

Town of Chapel Hill Legion Pond Dam

Preliminary Engineering Report

Presented by



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Purpose:

Provide an update to a 2017 evaluation of the Legion Pond dam regarding the following issues:

- Existing Site Conditions
- NC Dam Safety Regulations
- Applicable Ordinances and Environmental Rules
- Construction Planning Cost Estimates

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Existing Conditions of the Dam:

- Extensive tree growth on the dam
- Overly steep slopes
- Condition of the outlet structure

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Photograph 1 – Impoundment Area and Upstream Dam Face from East Shore



Photograph 2 – Dam Crest Facing East from West Abutment



Photograph 3 – Downstream Face, Facing East from Western Groin



Photograph 4 – PVC Overflow Device Inlet



Photograph 5 – Overflow Outlet and Primary Outlet Valve from Dam Crest

Drill



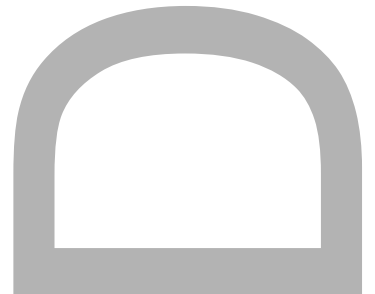
Photograph 6 – Overflow Device Outlet, Erosion Cavity Below Repaired Joint, Erosion Cavity at Outlet



Photograph 7 – Butterfly Valve at Downstream End of Primary Outlet



Photograph 8 – Pipe Culvert Outlet at Clover Drive





Dam Hazard Classification:

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than \$30,000
Intermediate	Damage to highways, Interruption of service	25 to less than 250 vehicles per day
	Economic damage	\$30,000 to less than \$200,000
High	Loss of human life*	Probable loss of 1 or more human lives
	Economic damage	More than \$200,000
	*Probable loss of human life due to breached roadway or bridge on or below the dam.	250 or more vehicles per day

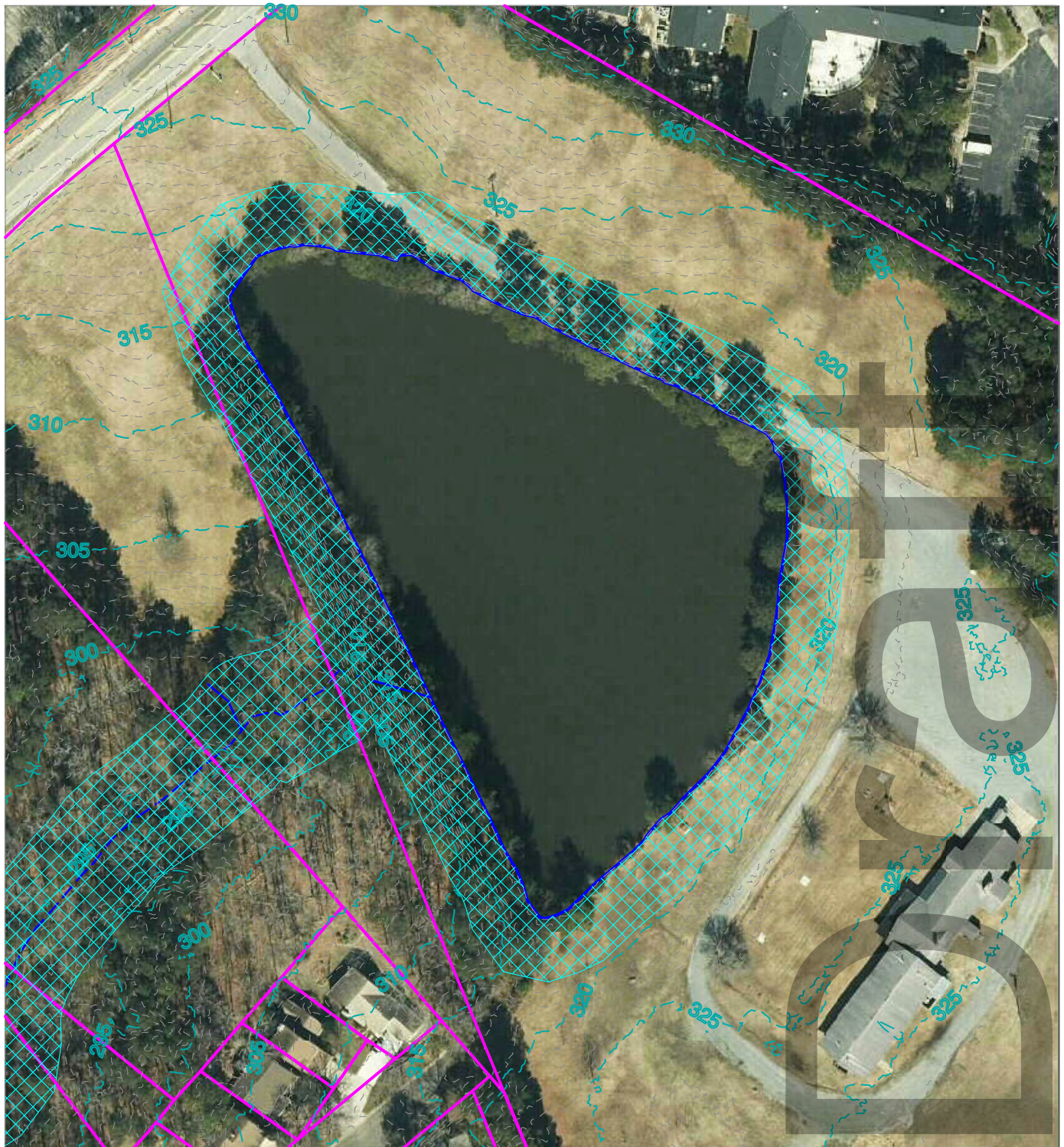
Based on the classification of the dam, Dam Safety permitting will be required to either 1) repair the dam, or 2) remove the dam.

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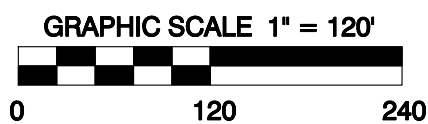
Environmental Rules

- Section 404 Permitting (US Army Corps of Engineers)
- Section 401 Water Quality Certification (NCDEQ DWR)
- Jordan Lake Riparian Buffer Rules, 15A NCAC 02B .0267.
- Resource Conservation District

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EXISTING CONDITIONS



 JORDAN LAKE RIPARIAN 50-FOOT BUFFER & RESOURCE CONSERVATION DISTRICT 50-FOOT BUFFER

Environmental Rules

- Permitting requirements will depend on whether the repair option or remove option is chosen.
- Repair option:
 - Will likely require individual permits (approximately a 12-month review period)
 - May require mitigation for fill placement in Water of the US (mitigation cost of \$100,000 is included in the budget)
 - Will depend on the final design and COE interpretation of “minimal”

Environmental Rules

- Permitting requirements will depend on whether the repair option or remove option is chosen.
- Remove option:
 - Will likely qualify for nationwide permit (approximately a 4-month review period)
 - May require mitigation for impacts to a Water of the US (mitigation cost of \$25,000 is included in the budget)
 - Will depend on the final design and COE interpretation of “minimal”

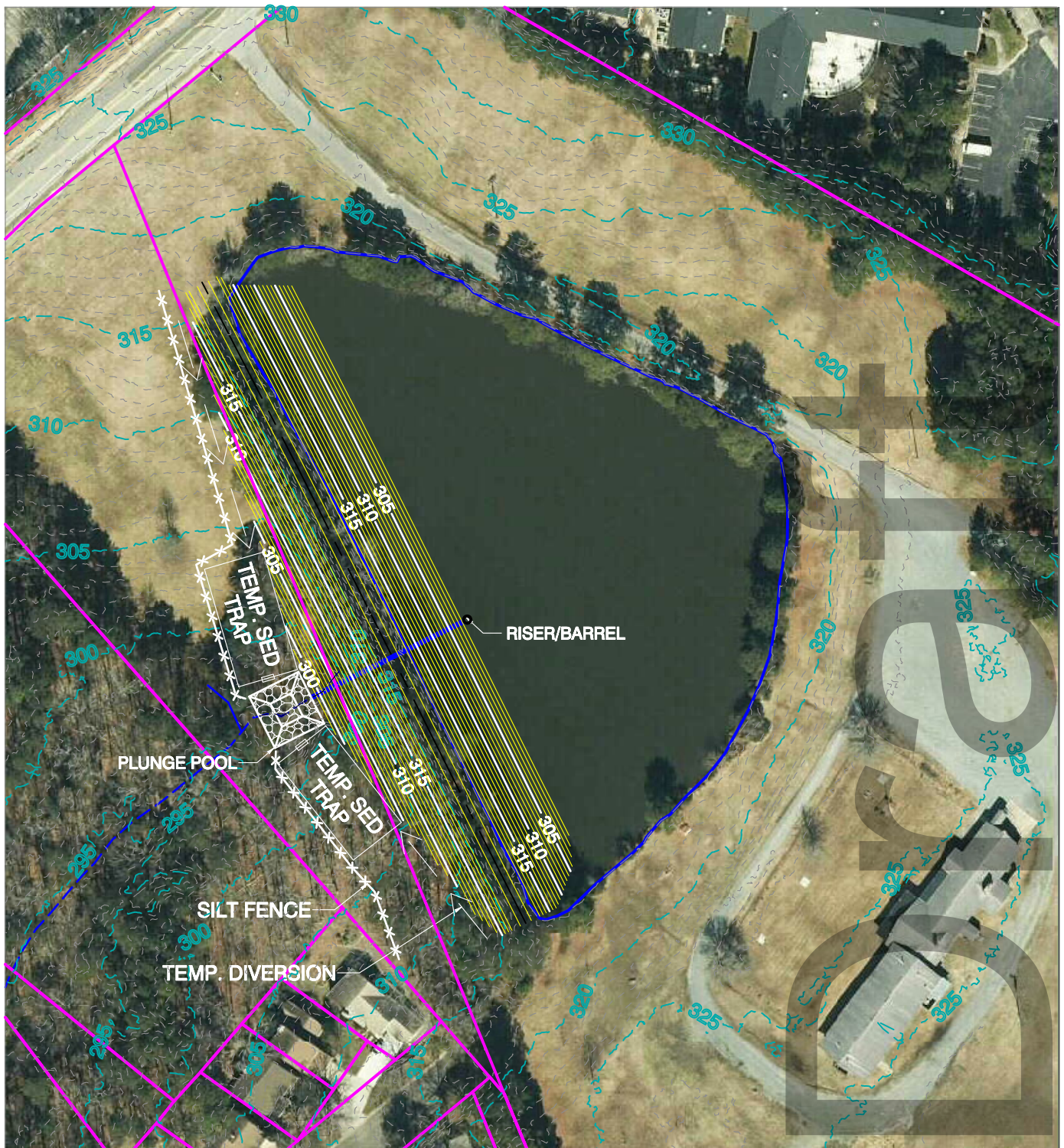
Cost Estimates

- The cost estimates are limited to the work specifically required to bring the dam into compliance with dam safety regulations.
- Cost estimates do not address any mitigation costs associated with future projects that would include impacts to the pond or stream beyond the immediate dam repair.
- In following the State's procedures for the work, both the Repair and the Removal options will require that the pond be drained, and the dam be breached

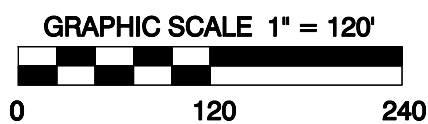
Cost Estimates

- Repair Option
 - Dewatering the pond
 - Tree removal
 - New riser and barrel structure
 - Filter diaphragm/drainage blanket (drainage through the dam)
 - Backfill at 3:1 slopes
 - Outlet energy dissipater

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DAM REHABILITATION



Cost Estimates

- Removal Option
 - Dewatering the pond
 - Tree removal
 - Existing outlet structure removal
 - Excavation of dam embankment

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Table 2
Engineer's Opinion of Probable Cost
Town of Chapel Hill
Legion Pond

Dam Repair Option

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Geotechnical Investigation/Drilling	1	LS	\$25,100	\$25,100
2	Surveying	1	LS	\$11,400	\$11,400
3	Dam Safety Permit	1	LS	\$20,700	\$20,700
4	Mitigation	1	LS	\$100,000	\$100,000
5	Erosion & Sediment Control Permit	1	LS	\$19,900	\$19,900
6	Bid/Construction Documents	1	LS	\$16,000	\$16,000
7	Bidding Services	1	LS	\$13,000	\$13,000
8	Mobilization/Demobilization	1	LS	\$26,000	\$26,000
9	Silt Fence	1500	LF	\$5.00 /LF	\$7,500
10	Temporary Diversion Ditch	400	LF	\$15.00 /LF	\$6,000
11	Sediment Trap	2	LS	\$30,000	\$60,000
12	Dewatering Pump	2.5	Mo	\$10,000 /Mo	\$25,000
13	Filter Bag	1	LS	\$2,000	\$2,000
14	Tree Removal	2	AC	\$10,000 /AC	\$20,000
15	Grubbing	2	AC	\$10,000 /AC	\$20,000
16	Unsuitable Excavation	2500	CY	\$15 /CY	\$37,500
17	Excavation & Haul Offsite	0	CY	\$20 /CY	\$0
18	Backfill w/ Offsite Soils	8500	CY	\$20 /CY	\$170,000
19	Filter Diaphragm	2000	CY	\$25 /CY	\$50,000
20	Riser Structure	1	LS	\$30,000	\$30,000
21	Barrel Pipe	140	LF	\$300 /LF	\$42,000
22	Rip Rap Plunge Pool	1	LS	\$15,000	\$15,000
23	Erosion Control Matting	0	SY	\$7 /SY	\$0
24	Seeding & Mulching	2	AC	\$5,000 /AC	\$10,000
25	Miscellaneous Work & Cleanup	1	LS	\$25,000	\$25,000
26	Construction Administration	1	LS	\$19,600	\$19,600
27	Construction Quality Assurance	1	LS	\$35,200	\$35,200
Total					\$806,900

Table 3
Engineer's Opinion of Probable Cost
Town of Chapel Hill
Legion Pond

Dam Removal Option

Item No.	Description	Quantity	Unit	Unit Price	Amount
1	Geotechnical Investigation/Drilling	0	LS	\$25,100	\$0
2	Surveying	1	LS	\$11,400	\$11,400
3	Dam Safety Permit	1	LS	\$20,700	\$20,700
4	Mitigation	1	LS	\$25,000	\$25,000
5	Erosion & Sediment Control Permit	1	LS	\$19,900	\$19,900
6	Bid/Construction Documents	1	LS	\$16,000	\$16,000
7	Bidding Services	1	LS	\$13,000	\$13,000
8	Mobilization/Demobilization	1	LS	\$20,775	\$20,775
9	Silt Fence	1500	LF	\$5.00 /LF	\$7,500
10	Temporary Diversion Ditch	400	LF	\$15.00 /LF	\$6,000
11	Sediment Trap	2	LS	\$30,000	\$60,000
12	Dewatering Pump	2.5	Mo	\$10,000 /Mo	\$25,000
13	Filter Bag	1	LS	\$2,000	\$2,000
14	Tree Removal	2	AC	\$10,000 /AC	\$20,000
15	Grubbing	2	AC	\$10,000 /AC	\$20,000
16	Unsuitable Excavation	0	CY	\$15 /CY	\$0
17	Excavation & Haul Offsite	12000	CY	\$20 /CY	\$240,000
18	Backfill w/ Offsite Soils	0	CY	\$20 /CY	\$0
19	Filter Diaphragm	0	CY	\$25 /CY	\$0
20	Riser Structure	0	LS	\$30,000	\$0
21	Barrel Pipe	0	LF	\$300 /LF	\$0
22	Rip Rap Plunge Pool	0	LS	\$15,000	\$0
23	Erosion Control Matting	0	SY	\$7 /SY	\$0
24	Seeding & Mulching	2	AC	\$5,000 /AC	\$10,000
25	Miscellaneous Work & Cleanup	1	LS	\$25,000	\$25,000
26	Construction Administration	0.7	LS	\$19,600	\$13,720
27	Construction Quality Assurance	0.7	LS	\$35,200	\$24,640
Total					\$580,635

Future Development Considerations

- Repair Option

- Repair option may be preferred if pond would be beneficial regarding future use of the site.

- Removal Option

- Removal option may be preferred if the pond would hinder future use of the site
 - The extent to which a stream or wetland would re-emerge would need to be evaluated after completion of the dam repair project.