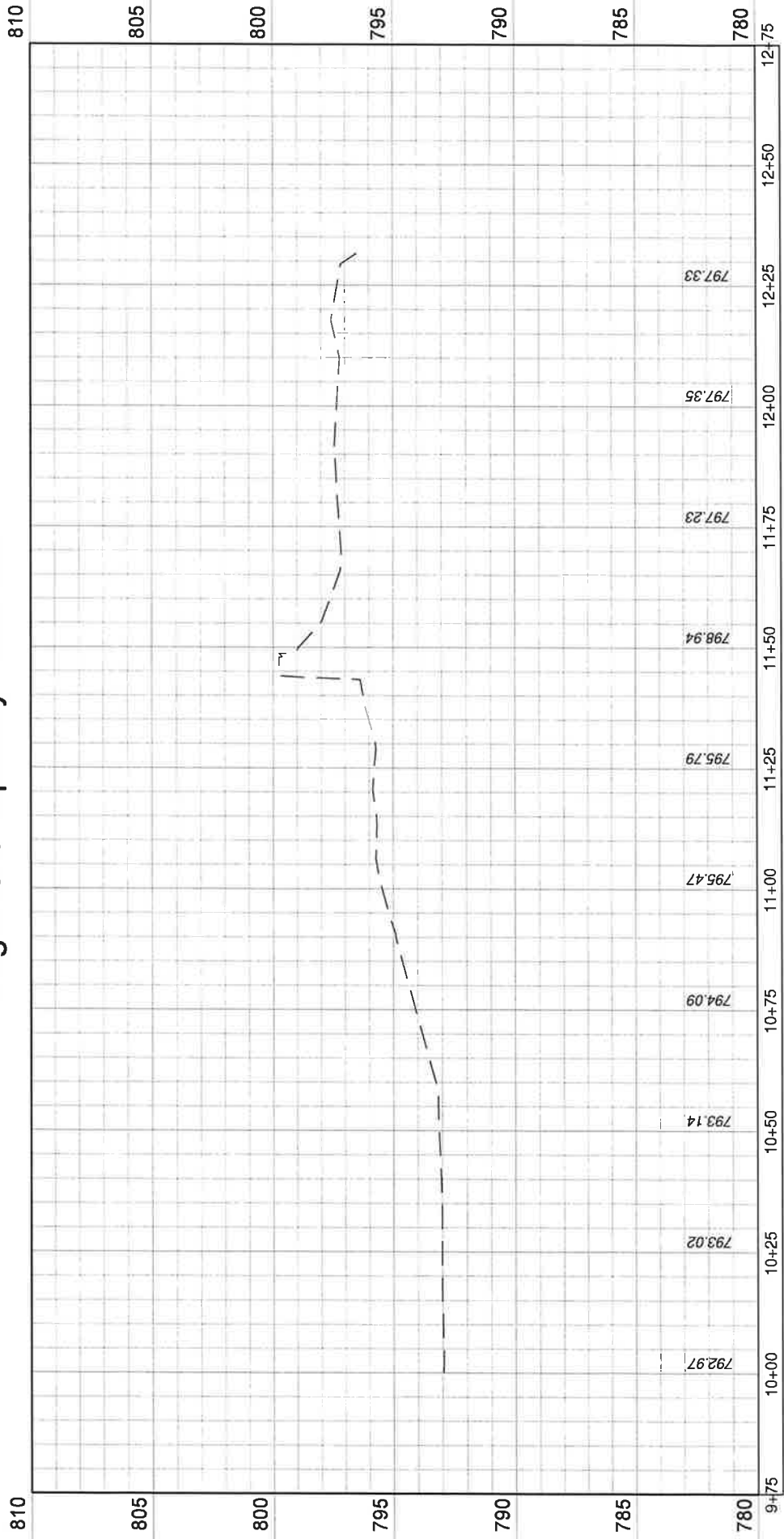


Spillway Plan - No Points



SCALE = 1" = 20'-0"
NORTH IS UP

Alignment - Spillway PROFILE



HORIZ SCALE = 20'-0"

Dam Profile



100



Memorandum

To: ACL Board

Date: June 10, 2022

From: Flood Mitigation Ad Hoc Commission

Memo #: 2022-72

Topic: Design and Permitting of A2 Option for Spillway

Analysis: The Flood Mitigation Ad Hoc Commission's recommendation is to proceed with design and permitting of A2 for the spillway. The Flood Mitigation Ad Hoc Commission has been meeting since July 2021, in that time they have met with CMT Engineer Ted LaBelle four times and PSI Geotechnical Engineer Kevin Miller once. From the June 2020 Dam and Spillway Planning Report, the January 2022 Preliminary Design report and now, the May 2022 Labyrinth Spillway and Dam Crest Raise Design Engineering Proposal, the commission has considered the best options for the spillway project to reduce the risk of flooding during the next one-hundred-year flood.

Recommendation: To approve the Labyrinth Spillway and Dam Crest Raise Design Engineering Proposal from CMT for an amount not to exceed \$249,000 with the money coming out of the Capital Project fund.

Apple Canyon Lake Property Owners Association Committee/Commission Motion Card

FLOOD MITIGATION ^{AD HOC} Committee/Commission

Date 6/2/22

I move:

THE F.M. AD HOC COMMITTEE RECOMMENDS TO BOB TO APPROVE THE CMT LABYRINTH SPILLWAY & DAM CREST RAKE DESIGN ENGINEERING PROPOSAL FOR CONTRACT PRICE NOT TO EXCEED \$249,200. THIS PRICE IS INCLUSIVE OF TOTAL APPROXIMATE PROJECT COST OF TWO MILLION.

Action Taken

MOTION MADE BY: STEVE NELSON Steve Nelson	VOTE RECORDED:
MOTION SECONDED BY: MIKE CAMMAK Mike Cammack	YEA: 5
CHAIR: HANNOON/NELSON Steve Nelson	NAY: 0
	ABSTAIN: 0

Date Received _____ Given to _____ Date Completed _____



Crawford, Murphy & Tilly

2750 W Washington Street
Springfield, Illinois 62702

May 11, 2022

Property Owners Association
c/o Mr. Shaun Nordlie
Apple Canyon Lake Property Owners Association
14A157 Canyon Club Drive
Apple River IL 61001

Re: Apple Canyon Lake – Labyrinth Spillway and Dam Crest Raise
Design Engineering Proposal

Shaun:

We are providing you with an engineering proposal for Apple Canyon Lake Spillway and Dam as requested. The proposal includes design phase services for Alternative No. 2 of the Planning Report (January 2020) for a labyrinth spillway which will pass the 60% Probable Maximum Flood and for raising the crest of the dam to be level from end to end.

The following items are attached for your review.

- CMT Professional Services Agreement
- Exhibit A Detailed scope of work including engineering and environmental services

The project deliverables will be

- Construction plans and specifications to obtain construction bids
- Joint Waterways Application and environmental report to be submitted to Corps of Engineers (COE), Illinois Department of Natural Resources (IDNR) and Illinois Environmental Protection Agency (IEPA).
- Permit application package to IDNR including plans, specs, Final Design Report and items required by Part 3702 regulations.
- Revised O&M Plan and Emergency Action Plan

The first phase of the work will be to finalize the computer modeling of the hydrology and hydraulics of the spillway. The second phase will be to prepare the detailed construction plans and specifications. We are planning on a single construction contract for the labyrinth spillway, channels and raising the top of the dam. The scope includes three progress meetings with CMT, the Ad Hoc Committee and POA. Coordination with the designated representative of the POA (Shaun Nordlie) is also included in the scope.

Crawford, Murphy & Tilly

Centered in Value

2750 W Washington Street Springfield, Illinois 62702 PHONE 217.787.8050 FAX 217.787.4183 cmtengr.com Engineers and Consultants

The scope of work includes consultation with two subconsultants in the review of the hydrology and labyrinth spillway.

- o Michael Horst – Specialist in HEC-HMS modeling (Professor at College of New Jersey) for QA/QC review of the modeling. We have specific items for his review.
- o Blake Tullis – Hydraulic lab modeling and developer of labyrinth spillway hydraulic equations. (Professor at Utah State University.) for advising on labyrinth spillway layout and spillway rating curve calculations. (Tullis Hydraulic Engineering Consulting Inc.)

Environmental assessment is included in the proposal. The project will include submitting a permit application to the COE - Rock Island District because Apple Canyon Lake and its outlet stream are considered Waters of the U.S. The channel between the spillway and waterfall is considered a stream which will be impacted. The proposal includes a site visit by environmental scientists to assess the areas which will be disturbed and prepare an environmental report which will be submitted with the Joint Waterways Application. The environmental report will address streams, lake, wetlands, endangered species and cultural resources which are required by regulations.

The initial discussion with the COE indicates that no stream mitigation will be required for deepening and widening the channel which is subject to further review by the COE. We do not anticipate any wetlands will be disturbed or impacted by the project and therefore no mitigation will be required. The expectation is that one or more COE nationwide permits will apply to the project and an individual permit will not be required.

Company	Not-to-exceed Amount	Comments
CMT – Design Engineering Services	\$175,520	
CMT – Environmental Services	\$ 20,000	Required for COE permit
PSI Geotechnical Services	\$ 22,580	Rock borings and report
Michael Horst	\$ 3,600	Up to 24 hours
Blake Tullis	\$ 4,800	Up to 16 hours
Contingency Amount (10%)	\$ 22,700	
Total Amount	\$ 249,200	

A detailed breakdown of the tasks and costs are presented on the following page. We propose to perform the work included in the Scope of Work on a time and expense basis not to exceed \$249,200.

Please review the attachments and let us know if you have comments or revisions. We will be available for a conference call to respond to questions if requested. If the proposal is acceptable, please sign the agreement and return to us.

We look forward to working with the Apple Canyon Lake Property Owners Association on this project.

Sincerely,
Crawford Murphy and Tilly



Edward LaBelle P.E., CFM, Env SP
Senior Project Manager

PROJECT TASK	AMOUNT
Project Kickoff Meetings	\$ 3,600
Final hydrologic analysis, reservoir routing and hydraulic analysis (includes up to \$8,400 for subconsultants Michael Horst and Blake Tullis)	\$ 21,000
Design summary report of hydrology and hydraulics	\$ 4,400
Lake drawdown time	\$ 3,300
Develop layout of labyrinth spillway and channels	\$ 8,300
Pre-application conference with Corps of Engineers	\$ 2,900
Coordination with Owner on various items	\$ 1,900
Rock borings on site and geotechnical report	\$ 22,600
Structural design of labyrinth spillway	\$ 12,800
Prepare construction drawings	
Cover & general notes sheets	\$ 3,500
Rock removal sheets	\$ 10,800
Spillway and channel section sheets	\$ 14,200
Structural sheets	\$ 25,700
Raise dam crest sheets	\$ 14,500
Environmental Site Survey	\$ 2,800
Prepare environmental assessment report	\$ 9,600
Prepare technical specifications, bidding documents & contract documents	\$ 17,400
Prepare revisions to Emergency Action Plan and O&M Plan	\$ 3,200
Prepare Final Design Report & Joint Waterways Application for IDNR & COE	\$ 11,300
Submit application to IDNR, COE and IEPA. Respond to comments.	\$ 5,400
Prepare SWPPP & Notice of Intent for NPDES Stormwater Permit (IEPA)	\$ 3,900
Conference calls & coordination with POA & Ad Hoc Committee (up to 3)	\$ 2,600
Site visit (if required)	\$ 3,100
Prepare Opinion of Probable Construction Cost	\$ 4,500
Project Management	\$ 9,400
Contingency Amount – 10% and hours occurring in 2023	\$ 26,700
TOTAL AMOUNT NOT TO EXCEED	\$ 249,200

Notes:

Amounts above include labor and travel expenses, and are based on 30% of hours occurring in 2023. IDNR will charge a fee for construction permit application. Amount currently published by IDNR for a Major Modification of existing dam is \$4,030. Amount will increase by inflation in the next fiscal year. The amount of the fee will be paid by Apple Canyon Lake POA. Amount is not included in the engineering fees.

Crawford, Murphy & Tilly

Centered in Value

2022 STANDARD AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT made between Apple Canyon Lake Property Owners Association, whose address is 14A157 Canyon Club Drive, hereinafter called the **CLIENT** and Crawford, Murphy & Tilly, Inc., Consulting Engineers, 2750 West Washington Street, Springfield, Illinois 62702, hereinafter called the **ENGINEER**.

WITNESSETH, that whereas the **CLIENT** desires the following described professional engineering, land surveying or architectural services:

Design Phase engineering and environmental services as described in **EXHIBIT A**.

NOW THEREFORE, the **ENGINEER** agrees to provide the above described services and the **CLIENT** agrees to compensate the **ENGINEER** for these services in the manner checked below:

- On a time and expense basis in accordance with the attached Schedule of Hourly Charges which is subject to change at the beginning of each calendar year. Reimbursable direct expenses will be invoiced at cost. Professional or Subconsultant services performed by another firm will be invoiced at cost plus ten percent.
- At the lump sum amount of \$_____.

IT IS MUTUALLY AGREED THAT, payment for services rendered shall be made monthly in accordance with invoices rendered by the **ENGINEER**.

IT IS FURTHER MUTUALLY AGREED:

The total amount of the services shall not exceed \$249,200 without prior written authorization by the Owner.

The **CLIENT** and the **ENGINEER** each binds himself, his partners, successors, executors, administrators and assignees to each other party hereto in respect to all the covenants and agreements herein and, except as above, neither the **CLIENT** nor the **ENGINEER** shall assign, sublet or transfer any part of his interest in this **AGREEMENT** without the written consent of the other party hereto. This **AGREEMENT**, and its construction, validity and performance, shall be governed and construed in accordance with the laws of the State of Illinois. This **AGREEMENT** is subject to the General Conditions attached hereto.

IN WITNESS WHEREOF, the parties hereto have affixed their hands and seals this ____ day of ____, 2022.

CLIENT:
Apple Canyon Lake
Property Owners Association

 (Client Name)

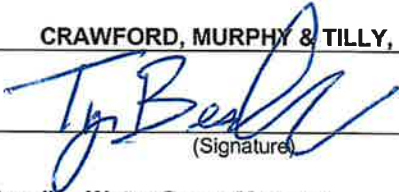
 (Signature)

Bard Hendren, President

 (Name and Title)

 Date

ENGINEER:
CRAWFORD, MURPHY & TILLY, INC.


 (Signature)

Ty Besalke, Water Group Manager

 (Name and Title)

5/11/2022

 Date

CMT Job No. 19000144.03

STANDARD GENERAL CONDITIONS
Crawford, Murphy & Tilly, Inc.

1. Standard of Care

In performing its professional services hereunder, the **ENGINEER** will use that degree of care and skill ordinarily exercised, under similar circumstances, by members of its profession practicing in the same or similar locality. No other warranty, express or implied, is made or intended by the **ENGINEER'S** undertaking herein or its performance of services hereunder.

2. Reuse of Document

All documents including Drawings and Specifications prepared by **ENGINEER** pursuant to this Agreement are instruments of service. They are not intended or represented to be suitable for reuse by **CLIENT** or others on extensions of the Project or on any other project. Any reuse without written verification or adaptation by **ENGINEER** for the specific purpose intended will be at **CLIENT'S** sole risk and without liability or legal exposure to **ENGINEER**; and **CLIENT** shall indemnify and hold harmless **ENGINEER** from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting therefrom.

3. Termination

This Agreement may be terminated by either party upon seven days prior written notice. In the event of termination, the **ENGINEER** shall be compensated by the client for all services performed up to and including the termination date, including reimbursable expenses, and for the completion of such services and records as are necessary to place the **ENGINEER'S** files in order and/or to protect its professional reputation.

4. Parties to the Agreement

The services to be performed by the **ENGINEER** under this Agreement are intended solely for the benefit of the **CLIENT**. Nothing contained herein shall confer any rights upon or create any duties on the part of the **ENGINEER** toward any person or persons not a party to this Agreement including, but not limited to any contractor, subcontractor, supplier, or the agents, officers, employees, insurers, or sureties of any of them.

5. Construction and Safety

The **ENGINEER** shall not be responsible for the means, methods, procedures, techniques, or sequences of construction, nor for safety on the job site, nor shall the **ENGINEER** be responsible for the contractor's failure to carry out the work in accordance with the contract documents.

6. Payment

Payment for services rendered shall be made monthly in accordance with invoices rendered by the **ENGINEER**. If payment is to be on a lump sum basis, monthly payments will be based on the portion of total services completed during the month. Invoices, or any part thereof, which are not paid within 30 days after the date of issue shall bear interest at the rate of 1-1/2% for each month or fraction thereof from the date 30 days after issue to time of payment. **CLIENT** will pay on demand all collection costs, legal expenses and attorneys' fees incurred or paid by **ENGINEER** in collecting payment, including interest, for services rendered.

7. Indemnification for Release of Pollutants

If this project does not involve pollutants, this provision will not apply. This provision may not be deleted if the project involves pollutants.

If, due to the nature of the service covered under this Agreement including the potential for damages arising out of the release of pollutants, **CLIENT** agrees that in the event of one or more suits or judgments against **ENGINEER** in favor of any person or persons, or any entity, for death or bodily injury or loss of or damage to property or for any other claimed injury or damages arising from services performed by **ENGINEER**, **CLIENT** will indemnify and hold harmless **ENGINEER** from and against liability to **CLIENT** or to any other persons or entities irrespective of Engineer's compensation and without limitation. It is understood that the total aggregate liability of **ENGINEER** arising from services performed by **ENGINEER** shall in no event exceed \$50,000 or the total compensation received under this agreement whichever is greater, irrespective of the number of or amount of such claims, suits, or judgments.

8. Risk Allocation Check box if this does not apply

The total liability, in the aggregate, of the **ENGINEER** and **ENGINEER'S** officers, directors, employees, agents and consultants, and any of them, to **CLIENT** and anyone claiming by, through or under **CLIENT**, for any and all injuries, claims, losses, expenses or damages arising out of the **ENGINEER'S** services, the project or this agreement, including but not limited to the negligence, errors, omissions, strict liability or breach of contract of **ENGINEER** or **ENGINEER'S** officers, directors, employees, agents or consultants, or any of them, shall not exceed the total compensation received by **ENGINEER** under this agreement, or the total amount of \$50,000, whichever is greater.

9. Project Schedule and Scope

Based on the schedule objectives provided by **CLIENT**, **ENGINEER** will develop a schedule of important milestones as necessary for the project for **CLIENT'S** review and approval. **ENGINEER** will monitor performance of services for conformance with the schedule and will notify **CLIENT** of any necessary changes to or deviations from the schedule. Where required by approved project schedule, **ENGINEER** will present the required deliverables and complete the required tasks at the appropriate intervals for **CLIENT'S** review and approval prior to payment.

CRAWFORD, MURPHY & TILLY, INC.
STANDARD SCHEDULE OF HOURLY CHARGES
JANUARY 1, 2022

Classification	Regular Rate
Principal	\$ 245
Project Engineer II Project Architect II Project Manager II Project Environmental Scientist II	\$ 235
Project Engineer I Project Architect I Project Manager I Project Environmental Scientist I Project Structural Engineer I	\$ 205
Sr. Structural Engineer II Sr. Architect II	\$ 190
Sr. Technician II	\$ 170
Aerial Mapping Specialist	\$ 165
Sr. Engineer I Sr. Architect I Sr. Structural Engineer I Land Surveyor	\$ 165
Technical Manager II Environmental Scientist III	\$ 150
Sr. Technician I	\$ 145
Sr. Planner I GIS Specialist Engineer I Architect I Structural Engineer I	\$ 145
Environmental Scientist II Technician II	\$ 125
Planner I Technical Manager I Environmental Scientist I Technician I Project Administrative Assistant	\$ 105
Administrative/Accounting Assistant	\$ 70

If the completion of services on the project assignment requires work to be performed on an overtime basis, labor charges above are subject to a 15% premium. These rates are subject to change upon reasonable and proper notice. In any event this schedule will be superseded by a new schedule effective January 1, 2023.

Out of pocket direct costs will be added at actual cost for blueprints, supplies, transportation and subsistence and other miscellaneous job-related expenses directly attributable to the performance of services. A usage charge may be made when specialized equipment is used directly on the project.

Subconsultant services furnished to CMT by another company will be invoiced at actual cost, plus ten percent.

EXHIBIT A
APPLE CANYON LAKE SPILLWAY AND DAM
SCOPE OF SERVICES
May 11, 2022

General Description of Project

1. Deepen the approach channel to new spillway.
2. New concrete labyrinth spillway and end walls.
3. Widening and deepening of channel downstream of new spillway.
4. Concrete floor slab and side walls at downstream end of downstream channel.
5. Relocation of rock removed from spillway channel.
6. Demolish the existing concrete weir wall.
7. Raise crest of dam to uniform elevation. Add riprap from top of existing to new crest fill.

Notes:

- The work does not include an energy dissipater structure because the existing water fall functions as an energy dissipater.
- The concrete slab in the spillway channel shall be designed to preserve the appearance of the existing waterfall.
- Owner and Engineer shall coordinate on the determination of the normal water level of the lake.

Scope of Engineering Design Phase Services

1. Project kickoff meeting with Apple Canyon POA and Ad Hoc Committee. Internal CMT kickoff meeting.
2. Develop final hydrologic analysis and reservoir routing:
 - a. Review historical lake levels and select normal lake level. Review water level records from datalogger. Coordinate with Owner. Evaluate low flow notch.
 - b. Coordinate with PSI on orientation of spillway considering rock removal.
 - c. Consult with HEC-HMS specialist (Michael Horst) on calibration of previous HEC-HMS model with HEC-1 model in report dated 1980.
 - d. Consult with labyrinth spillway specialist (Blake Tullis PhD Utah State University) of Tullis Hydraulic Engineering Consulting on labyrinth spillway layout, approach channel orientation, end walls and other items.
 - e. Review and refine labyrinth spillway rating curve and geometry.
 - f. Revise HEC-HMS hydrologic and reservoir routing of 60% PMF flood and lesser floods.
3. Develop final hydraulic modeling of channel downstream of spillway
 - a. Refine dimensions of channel downstream of labyrinth weir based on field survey.
 - b. Perform HEC-RAS modeling of downstream channel.
4. Prepare Design Summary of hydrologic and hydraulic modeling (use for Final Design Report).

5. Lake drawdown time calculations
6. Develop layout of labyrinth spillway and channels
7. Pre-application coordination with Corps of Engineers – Rock Island District for construction permit.
8. Coordination with Owner on various items
 - a. Property available for construction contractor and restrictions to its use.
 - b. Method for maintaining waterfall
 - c. Lake normal water level
 - d. Safety aspects of visitors to spillway from lake or adjacent ground
9. Geotechnical services (by Intertek PSI):
 - a. One rock boring at site by subcontractor with Rubino Inc. engineer onsite
 - b. Lab testing of rock samples
 - c. Geotechnical report contents
 - i. Review of soil and rock borings on 1969 construction plans
 - ii. Foundation recommendation for labyrinth spillway structure
 - iii. Rock excavation recommendations for approach channel. Rock fissure sealing if required.
 - iv. Rock excavation recommendations for downstream channel floors and walls.
 - v. Recommendation for rock removal methods
 - vi. Recommendations on earth fill on dam crest (0 to 12 inches thick)
 - vii. Construction sequence recommendations
 - viii. Provide technical specifications for rock removal for construction contract
 - d. Review of rock removal construction plan sheets
 - e. Consultation with CMT on geotechnical questions
10. Structural design of labyrinth spillway and channel slabs and walls
11. Prepare construction drawings:
 - a. Cover and general notes sheets
 - b. Removal of existing material
 - i. Native rock for labyrinth weir and downstream channel
 - ii. Native rock for channel upstream of labyrinth wall (lake bottom)
 - iii. Concrete floor slab and walls
 - iv. Concrete weir wall.
 - c. Proposed spillway and channel profile and sections
 - d. Structural work
 - i. Labyrinth spillway and foundation
 - ii. Labyrinth spillway end walls
 - iii. Downstream channel floor slab and side walls
 - iv. Incorporate design feature in floor slab to preserve look of existing waterfall
 - v. Drawdown valve or sluice gate in labyrinth spillway if desired
 - e. Raise crest of dam
 - i. Select new crest elevation from existing longitudinal profile. Typical sections.
 - ii. Geotechnical recommendations for crest stripping and fill placement.
 - iii. Consider clay material sources (onsite or offsite).
12. Environmental site survey and report preparation
13. Prepare technical specifications for spillway and dam crest
 - a. CMT
 - i. Concrete

- ii. Earth fill
 - iii. Riprap
 - iv. Construction sequence
 - v. Diversion and lake drawdown
 - vi. Erosion control
 - vii. Etc.
- b. Intertek PSI
 - i. Rock removal
 - ii. Protection of dam from blasting
 - iii. Etc.
- 14. Prepare construction bidding documents and contract documents.
- 15. Modify Emergency Action Plan for changes to labyrinth spillway and dam crest
- 16. Modify Operation and Maintenance Plan for changes to labyrinth spillway and dam crest
- 17. Prepare Final Design Report per IDNR requirements
 - a. Hydrologic and Hydraulic Investigations
 - b. Structural and Geotechnical Investigation and Design (only for Spillway & dam crest)
- 18. Quality control review
- 19. Review Final Design Report and plans with Apple Canyon Lake POA in conference call.
- 20. Submit Application for Permit to Construct Major Modification to IDNR (IL Admin Code 3702.60).
 - a. Final Design Report
 - b. Geotechnical Report
 - c. Soil boring logs from 1969 plans if applicable
 - d. Construction plans
 - e. Specifications
 - f. Owner compliance statement(s)
- 21. Review IDNR comments. Revise plans and specifications if required. Submit to IDNR.
- 22. Receive IDNR construction permit.
- 23. Prepare Stormwater Pollution Prevention Plan (SWPPP) and submit Notice of Intent for NPDES stormwater permit to Illinois EPA if required (Disturbed area > 1 acre).
- 24. Field site visit during design (if required)
- 25. Prepare Opinion of Probable Construction Cost
- 26. Project Management

Note: Payment of IDNR permit application fee to be made by ACL POA.

Not Included in Scope of Services

- Bidding Phase Services
- Construction Phase Services
- Clearing of trees for rock boring



Memorandum

To: ACL Board

Date: June 10, 2022

From: Deer Management & Rules & Regulations Commissions

Memo #: 2022-70

Topic: Deer Management Zone Selection Procedures – 1st Reading

Analysis: The Deer Management Commission has prepared Zone Selection Procedures in anticipation that as the program continues to grow from year to year, there will come a time when there are not enough zones to accommodate all hunters who have qualified to participate in the Deer Management Program.

Their procedures were presented to the Rules & Regulations Commission and approved at their June 3 meeting with one small change – change “Megan” to “the Office Manager.”

The Zone Selection Procedures will be inserted into the Rules & Regulations section XX. Hunting.

Recommendation: No motion required at this meeting. For presentation & discussion only.

Apple Canyon Lake Property Owners Association Committee/Commission Motion Card

Rules & Regs Committee/Commission

Date 6-3-22

I move:

Rules & Regs Commission recommends the ACL Board to approve the attached motion from the Deer Management Commission and as presented with one correction.

Action Taken passed

GLEO MOTION MADE BY: <u>Gregory Dreyfus</u> MARK MOTION SECONDED BY: <u>Mark Dreyfus</u> CHAIR: <u>Vickie Serston</u>	VOTE RECORDED: YEA: <u>15</u> NAY: <u>0</u> ABSTAIN: <u>-</u>
---	--

Date Received _____ Given to _____ Date Completed _____

Definitions:

ACL Zone - An ACL zone is an area identified by the Deer Management Commission to be more than 100 yards from a dwelling, more than 75 feet from a trail, and on ACL green space.

Private Zone - A private zone is a zone located on ACL green space where written permission to allow hunting within 100 yards of a dwelling is required from one or more property owners.

Zone Selection:

Zone selection is based on a point system with one point earned for each deer harvested up to a maximum of three deer, one of which may be an antlered deer. An antlered deer will only be counted if an antlerless deer is also harvested.

A hunter may earn 0.5 point for participating in the annual deer count, 0.5 point for participating in the Youth Archery event, and 0.5 point for activities approved by the Deer Management Commission. A maximum limit of 1.0 point may be earned by a hunter for volunteer work.

Zone selection order shall be determined by points in descending order with ties determined by the most days hunted the previous season. Ties for the same points and days hunted shall be broken by drawing names. The tie breaker for those with no points (new applicants and those who did not hunt any days the previous year) will be done by drawing names.

The maximum hunters allowed to participate in the ACL Deer Management Program will be limited to the total number of zones (Private and ACL combined). Applicants that exceed the number of ACL zones can seek a private zone and/or be put on an annual zone waiting list. Those who do not get a zone will have their application fee returned.

If an applicant has arranged for a private zone and there are fewer applicants than ACL zones, the applicant may also choose an ACL zone.

During the archery deer hunting season, if a participant has harvested the maximum allowed number of deer, the zone may be made available to another hunter at the Deer Management Commission's discretion. (The decision will be based on previous deer counts, deer seen, whether the zone is shared, DNR input, and other factors.) The zone would be made available for trade using the zone selection order. If no hunter chooses to trade for an available ACL zone, the zone will be offered to those on the waiting list using the zone selection order.

A refund is issued to those on the waiting list when a person requests to be taken off the waiting and notifies a member of the Deer Management Commission or at the end of the season. A member of the Deer Management Commission will notify the Office Manager when a refund is to be issued.

A hunter will be penalized 1.0 credit for zone selection if their stand(s) are not removed by April 1st. An exception is for anyone who notifies the Deer Management Commission of family or health issues that prevent them from removing stands so others can remove the stands.

Apple Canyon Lake Property Owners Association Committee Motion Card

Deer Management Committee

Date April 30, 202

I Move:

Each year there has been an increase in the number of applications for the deer management program. The Deer Management Commission anticipates that there may be more applicants than greenway zones available in the future. The Deer Management Commission has developed (find attached) a proposed written procedure for zone selection for approval.

Action Taken

MOTION MADE BY: <u>[Signature]</u>	VOTE RECORDED:
MOTION SECONDED BY: <u>[Signature]</u>	YEA: <u>6</u>
CHAIR: _____	NAY: <u>0</u>
	ABSTAIN: <u>0</u>

Date Received _____ Given to _____ Date Completed _____

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The zone would be made available for trade using the zone selection order. If no hunter chooses to trade for an available ACL zone, the zone will be offered to those on the waiting list using the zone selection order.

A refund is issued to those on the waiting list when a person requests to be taken off the waiting and notifies a member of the Deer Management Commission or at the end of the season. A member of the Deer Management Commission will notify Megan when a refund is to be issued.

A hunter will be penalized 1.0 credit for zone selection if their stand(s) are not removed by April 1st. An exception is for anyone who notifies the Deer Management Commission of family or health issues that prevent them from removing stands so others can remove the stands.

Capital Projects Update