REFERENCES

1. Max McGraw Wildlife Foundation and USEPA, "Fox River Fish Passage Feasibility Study", Preliminary study, October, 2000

2. Jonathon T. Arbruster and Marcelo H. Garcia, " Hydraulic Model Study for the Restoration of Batavia Dam, Fox River, Illinois," prepared for IDNR, April 1998.

3. "Fox River Paddleway", Fox River Study V, prepared for Kane County Urban Development, 1978.

4. Illinois State Water Survey, "USGS Discharge at Partial-Record Stations and Misc. Sites," prepared for IDNR, 1989

5. " Flood Insurance Study, City of Batavia, Illinois," FEMA, March 2, 1981

6. Krishan P. Singh, Thomas A. Butts, H. Vernon Knapp, Dana B. Shackleford, and Robert S. Larson, "Considerations in Water Use Planning for the Fox River," prepared for IDOT and IDWR, September 1995.

7. Makuk, J. S., University of Calgary, Environmental Science Program, Calgary, "Multiple Use of Water Resources: Adapting Weirs for Recreation", Alberta, Canada, 1988.

8. The City of Batavia, "The Comprehensive Plan for the City of Batavia" Updated 1987, Amended 1993.

9. Bell, Milo C., U.S. Army Corps of Engineers Portland District, Fish Passage Development and Valuation Program, "Fisheries Handbook of Engineering Requirements and Biological Criteria," 1991.

10. Adams, S. Reid, Glenn R. Parsons, Jan Jeffrey Hoover, and K. Jack Kilgore, "Observations of Swimming Ability in Shovelnose Sturgeon (*Scaphirhynchus platorynchus*)," Journal of Freshwater Ecology, Volume 12, No. 4, December 1997.

11. Caisley, Marjorie E., Marcelo H. Garcia, "Canoe Chutes and Fishways for Low Head Dams: Literature Review and Design Guidelines," Department of Civil and Environmental Engineering, University of Illinois at Urbana Champaign, Urbana, Illinois, 1998.

12. Childs, Michael R., Robert W. Clarkson, "Temperature Effects on Swimming Performance of Larval and Juvenile Colorado Squawfish: Implications for Survival and Species Recovery," Arizona Game and Fish Department, Research Branch, Transactions of the American Fisheries Society, 125: 940-947, 1996.

13. Domenici, Paolo, Robert W. Blake, "The Kinematics And Performance of Fish Fast-Start Swimming," The Journal of Experimental Biology, 200, 1165-1178, Great Britain, 1997.

14. Eaton, Robert C., Rocco A. Bombardieri, and Dietrich L. Meyer, "The Mauthner -- Initiated Startle Response in Teleost Fish," The Journal of Experimental Biology, 66, 65-81, Great Britain, 1977.

15. Katopodis, C., A. J. Derksen, B. L. Christensen, "Assessment of Two Denil Fishways for Fish Passage of Freshwater Species," American Fisheries Society Bioengineering Symposium, John Colt and Ray J. White editors, Symposium 10: 306-324, Bethesda, Maryland, 1991.

16. Kelsch, Stephen W., "Temperature Selection and Performance by Bluegills: Evidence for Selection in Response to Available Power," Transactions of the American Fisheries Society, 125: 948-955, 1966.

17. Kolock, Alan S., "The Swimming Performances of Individual Largemouth Bass (*Micrpoterus salmoides*) Are Repeatable," Journal of Experimental Biology, 170, 265-270, Great Britain, 1992.

18. Law, T. C., R. W. Blake, "Comparison of the Fast-Start Performances of Closely Related, Morphologically Distinct Threespine Sticklebacks (*Gasterosteus spp.*)," Journal of Experimental Biology, 199, 2595-2604, Great Britain, 1996.

19. Mesa, Matthew G., Todd M. Olsen, "Prolonged Swimming Performance of Northern Squawfish," Transactions of the American Fisheries Society, 122: 1104-1110, 1993.

20. Parsons, Glenn R., James L. Sylvester, Jr., "Swimming Efficiency of the White Crappie, *Pomoxis annularis*, Copeia," pp 1033-1038, 1992 (4).

21. Peake, S., F. W. H. Beamish, R. S. McKinley, D. A. Scrutton, and C. Katopodis, "Relating Swimming Performance of Lake Sturgeon, *Acipenser fulvencens*, to Fishway Design," Canadian Journal of Fisheries and Aquatic Sciences, 54: 1361-1366, 1997.

22. Pescitelli, Stephen M., Robert C. Rung, "Effects of Dams on Aquatic Ecosystems in Northeastern Illinois and Overview of Removal/Modifications Efforts," Illinois Department of Natural Resources, an article presented at a Midwestern bioengineering symposium of unknown title and Date, 1999

23. Scott, W.B., E.J. Crossman, "Freshwater Fishes of Canada," Bulletin 184, FRBC, Ottawa, Canada, 1973.

24. Stahlberg, S., P. Peckmann, "The Critical Swimming Speed of Small Teleost Fish Species in the Flume," Arch. Hydrobiol., 110, 2, 179-193, Stuttgart, Germany, 1987.

25. Taylor, Eric B., J. McPhail, "Prolonged and Burst Swimming in Indebtedness and Freshwater Threespine Sticklebacks (*Gasterosteus aculeatus*)," Canadian Journal of Zoology, 64, 416-420, 1985.

26. Watenpaugh, Donald E., Thomas L. Beitinger, "Swimming Performance of Channel Catfish (*Ictalurus puctatus*) after Nitrite Exposure," Bulletin of Environmental Contamination Toxicology, Volume 34: 754-760, New York, 1985.

27. Webb, P. W., "Acceleration Performance of Rainbow Trout *Slamo gairdneri* and Green Sunfish *Lepomis cyanellus*," Journal of Experimental Biology, 63, 451-465, Great Britain, 1975.

28. Webb, Paul W., "Kinematics of Lake Sturgeon, *Acipenser fulvencens*, at Cruising Speeds," Canadian Journal of Zoology, Volume 64, 1986.

29. Ranken, E.T., "The qualitative habitat evaluation index (QHEI): rationale, methods, and application", By Ohio Environmental Protection Agency, Columbus, Ohio, USA., 1989

30. Ralph Voris, personal communication.

31. USCA web page: http://usca-canoe-kayak.org/.

32. Erik Sprenne, Chicago Whitewater Association, personal communication.

33. Terry Kent, phone conversation.

34. American Rivers with Trout Unlimited and Friends of the Earth, Dam Removal Success Stories, December 1999.

35. "Report of Soils Exploration, Proposed Dam, Batavia, Illinois", Prepared for the Illinois Department of Natural Resources, December 1998.

Fish species list for Fox River mainstem collections - IDNR Database 1979-1995

FAMILY	COMMON	SCIENTIFIC
Lepisosteidae	Longnose gar	*Lepisosteus osseus*
Amiidae	Bowfin	*Amia calva*
Clupeidae	Skipjack herring	*Alosa chrysochloris*
	Gizzard shad	*Dorosoma cepedianum*
Hiodontidae	Goldeye	*Hiodon alosoides*
Esocidae	Grass pickerel	*Esox americanus*
	Northern pike	*Esox lucius*
	Muskellunge	*Esox masquinongy*
Cyprinidae	Goldfish	*Carassius auratus*
	Carp	*Cyprinus carpio*
	Golden shiner	*Notemigonus crysoleucas*
	Hornyhead chub	*Nocomis biguttatus*
	Suckermouth minnow	*Phenacobius mirabilis*
	Striped shiner	*Luxilus chrysocephalus*
	Common shiner	*Luxilus cornutus*
	Redfin shiner	*Lythrurus umbratilis*
	Spotfin shiner	*Cyprinella spiloptera*
	Red shiner	*Cyprinella lutrensis*
	Pugnose minnow	*Opsopoeodus emiliae*
	Fathead minnow	*Pimephales promelas*
	Bluntnose minnow	*Pimephales notatus*
	Bullhead minnow	*Pimephales vigilax*
	Emerald shiner	*Notropis atherinoides*
	Rosyface shiner	*Notropis rubellus*
	River shiner	*Notropis blennius*
	Bigmouth shiner	*Notropis dorsalis*
	Sand shiner	*Notropis ludibundus*
	Mimic shiner	*Notropis volucellus*
	Spottail shiner	*Notropis hudsonius*
Catostomidae	Bigmouth buffalo	*Ictiobus cyprinellus*
	Smallmouth buffalo	*Ictiobus bubalus*
	Black buffalo	*Ictiobus niger*
	Quillback	*Carpiodes cyprinus*
	River carpsucker	*Carpiodes carpio*
	Highfin carpsucker	*Carpiodes velifer*
	White sucker	*Catostomus commersoni*
	Northern hog sucker	*Hypentelium nigricans*
	River redhorse*	*Moxostoma carinatum*
	Greater redhorse**	*Moxostoma valenciennesi*
	Shorthead redhorse	*Moxostoma macrolepidotum*
	Black redhorse	*Moxostoma duquesnei*
	Golden redhorse	*Moxostoma erythrurum*
	Silver redhorse	*Moxostoma anisurum*
Ictaluridae	Channel catfish	*Ictalurus punctatus*
	Yellow bullhead	*Ameiurus natalis*
	Black bullhead	*Ameiurus melas*
	Brown bullhead	*Ameiurus nebulosus*
	Flathead catfish	*Pylodictis olivaris*
	Stonecat	*Noturus flavus*
	Tadpole madtom	*Noturus gyrinus*
Cypriodontidae	Blackstripe topminnow	*Fundulus notatus*
Atherinidae	Brook silverside	*Labidesthes sicculus*
Moronidae	White bass	*Morone chrysops*
	Yellow bass	*Morone mississippiensis*
Centrarchidae	Black crappie	*Pomoxis nigromaculatus*
	White crappie	*Pomoxis annularis*
	Rock bass	*Ambloplites rupestris*
	Largemouth bass	*Micropterus salmoides*
	Smallmouth bass	*Micropterus dolomieu*
	Warmouth	*Lepomis gulosus*
	Green sunfish	*Lepomis cyanellus*
	Bluegill	*Lepomis macrochirus*
	Pumpkinseed	*Lepomis gibbosus*
	Orangespotted sunfish	*Lepomis humilis*
Percidae	Walleye	*Stizostedion vitreum*
	Sauger	*Stizostedion canadense*
	Yellow perch	*Perca flavescens*
	Blackside darter	*Percina maculata*
	Logperch	*Percina caprodes*
	Johnny darter	*Etheostoma nigrum*
Sciaenidae	Freshwater drum	*Apiodinotus grunniens*

*State Threatened
**State Endangered

PROJECT **Batavia Dam Study, Batavia, Illinois**

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BORING **2** DATE STARTED **10-13-98** DATE COMPLETED **10-13-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **638.5**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	ϑ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
							5		Water
							10		
	1	SS	20				10.0	655.0	Firm gray silty SAND and GRAVEL, saturated (GM)
	2	SS	31				11.0	654.0	Dense gray GRAVEL, trace silt, saturated (GP)
							13.0	652.0	
	3	SS	55						Very dense gray medium to large GRAVEL, occasional Cobbles, saturated (GP)
							15		
							16.0	649.0	
	RN 1	CORE	REC=	75%	RQD=	0%			DOLOMITE, light brown pure to slightly silty, thinly bedded 10%-15% pinpoint vugs, fossiliferous calcite filled corals
							19.0	646.0	
	RN 2	CORE	REC=	100%	RQD=	15%			DOLOMITE, light gray weathered, tan at bedding, slightly pure to silty, thinly bedded (undulating) 5-10% pinpoint vugs large calcite filled coral (4") @ 18.0'
							20		
							22.0	643.0	
	RN 3	CORE	REC=	100%	RQD=	50%			DOLOMITE - light gray, few dark gray clay partings, slightly pure to silty, trace pyrite, chert nodules (1") 24-26.5.
							25		
									End of Boring at 26.5'
							30		
							35		
							40		

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

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BORING **3** DATE STARTED **10-12-98** DATE COMPLETED **10-12-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

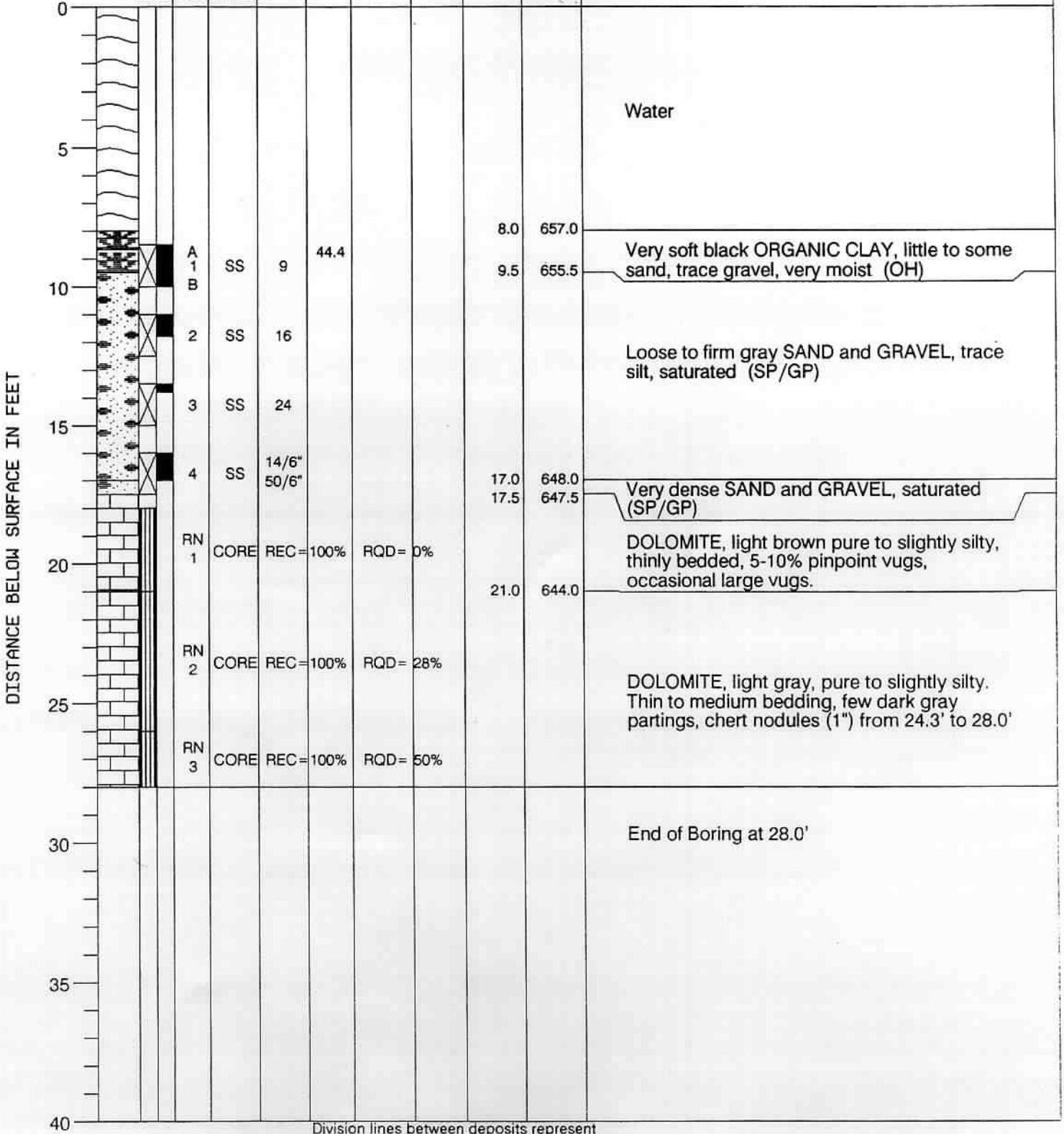
END OF BORING **637.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS



DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **4** DATE STARTED **10-12-98** DATE COMPLETED **10-12-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **640.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	ϒ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Water
							2.5	662.5	
	1	SS	WOH	75.6					Very soft gray and black ORGANIC CLAY, little sand, very moist
	2	SS	WOH	104					
	A 3 B	SS	12	71.8			9.5	655.5	
	4	SS	34						Firm to dense brown and gray SAND and GRAVEL, saturated (SP/GP)
	5	SS	16/6" 50/4"				14.5	650.5	
	RN 1	CORE	REC= 100%		RQD= 0%				DOLOMITE - light brown slightly pure to silty, thinly bedded, fossiliferous, 5-10% pinpoint vugs.
	RN 2	CORE	REC= 100%		RQD= 0%		19.5	645.5	
	RN 3	CORE	REC= 100%		RQD= 41%				DOLOMITE - light gray mottled dark gray, slightly pure to silty. Thinly bedded fossiliferous occasional chert nodule (1") from 24' to 25'.
									END OF BORING @ 25.0'
									WOH = Weight of Hammer

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

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CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **4** DATE STARTED **10-12-98** DATE COMPLETED **10-12-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **640.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	% DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Water
							2.5	662.5	
	1	SS	WOH	75.6					Very soft gray and black ORGANIC CLAY, little sand, very moist
	2	SS	WOH	104					
	A 3 B	SS	12	71.8			9.5	655.5	
	4	SS	34						Firm to dense brown and gray SAND and GRAVEL, saturated (SP/GP)
	5	SS	16/6" 50/4"				14.5	650.5	
	RN 1	CORE	REC=100%		RQD= 0%				DOLOMITE - light brown slightly pure to silty, thinly bedded, fossiliferous, 5-10% pinpoint vugs.
	RN 2	CORE	REC=100%		RQD= 0%		19.5	645.5	
	RN 3	CORE	REC=100%		RQD= 41%				DOLOMITE - light gray mottled dark gray, slightly pure to silty. Thinly bedded fossiliferous occasional chert nodule (1") from 24' to 25'.
									END OF BORING @ 25.0'
									WOH = Weight of Hammer

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

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BORING **5** DATE STARTED **10-8-98** DATE COMPLETED **10-8-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

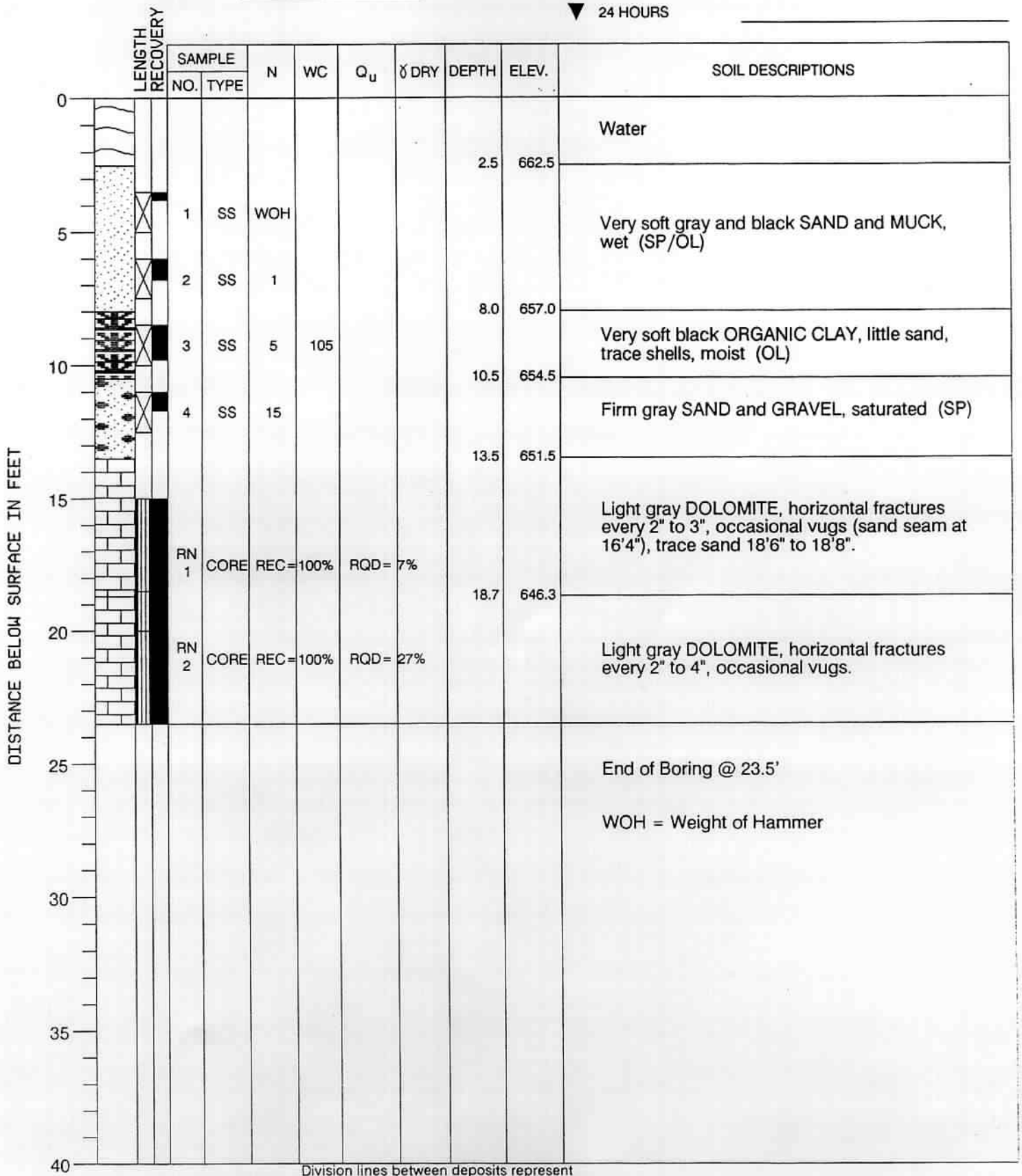
END OF BORING **641.5**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS



LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
									Water
							2.5	662.5	
	1	SS	WOH						Very soft gray and black SAND and MUCK, wet (SP/OL)
	2	SS	1						
							8.0	657.0	
	3	SS	5	105					Very soft black ORGANIC CLAY, little sand, trace shells, moist (OL)
							10.5	654.5	
	4	SS	15						Firm gray SAND and GRAVEL, saturated (SP)
							13.5	651.5	
	RN 1	CORE	REC=100%		RQD= 7%				Light gray DOLOMITE, horizontal fractures every 2" to 3", occasional vugs (sand seam at 16'4"), trace sand 18'6" to 18'8".
							18.7	646.3	
	RN 2	CORE	REC=100%		RQD= 27%				Light gray DOLOMITE, horizontal fractures every 2" to 4", occasional vugs.
									End of Boring @ 23.5'
									WOH = Weight of Hammer

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

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BORING **6** DATE STARTED **10-7-98** DATE COMPLETED **10-8-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **640.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	ϑ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
									Water
							4.0	661.0	
	1	SS	WOH	112					Very soft black ORGANIC CLAY, some sand, very moist (OL)
	A		1-1	75.1					
	2	SS							
	B		2-2				7.5	657.5	
							8.0	657.0	Loose gray and black SAND and GRAVEL, trace organic, saturated (SP)
			4-4						
	3	SS	5-4						
									Loose gray SAND and GRAVEL, trace clay, saturated (GP-GC)
			5-3						
	4	SS	4-6						
			5-8						
	5	SS	50/3"						
							13.3	651.7	
							14.0	651.0	Very dense fractured BEDROCK
	RN 1		REC=	100%	RQD=	0%			DOLOMITE tan to light gray, slightly pure to silty, thinly bedded 5% pinpoint vugs, trace pyrite, fractured 16.5' to 17.5' and 18.5' to 20.5'
	RN2		REC=	100%	RQD=	0%			
	RN3		REC=	100%	RQD=	0%			
	RN 4		REC=	100%	RQD=	13%			
							20.0	645.0	
	RN 5		REC=	100%	RQD=	40%			DOLOMITE, light gray, mottled dark gray, slightly pure to silty, thinly bedded, 5-10% pinpoint vugs, occasional large vugs, trace pyrite, fossiliferous.

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

WOH = Weight of Hammer

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **7** DATE STARTED **10-8-98** DATE COMPLETED **10-8-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **640.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	δ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
									Water
	A			106			8.5	656.5	Very soft black ORGANIC CLAY, very moist (OL)
	1	SS	2-1 50/5"				9.5	655.5	
	B						10.0	655.0	Very dense Cobbles and Boulders
									DOLOMITE light tan, slightly pure to silty, thinly bedded, dense
	RN 1	CORE	REC = 100%		RQD = 20%		12.5	652.5	
	RN 2	CORE		REC 100%	RQD = 50%				DOLOMITE, light gray, mottled dark gray, pure to silty, thinly bedded, 5% to 10 % pinpoint vugs, occasional large vugs, trace pyrite, occasional green clay partings
	RN 3	CORE		REC 100%	RQD = 15%				
									End of Boring at 20.5'

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **8** DATE STARTED **10-15-98** DATE COMPLETED **10-15-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **653.7**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	ϒ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.8	664.2	Water
							1.3	663.7	Brown SAND and GRAVEL, saturated (SP/GP)
	RN 1	CORE	REC=	100%	RQD=	0%	3.3	661.7	DOLOMITE, light gray, weathered orange and tan, slightly pure to silty, thinly bedded, occasional small vugs
	RN 2	CORE	REC=	100%	RQD=	40%			DOLOMITE, light gray, occasionally mottled dark gray, few thin green clay partings, 1" clay seam at 2.8', thinly bedded, 1" chert nodule at 7.3'
	RN3	CORE	REC=	100%	RQD=	46%			
									End of Boring at 7.3'

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

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TSC

BORING **9** DATE STARTED **10-15-98** DATE COMPLETED **10-15-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **654.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_d DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							1.0	664.0	Water
									DOLOMITE light gray, weathered orange-tan, slightly pure, thinly bedded, dense
							2.5	662.5	
	RN 1	CORE	REC=	100%	RQD=	45%			
									DOLOMITE light gray occasional mottled dark gray, weathered orange-tan at bedding planes, thinly bedded, few greenish-gray clay partings, 1" clay seam at 4', trace pyrite.
	RN 2	CORE	REC=	100%	RQD=	28%			
									End of Boring at 11.0'

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **10** DATE STARTED **10-15-98** DATE COMPLETED **10-15-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **640.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	♂ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
									Water
							8.0	657.0	
	1	SS	3	79.7					Very soft black to dark gray ORGANIC CLAY, some to little sand, very moist (OH)
	2	SS	1	92.6					
							13.0	652.0	
	3	SS	3	52.3					Very soft dark gray and black ORGANIC CLAY and SAND, very moist (OH/SP)
							15.0	650.0	
	RN 1	CORE	REC=75%		RQD= 0%				Dolomite to light gray slighly pure to silty, thin bedded, 5%-10% pinpoint vugs, occasional large vugs (1"), small fractures 15-5.5'
	RN 2	CORE	REC=100%		RQD= 0%		18.0	647.0	
	RN 3	CORE	REC=100%		RQD= 20%				DOLOMITE light gray mottled dark gray, slightly pure to silty, thin bedded (undulating), few large vugs, trace pyrite.
	RN4	CORE	REC=100%		RQD= 0%				
	RN 5	CORE	REC=100%		RQD= 13%				
									End of Boring @ 25.0'

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **11** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **665.0**

END OF BORING **637.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ_d DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		Water
							9.5	655.5	
	1	SS	20						Firm brown SAND and fractured GRAVEL, saturated (GP)
							11.0	654.0	
	2	SS	19	21.1					Firm dark gray GRAVEL, saturated (GP)
	3	SS	25	25.6					
							15.5	649.5	
	4	SS	39						Dense dark GRAVEL, saturated (GP)
							18.0	647.0	
	RN 1	CORE	REC = 100%		RQD = 14%				DOLOMITE light gray slightly pure to silty, thinly bedded, occasional small vugs, trace pyrite, fractured 19-19 1/2, 20-20 1/2
	RN 2	CORE	REC = 80%		RQD = 0%				
							23.0	642.0	
	RN 3	CORE	REC = 90%		RQD = 0%				DOLOMITE to light gray mottled dark gray slightly pure to silty, thinly bedded occasional coarse vugs, fossiliferous
							25.0	640.0	
	RN 4	CORE	REC = 100%		RQD = 15%				DOLOMITE to light gray mottled dark gray, slightly pure to silty, thinly bedded occasional coarse vugs, fossiliferous
									End of Boring at 28.0'

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **12** DATE STARTED **10-15-98** DATE COMPLETED **10-15-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **636.5**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	♂ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
									Water
							2.0	663.0	
	1	SS	13				3.0	662.0	Firm brown GRAVEL and COBBLE, saturated (GP
	2	SS	32						
	3	SS	31						Dense to firm brown to black SAND and GRAVEL, occasional Cobbles, saturated (SP)
	4	SS	16						
	5	SS	22						
							13.0	652.0	
	6	SS	28						Firm dark gray SAND and fractured GRAVEL, trace muck, saturated (SP)
							16.0	649.0	
	7	SS	15						Firm dark gray GRAVEL, trace wood, saturated (GP)
							18.5	646.5	
	RN 1	CORE	REC=	100%	RQD=	0%			Dolomite, light gray weathered to tan at bedding planes, slightly pure to silty, thin bedded, occasional large vugs, fractures, 18.5'-21.0'
	RN 2	CORE	REC=	100%	RQD=	0%			
							22.0	643.0	
	RN 3	CORE	REC=	100%	RQD=	0%			DOLOMITE light gray mottled dark gray, slightly pure to silty - thin bedded, 5'-10'% pinpoint vugs, occasional large vugs, fossiliferous, trace pyrite, fractured 23.0' to 24.5'.
	RN 4	CORE	REC=	100%	RQD=	26%			
									End of Boring @ 28.5'

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **138 on barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **15** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **657.5**

END OF BORING **637.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	℄ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0.5	657.0	WATER
							0.9	656.6	Large Gravel and Cobble
	1	SS	19						Firm to dense black and gray SAND and GRAVEL, trace muck, occasional Cobble, saturated (GP)
	2	SS	32						
	3	SS	21				6.0	651.5	Firm gray SAND and GRAVEL, saturaated (GP)
	4	SS	27						
							10.5	647.0	
	RN 1	CORE	REC=100%		RQD=30%		13.0	644.5	DOLOMITE light brown, pure silty in thin zones. Thinly bedded, 5-10% pinpoint vugs, fossilferous, trace pyrite.
	RN 2	CORE	REC=100%		RQD=35%				DOLOMITE light gray, slightly argillaceous, thinly bedded, occasional green clay parting, fossilferous, trace pyrite.
									End of Boring at 20.5'

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **17** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

GROUND SURFACE **657.5**

END OF BORING **646.0**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							1.5	656.0	WATER
	RN 1	CORE	REC=100%		RQD=36%				DOLOMITE light gray, pure to slightly argillaceous, thinly bedded, occasional thin green clay parting, less than 5% pinpoint vugs, white chert nodule (1") at 7', trace pyrite.
	RN 2	CORE	REC=100%		RQD=35%				
									End of Boring at 11.5'

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **18** DATE STARTED **11-2-98** DATE COMPLETED **11-2-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **656.0**

END OF BORING **638.7**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							1.3	654.7	WATER
	1	SS	16/6" 50/1"				3.0	653.0	Firm dark black SAND and GRAVEL, occasional Cobbles, saturated (SP/GP)
	2	SS	100/3"				5.3	650.7	Very dense SAND and GRAVEL, trace Cobbles and Boulders, saturated (SP/GP)
							7.3	648.7	Possible Bedrock or Boulder
	RN 1	CORE	REC=100%		RQD=0.0				DOLOMITE, light gray weathered light brown bedding to 7.3' to 13.3'. Pure to slightly argillaceous, thinly bedded, occasional green parting, occasional vugs (1/2"-1)
	RN 2	CORE	REC=100%		RQD=27%				
									End of Boring at 17.3'

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **23** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **658.0**

END OF BORING **651.7**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	♂ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
									WATER
							3.8	654.2	
	1	SS	34						Dense gray SAND and GRAVEL, occasional Cobbles, saturated

NOTE: Auger refusal due to bedrock encountered at 6.3'.

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **201**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

BORING **25** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **648.5**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

DISTANCE BELOW SURFACE IN FEET

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
									Water
							2.0	663.0	
	1	SS	19						Firm gray silty GRAVEL, saturated (GM)
							3.5	661.5	
	2	SS	19						
	3	SS	10						Firm to loose black silty MUCK and GRAVEL, saturated (OH-GP)
	4	SS	12						
	5	SS	6						
							13.0	652.0	
	6	SS	16						Firm black silty SAND and GRAVEL, saturated (GM)
							16.0	649.0	
	7	SS	100/6"						Very dense gray SAND and GRAVEL, saturated (GM)
									End of Boring at 16.5', Possible Bedrock

0 5 10 15 20 25 30 35 40

DRILL RIG NO. **138 on Barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

PROJECT **Batavia Dam Study, Batavia, Illinois**

CLIENT **IDNR, 3215 Executive Park Drive, Springfield, Illinois**

TSC

BORING **26** DATE STARTED **10-16-98** DATE COMPLETED **10-16-98** JOB **L - 46,015**

ELEVATIONS

WATER SURFACE **665.0**

END OF BORING **651.3**

WATER TABLE

▼ WHILE DRILLING

▽ AT END OF BORING

▼ 24 HOURS

LENGTH RECOVERY	SAMPLE NO.	SAMPLE TYPE	N	WC	Q_u	γ DRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
							0		
									Water
							3.0	662.0	
	1	SS	5-5 7-4						Firm gray clayey SILT and GRAVEL, saturated (ML/GP)
							5.5	659.5	
	2	SS	12	26.1					Firm black silty MUCK and GRAVEL, saturated (OH/GP)
	3	SS	16	38.2					
	4	SS	6	42.1					
	5	SS	100/1"				13.5	651.5	Possible Bedrock
									End of Boring at 13.6', Possible Bedrock

DISTANCE BELOW SURFACE IN FEET

0 5 10 15 20 25 30 35 40

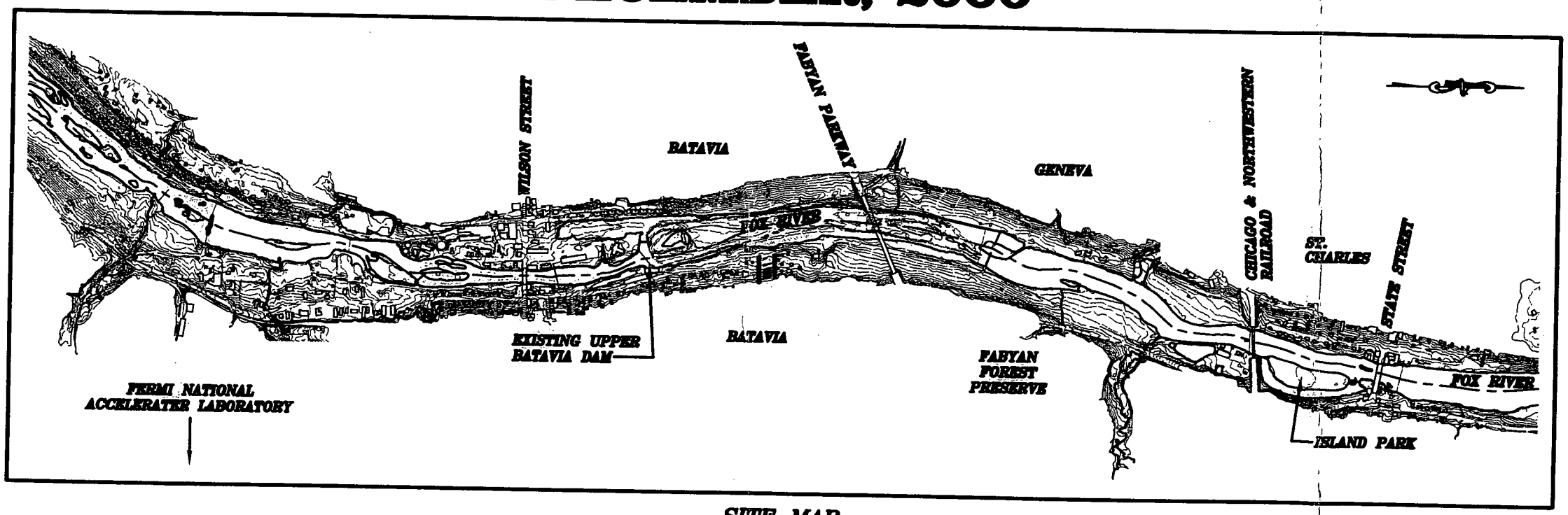
DRILL RIG NO. **138 on Barge**

Division lines between deposits represent approximate boundaries between soil types; in-situ, the transition may be gradual.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

MULTI-PURPOSE DAM REPLACEMENT ON FOX RIVER AT BATAVIA
KANE COUNTY, ILLINOIS
ALTERNATIVE DRAWINGS

DECEMBER, 2000



SITE MAP

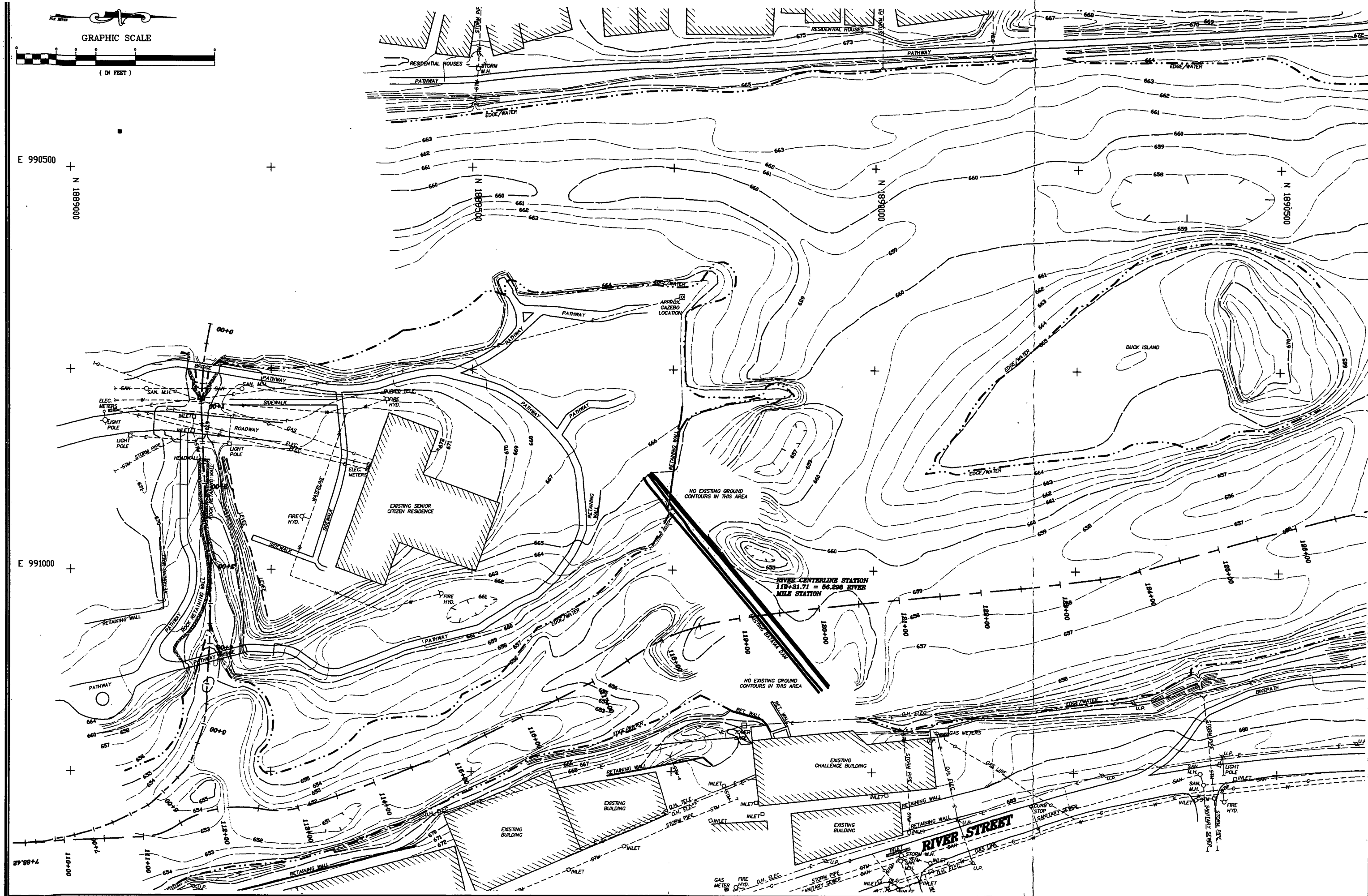
1000' 0 1000' 2000'

DRAWING INDEX

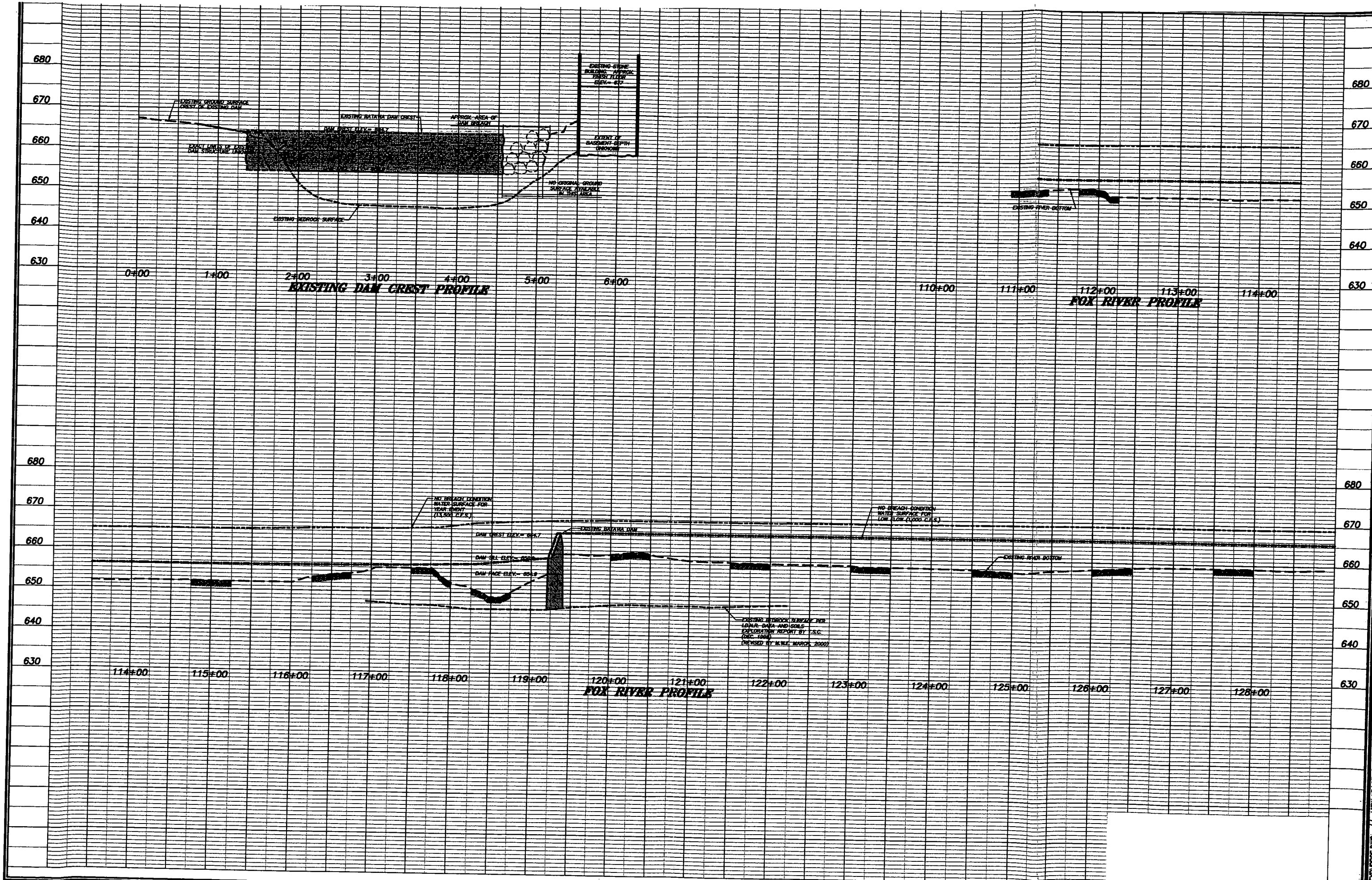
1. COVER SHEET
2. EXISTING CONDITIONS BASEMAP PLAN
3. EXISTING CONDITIONS PROFILE
4. ALTERNATIVE 1 – FULL-WIDTH WHITEWATER RAPID – PLAN & PROFILE
5. ALTERNATIVE 2 – RIVER RIGHT WHITEWATER PASS – PLAN
6. ALTERNATIVE 3 – WHITEWATER BYPASS THROUGH "CUT" – PLAN & PROFILE
7. ALTERNATIVE 4 – SHORT WHITEWATER RAPID W/ DEPOT POND – PLAN & PROFILE
8. ALTERNATIVE 4 – SHORT RAPID W/ DEPOT POND – UPSTREAM OF SITE – PLAN & PROFILE
9. ALTERNATIVE 4A – DAM MODIFICATION W/ DEPOT POND – PLAN & PROFILE
10. ALTERNATIVE 4A – DAM MODIFICATION W/ DEPOT POND – UPSTREAM OF SITE – PLAN & PROFILE
11. ALTERNATIVE 5 – WHITEWATER RAPID THROUGH TOWN CENTER – PLAN & PROFILE

D:\DWGS\99-041\001\FXRVRCVR 10-11-00

McLaughlin Water Engineers, Ltd.
2420 Alcott Street, Denver, CO 80211
PH. 303.458.5550; Fax 303.480.9766
email mwe@mwwater.com



STATE OF ILLINOIS DEPT. OF NATURAL RESOURCE	FOX RIVER BATAVIA DAM REPLACEMENT	EXISTING CONDITIONS BASEMAP	McLaughlin Water	DESIGN: HEM, JMC, JMK, RDM DETAIL: MAP CHECK:	PROJECT NUMBER 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER 2



STATE OF ILLINOIS DEPT. OF NATURAL RESOURCES	FOX RIVER BATAVIA DAM REPLACEMENT	FOX RIVER PROFILE	McLaughlin Water	DESIGN: REM, JMC, JMK, RDM DETAIL: MAP CHECK:	PROJECT NUMBER 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER 3

2/13/2000 FXRVRBSE.DWG 77 VIEW: PAGE-2

GRAPHIC SCALE
(IN FEET)

DREDGE POND TO 659±

PORTAGE TAKEOUT AND TRAIL

WALKING TRAIL

ALTERNATE PORTAGE TAKE OUT

ENLARGE EXISTING OVERFLOW CUT

RET. WALL

NEW BERM W/ CLAY CORE CREST ELEV.= 670.0

DUCK ISLAND ENLARGED

WHITEWATER CHANNEL INV. ELEV.= 663.2

FLOODWALL

MODIFY EXISTING DAM TO ACT AS GRADE CONTROL POINT

NEW DAM CREST ELEV.= 664.7

PORTAGE TRAIL ALONG EXISTING PATHWAY

890 FT. WHITEWATER CHANNEL (0.65% HYDRAULIC GRADE)

TOP OF WHITEWATER CHANNEL BANK

INTEGRATED FISH PASSAGE

REPAIR BREACH IN EXISTING DAM

INTERMEDIATE GRADE CONTROL STRUCTURE CREST ELEV.= 661.5 ±

NEW ABUTMENT

EXISTING WSE Q=13,500 CFS

EXISTING WSE Q=1,000 CFS

EXISTING RIVER BOTTOM

PROPOSED WSE Q=13,500 CFS

PROPOSED WSE Q=1,000 CFS

PROPOSED RIVER BOTTOM

TOP OF WHITEWATER CHANNEL BANK ELEV.= 658.0

EXISTING DAM MODIFIED TO ACT AS CHECK DAM

CHANNEL ENDS AT OLD DAM

EXISTING BEDROCK SURFACE

CHECK DAM

CHECK DAM

FOX RIVER PROFILE

RIVER PROFILE SCALES
HORIZ 1" = 80'
VERT.: 1" = 10'

STATE OF ILLINOIS
DEPT. OF NATURAL RESOURCES

FOX RIVER BATAVIA DAM REPLACEMENT

ALTERNATIVE 1
FULL-WIDTH WHITEWATER RAPID

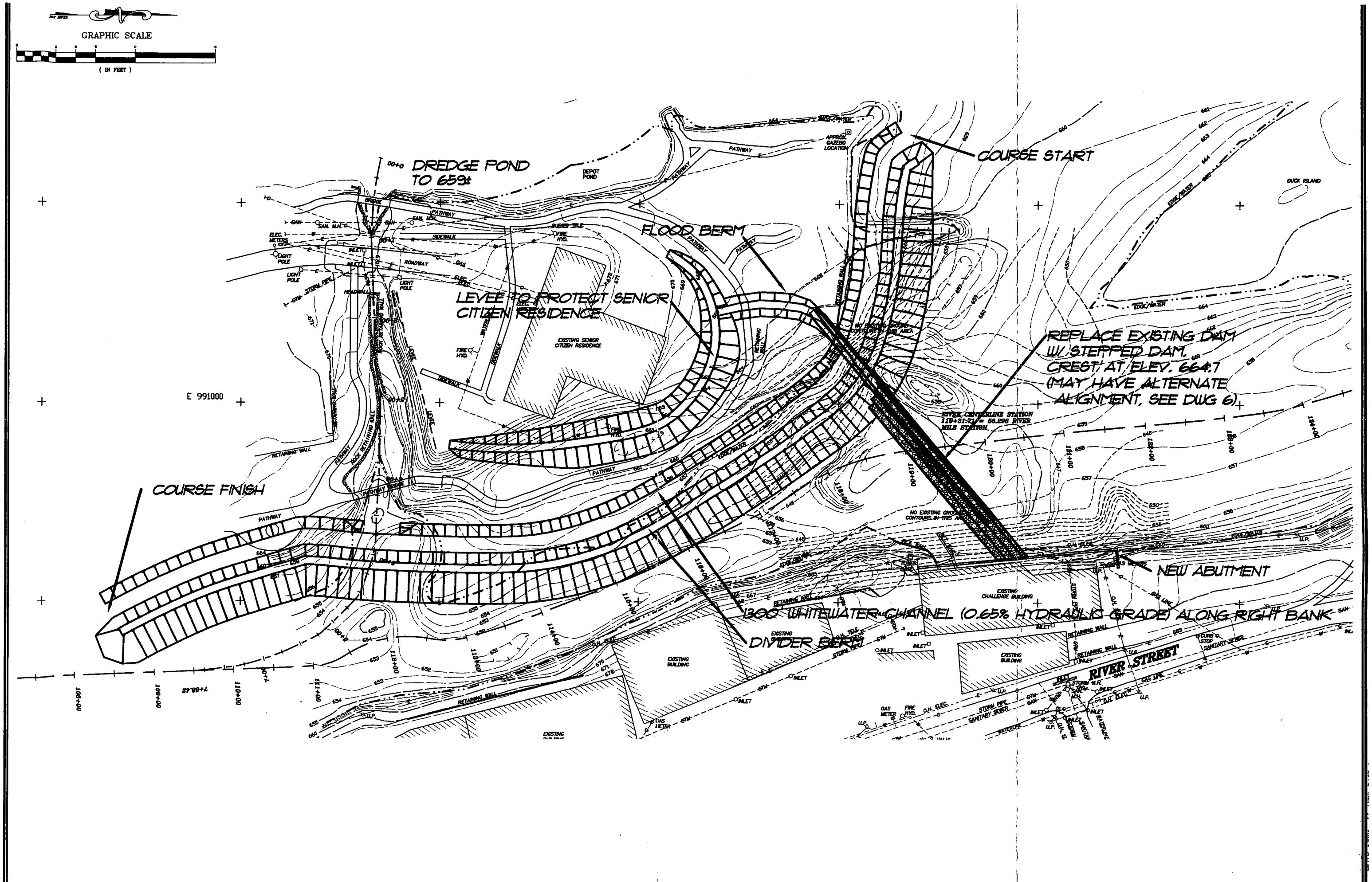
McLaughlin|Water
5420 Ahrens Street, Denver, CO 80211
PH. 303.458.0000; FAX 303.480.9760
email: mwe@mcwaterlaw.com

DESIGNED: RDH, AMC, JMK, RDH
DRAWN: JAA, MAP
CHECK:

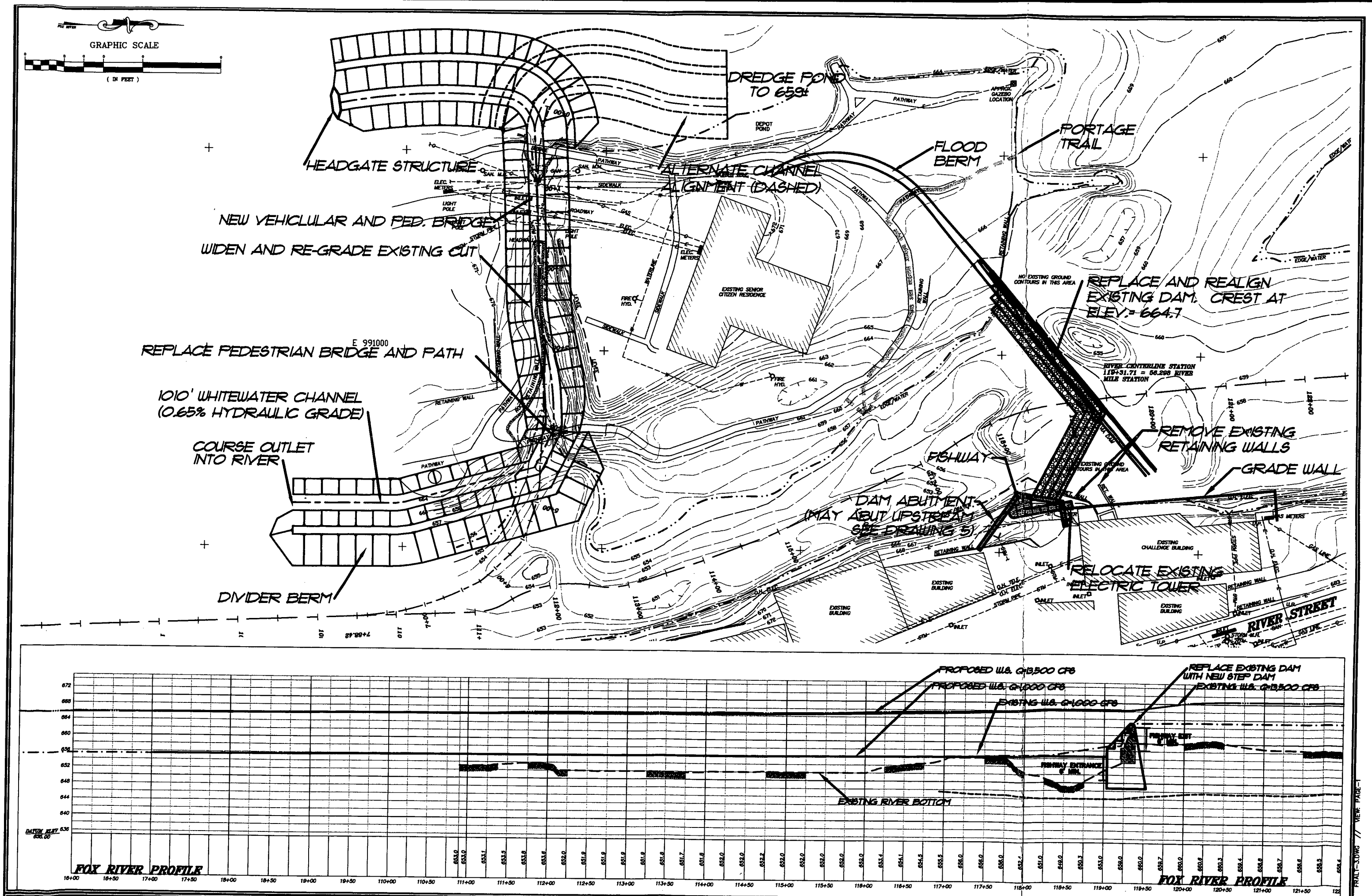
PROJECT NUMBER 99-041.001
DATED DECEMBER, 2000

DRAWING NUMBER 4

27/NOV/2000 PRINTED TIME 11:10:00 AM PAGE 1



STATE OF ILLINOIS DEPT. OF NATURAL RESOURCES	FOX RIVER BATAVIA DAM REPLACEMENT	ALTERNATIVE 2 RIVER-RIGHT WHITEWATER BYPASS	McLaughlin Water	DESIGN: RDM, JMC, JMK, RDM DETAIL: JRA, MAP CHECK:	PROJECT NUMBER 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER 5



STATE OF ILLINOIS
DEPT. OF NATURAL RESOURCES

FOX RIVER BATAVIA DAM REPLACEMENT

ALTERNATIVE 3
WHITEWATER BYPASS THROUGH "CUT"

McLaughlin Water

DESIGN: NEM, JMC, JMK, RDM
DETAIL: JRA, MAP

PROJECT NUMBER 99-041.001

DRAWING NUMBER 6

FRALT-3.DWG // VIEW: PAGE-1

GRAPHIC SCALE
(IN FEET)

DEPOT POND (WSE = 685+/-)

DREDGE POND TO 659±

LAKE OVERFLOW INTO CUT

PORTAGE ROUTE

PUMP STATION FOR POND MAKE-UP WATER

NEW HIKE/BIKE PATH

EXTEND EARTHEN DAM TO WEST RIVER BANK

BOAT TAKE OUT AND PORTAGE TRAIL

ENLARGE DUCK ISLAND

EARTHEN DAM W/ CLAY CORE (CREST ELEV. 670.0)

MODIFY EXISTING DAM TO ACT AS LOWER GRADE CONTROL POINT

LOW FLOW CHANNEL W/ INTEGRATED FISH PASSAGE (INVERT @ 659')

OPTIONAL BRIDGE

NEW REDUCED-HEIGHT DAM (CREST AT 661)

ABUT INTO BEDROCK (TYPICAL)

PORTAGE PUT-IN

REPAIR BREACH IN EXISTING DAM

NEW ABUTMENT

500-FOOT WHITEWATER CHANNEL (0.65% HYDRAULIC GRADE)

EXISTING SENIOR CITIZEN RESIDENCE

NO EXISTING GROUND CONTOURS IN THIS AREA

RIVER GEOCHEMICAL STATION
I.D. [illegible] = 56.298 RIVER MILE STATION

EXISTING DAM MODIFIED TO ACT AS COUNTER WEIR

PROPOSED W.S. Q=13,500 CFS

PROPOSED W.S. Q=1,000 CFS

PROPOSED RIVER BOTTOM

EXISTING W.S. Q=13,500 CFS

EXISTING W.S. Q=1,000 CFS

EXISTING RIVER BOTTOM

CHANNEL ENDS AT OLD DAM

CHECK DAM

FOX RIVER PROFILE

RIVER PROFILE SCALES
HORIZ. 1" = 50'
VERT.: 1" = 10'

STATE OF ILLINOIS
DEPT. OF NATURAL RESOURCES

FOX RIVER BATAVIA DAM REPLACEMENT

ALTERNATIVE 4
SHORT WHITEWATER RAPID WITH DEPOT POND

Mclaughlin Water Engineers

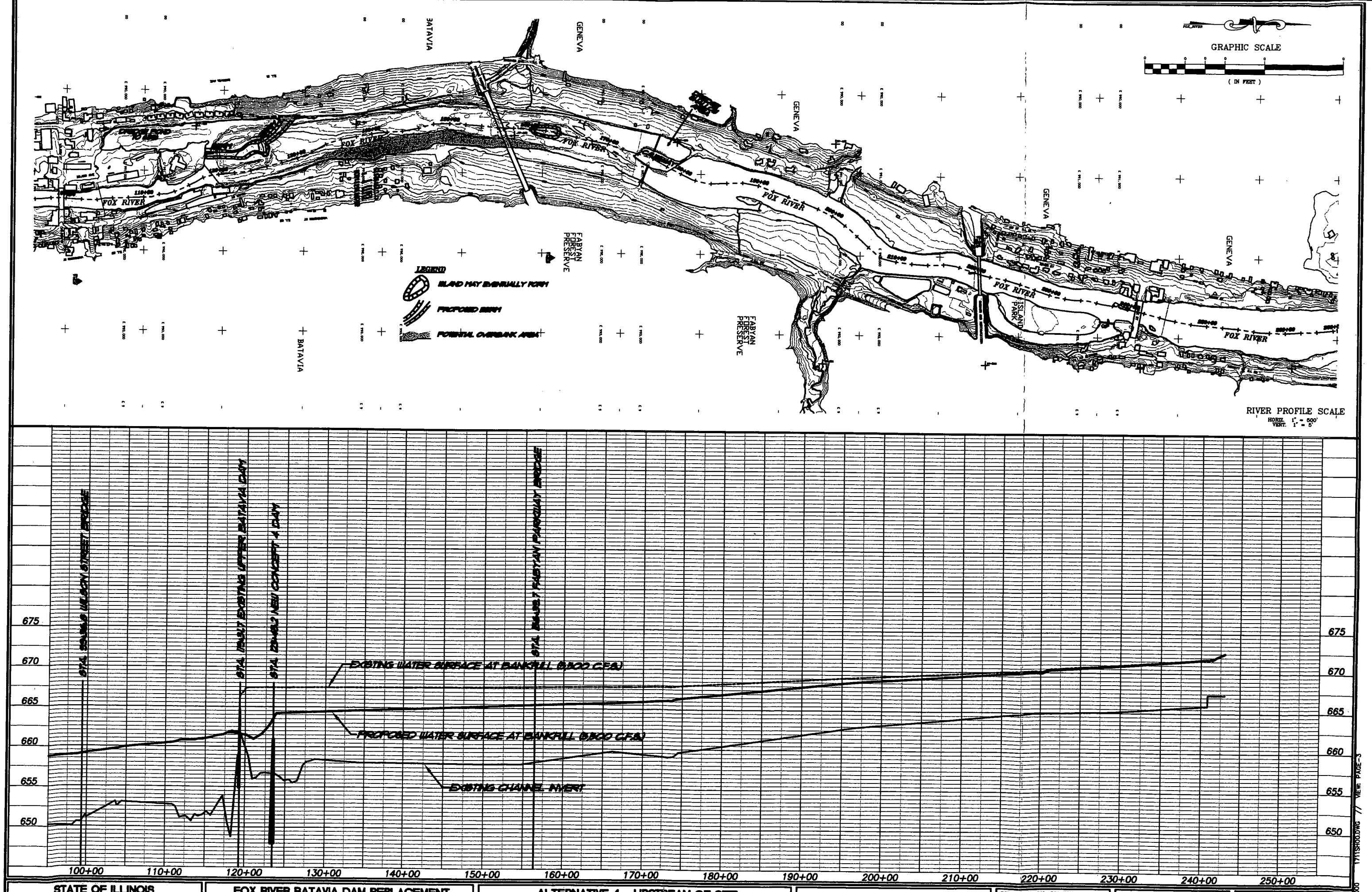
8400 Akoth Street, Denver, CO 80111
PH. 303.458.8850 Fax 303.458.8768
email mail@mcwater.com

DESIGN RDM, JBC, JBK, RDM
DETAIL JFA, MAP
CHECK

PROJECT NUMBER 99-041.001
DATE DECEMBER 2000

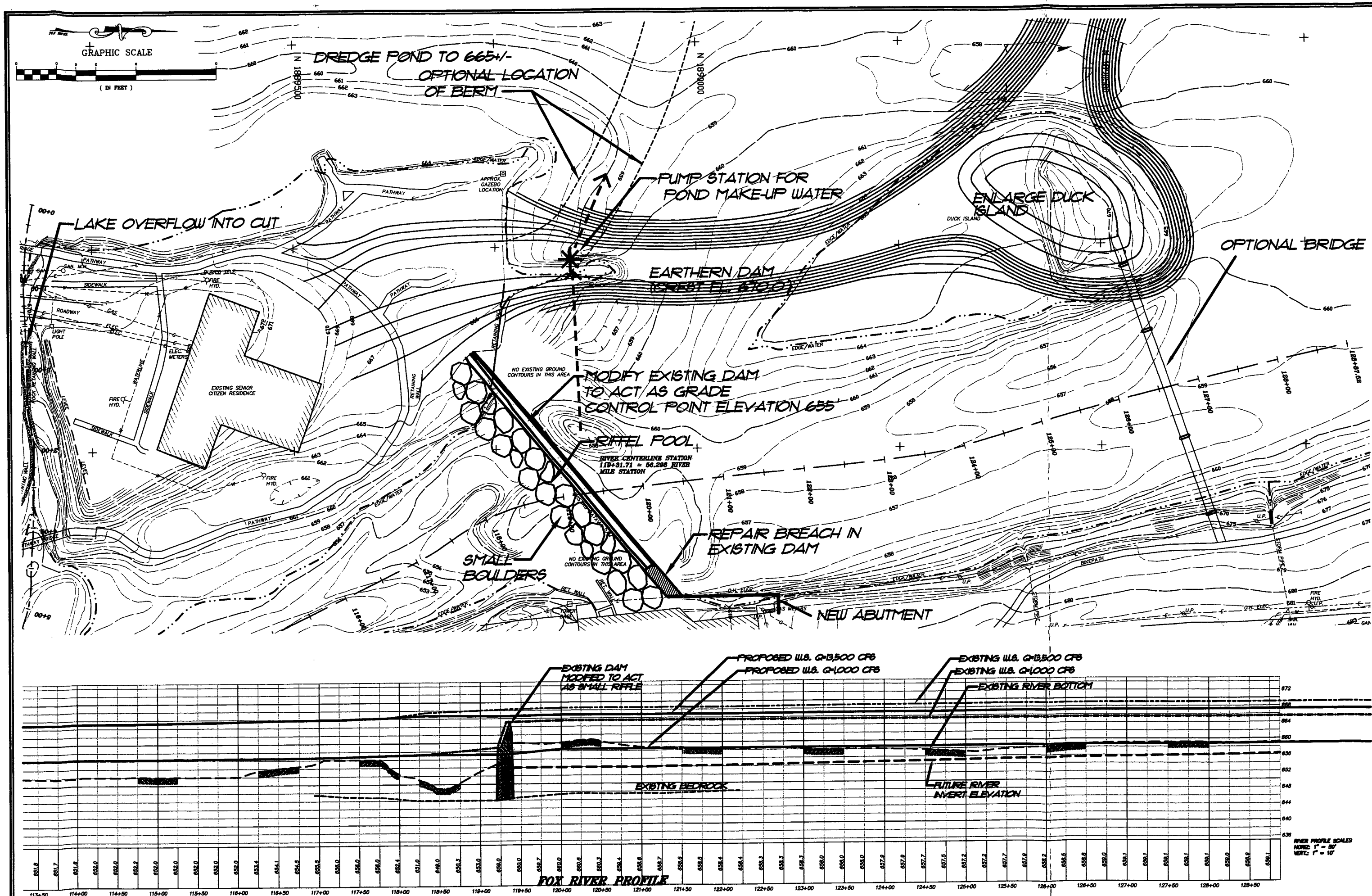
DRAWING NUMBER 7

7/13/2000 FRALT-4.DWG 77 VIEW: PAGE-1



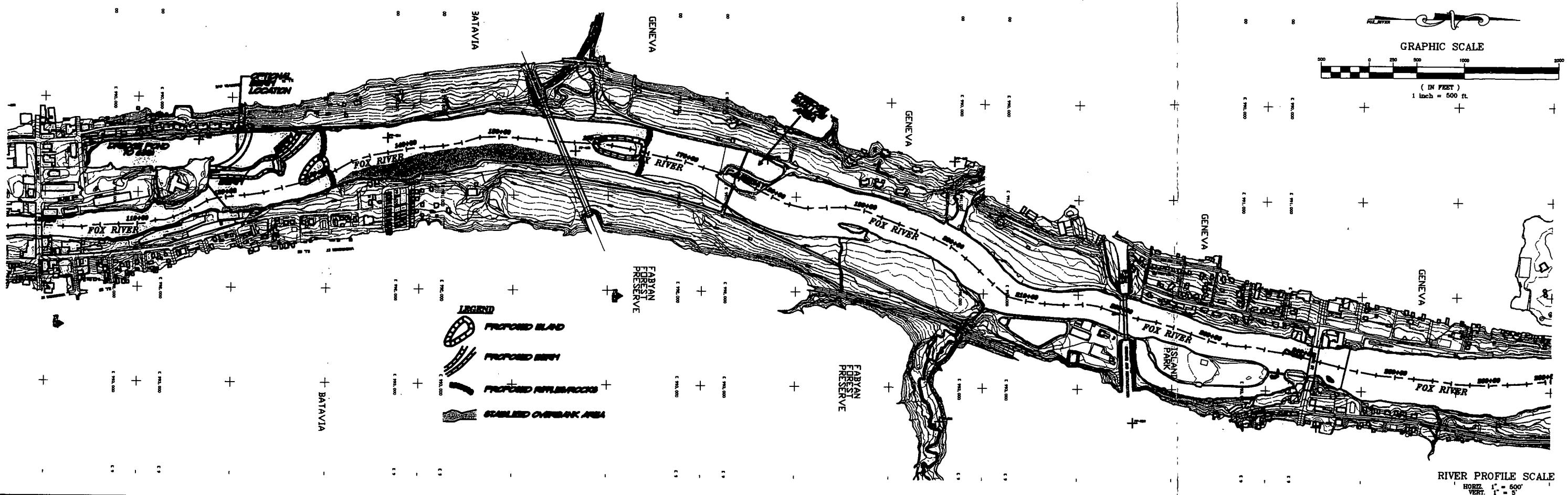
STATE OF ILLINOIS DEPT. OF NATURAL RESOURCES	FOX RIVER BATAVIA DAM REPLACEMENT	ALTERNATIVE 4 - UPSTREAM OF SITE PLAN / PROFILE VIEWS	McLaughlin Water	DESIGN: REM, JMC, JMK, RDM DETAIL: MAP CHECK:	PROJECT NUMBER 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER 8

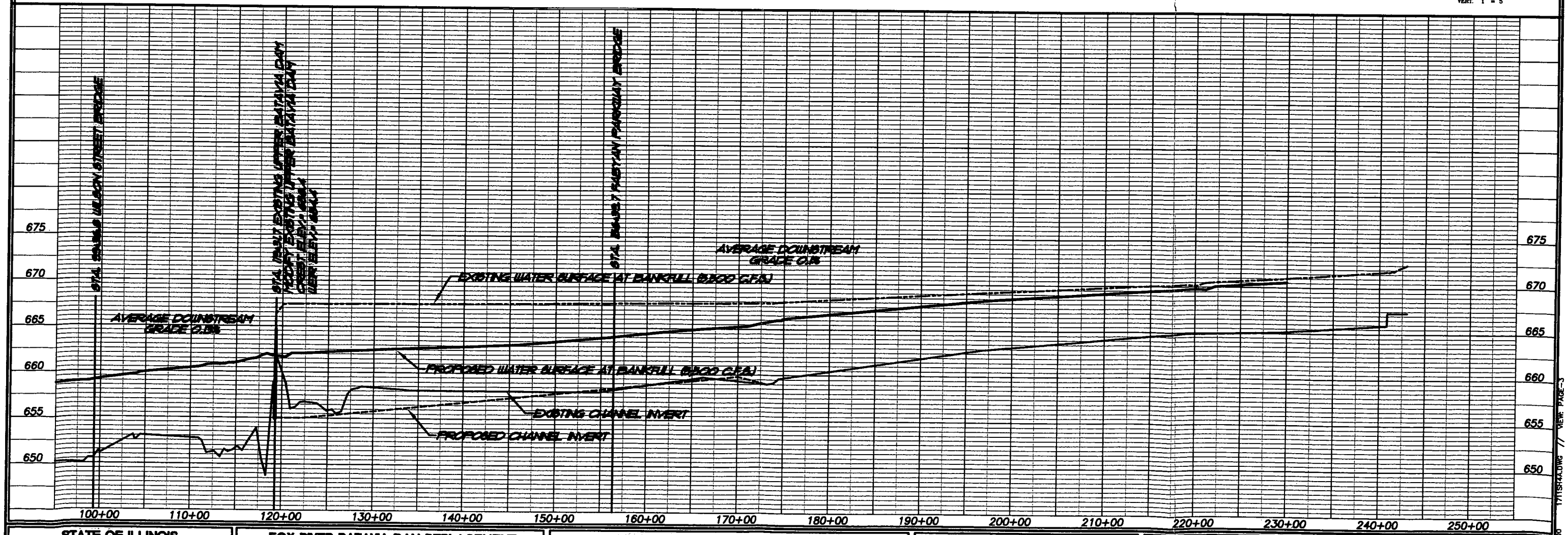
12/13/2000 1711SH00.DWG // VIEW: PAGE-3



STATE OF ILLINOIS | FOX RIVER BATAVIA DAM REPLACEMENT | ALTERNATIVE 4A | PROJECT NUMBER 99-041.001 | DRAWING NUMBER 9

FRALT-4A.DWG // VIEW: PAGE-1





STATE OF ILLINOIS DEPT. OF NATURAL RESOURCES	FOX RIVER BATAVIA DAM REPLACEMENT	ALTERNATIVE 4A - DAM MODIFICATION UPSTREAM OF SITE - PLAN / PROFILE VIEWS	Midwestern Water Group 2420 Aboott Street, Beaver, CO 80211 PH. 303.494.0000; Fax 303.690.0766 email mwg@gatewater.com	DESIGN: REM, JAC, JAK, RDM, SK DETAIL: MAP CHECK:	PROJECT NUMBER: 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER: 10

12/14/2000 T:\TSK4.DWG // VIEW: PAGE-3

STATE OF ILLINOIS DEPT. OF NATURAL RESOURCES	FOX RIVER BATAVIA DAM REPLACEMENT	ALTERNATIVE 5 WHITEWATER COURSE THROUGH DOWNTOWN BATAVIA	McLaughlin Water	DESIGN: REM, JMC, JMK, RDM DETAIL: MAP CHECK:	PROJECT NUMBER 99-041.001 DATE: DECEMBER, 2000	DRAWING NUMBER 11

12/13/2000 FRALT-5.DWG // VIEW: PAGE-1