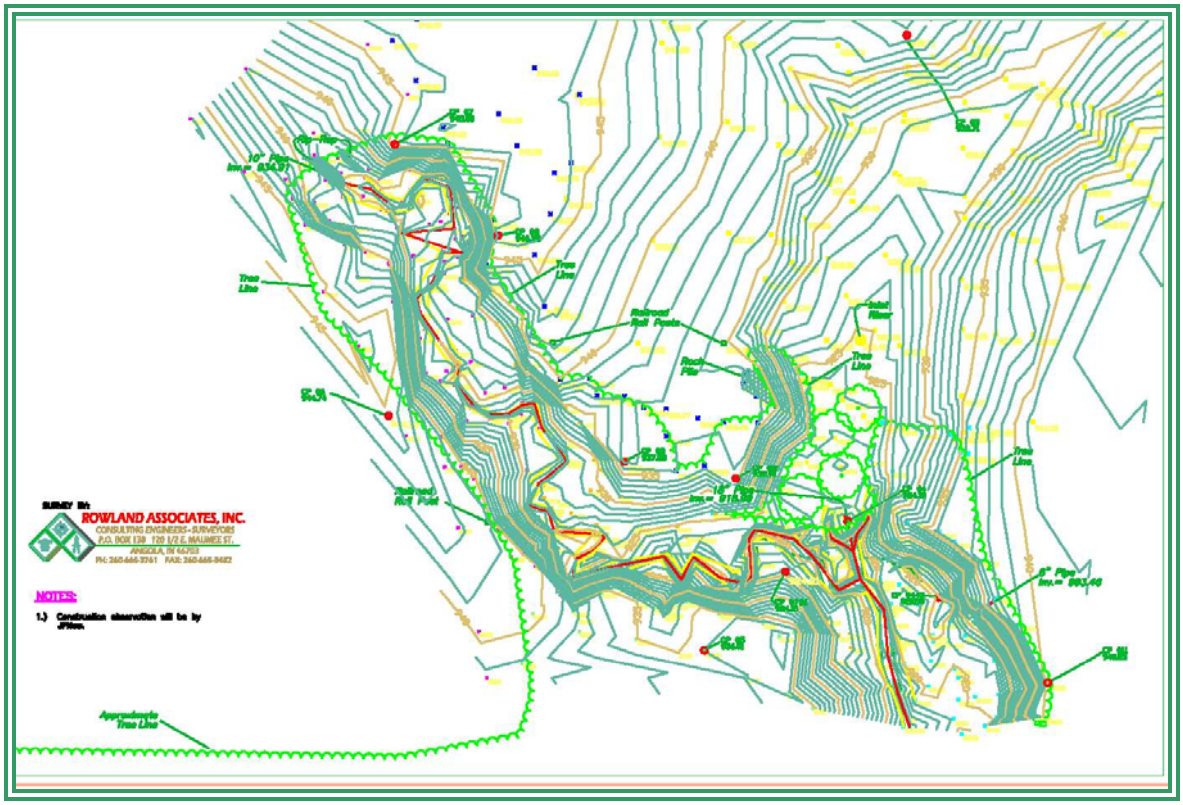
Tri-Lakes Design Report
Whitley County, Indiana

December 2005



Prepared for:

Tri-Lakes Property Owners Association
Chair-Environmental Committee
5653 N. 350 E
Columbia City, Indiana 46725

Prepared by:

JFNew

708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

EXECUTIVE SUMMARY

The Tri-Lakes Property Owners Association is addressing erosion issues within their watershed. One of the projects identified by the association was an eroding stream into Little Cedar Lake. The association contracted with JFNew to complete a design project that would address the erosion issue. Discussions with the landowner, Natural Resource Conservation Staff, and association members resulted in a designed pond, rock chute, and rock check dams within the existing drainage. The pond is designed in the western sub-watershed of the Thomas Henny Farm to be 1.1-acres and have a maximum depth of 14 feet. The rock chute is designed at the outlet of the designed pond and at the outlet of an 18-inch drainage tile within the eastern sub-watershed of the Thomas Henny Farm. The five check dams are located in the stream between the rock chute and Little Cedar Lake. The project is designed to reduce stormwater runoff-velocity and reduce downstream gradients in order to minimize future erosion from this drainage.

ACKNOWLEDGEMENTS

This project was funded by the Indiana Department of Natural Resources (IDNR) - Division of Fish and Wildlife, Lake and River Enhancement Program with matching funds provided by the Tri-Lakes Property Owners Association. JFNew recognizes the following individuals who assisted with the design: Wayne Stanger, Andrew Bender, Garth Hughes, Max Evans, Todd Nichols, and Brian Majka. Thomas Henny, who provided uninhibited access to the property for design work and contributed information used in the design process, owns the property. Rowland Associates, Inc. of Angola, Indiana, completed the survey work. John Richardson authored this report.

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

TABLE OF CONTENTS

Section Page

1.0 PROJECT DESCRIPTION AND PURPOSE 1

2.0 DESIGN RATIONALE 3

3.0 DESIGN AND CONSTRUCTION SPECIFICS 4
- 3.1 Pond 4
- 3.2 Rock Chute.....4
- 3.3 Rock Check Dams.....4
- 3.4 Landowner Agreements 5
- 3.5 Permitting.....5

4.0 SUMMARY OF PROBABLE CONSTRUCTION ESTIMATES 5

5.0 MONITORING AND MAINTENANCE ACTIVITY 6

6.0 PROJECT SUMMARY 6

TABLE OF APPENDICES

APPENDIX A. Design notes

APPENDIX B. Plans

APPENDIX C. Construction inspection form and specifications

APPENDIX D. Permit applications

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

1.0 PROJECT DESCRIPTION AND PURPOSE

Tri-Lakes is a chain of lakes consisting of Cedar, Little Cedar, Round, and Shriner lakes located in Whitley County, Indiana (Figure 1). The smallest lake in the chain is Little Cedar Lake at approximately 45 acres; however Little Cedar Lake has the largest sub-watershed of the lake chain. This sub-watershed is dominated by highly erodible land and drains to the lake via two small drainages (Figure 2). One landowner owns the majority of land draining to Little Cedar Lake from the north. This land is in active agricultural production. While erosion control practices including a grass waterway in each drainage have been implemented in the agricultural field, erosion downstream of the grassed waterways continues to occur due to increased runoff volumes and velocities (Figures 3 and 4). This purpose of this project was to design structures that would reduce runoff volume and velocity and subsequent erosion of stream bank sediments into Little Cedar Lake. After many discussions and proposed solutions, the designs focused on creating a permanent pond by building a dam in one of the two valleys, constructing a rock chute at the outlet of another valley, and installing rock check dams downstream of both valleys.

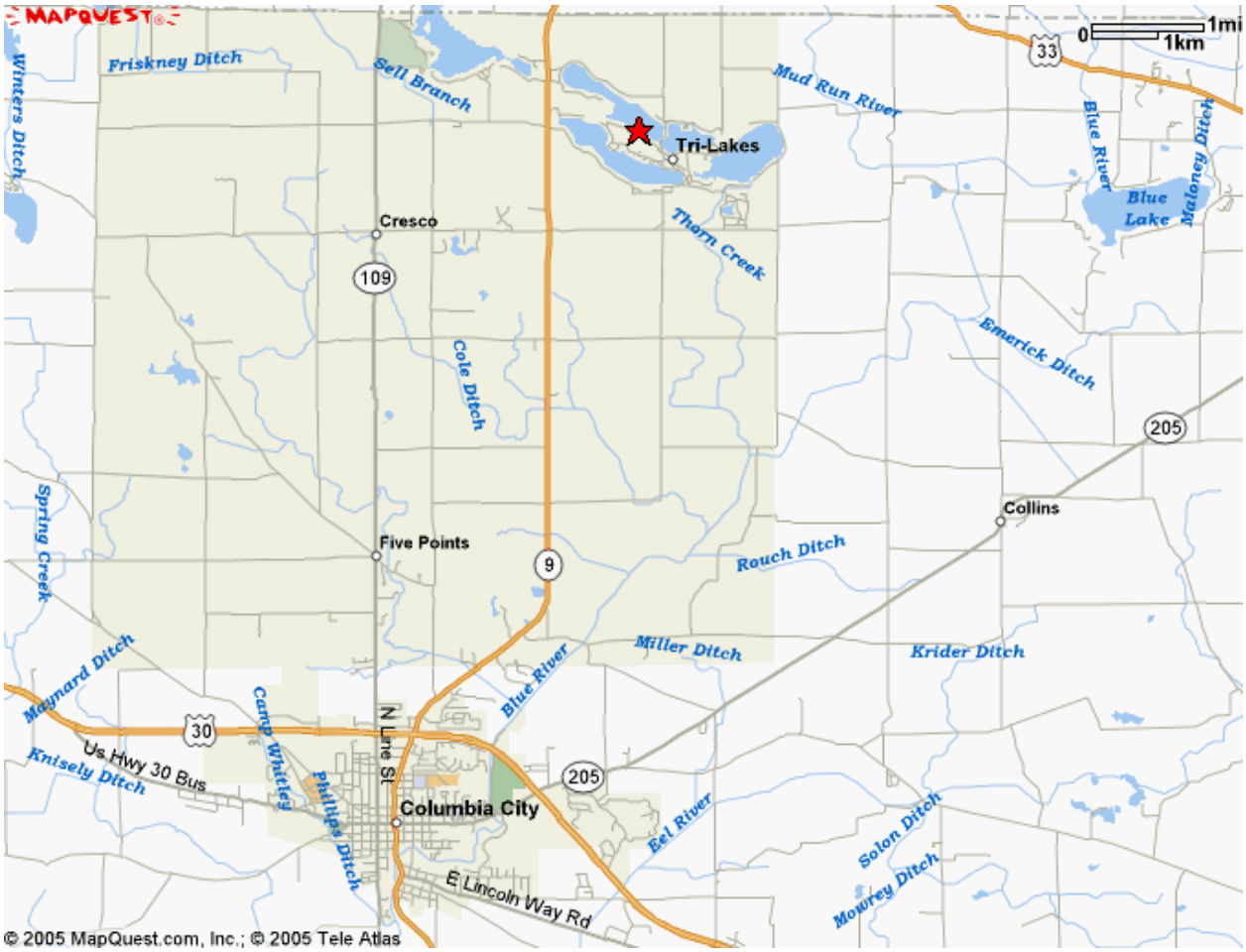


Figure 1: Location of the Tri-Lakes (Cedar, Round, and Shriner) in Whitley County, Indiana

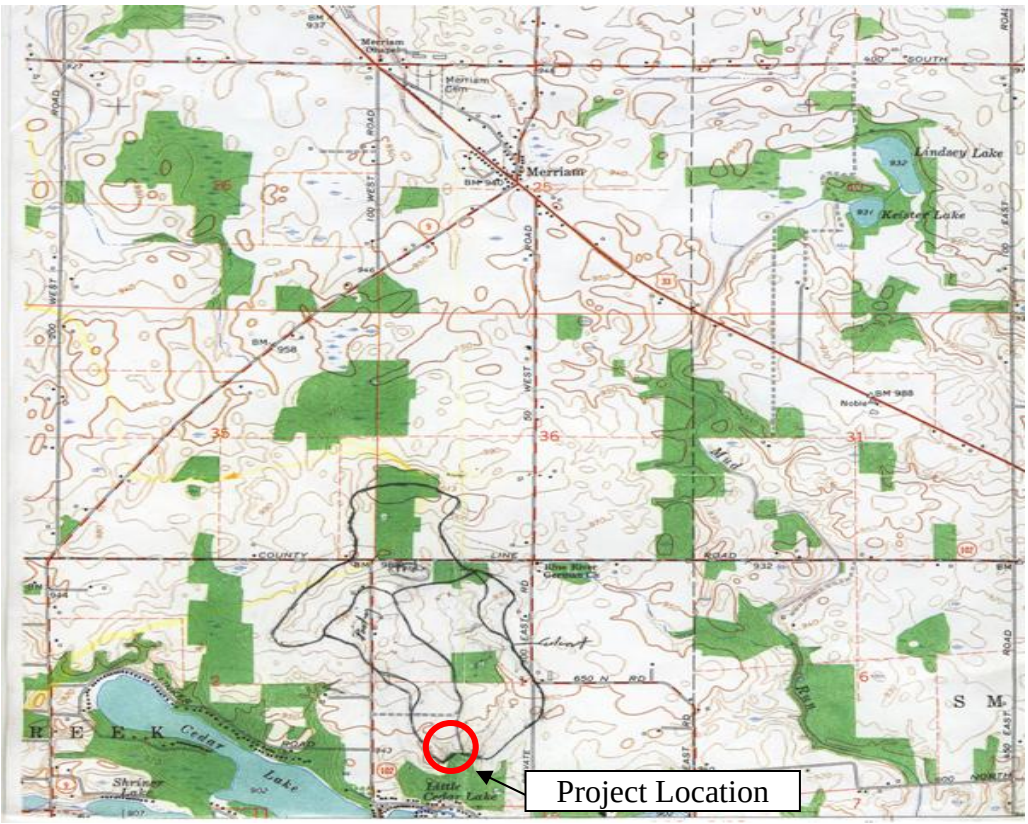


Figure 2. Approximate location and watershed boundaries of the Little Cedar Lake erosion control project.

Figure 3 and 4. View of drainage tile outlet from grassed waterway and downstream drainage north of Little Cedar Lake.

2.0 DESIGN RATIONALE

Initially, the project was conceived as a series of water and sediment control basins (WASCOB) within the drainages leading to little Cedar Lake. However, after calculating the runoff from the 184-acre watershed, it was determined that a WASCOB structure would not withstand the volume and velocity of water (176 cfs) flowing through both drainages (Appendix A) after a 5-year, 24 hour storm. Based on input from the landowner, a decision was made early on in the project to construct one or more ponds that could retain the runoff from each of the two sub-watersheds to reduce peak discharge volumes, water velocities, and erosion potential downstream of the existing grass waterways.

The natural topography of the two existing drainages meeting in a well-defined valley allowed consideration of one or two dams. At the considered dam elevation of 934 msl located at the lower end of each ravine, the west pond would obtain surface water runoff from 64-acres and create a 1.1-acre pond (58:1 ratio). At this same elevation the proposed pond in the east valley would obtain surface water from 104 acres and would be approximately 2.3 acres (45:1 ratio). These watershed surface area to pond ratios are considered extremely high and would result in very little storage potential during storm events. A 5-year, 24-hour storm fills the entirety of each basin with 6.3 acre-feet of runoff from the western sub-watershed and 9.6 acre-feet of runoff from the east sub-watershed (calculations based on a runoff volume of 1.56 inches per acre during the 5-year, 24-hour storm). Based on these calculations, it was determined that even dry-bottom basins would not result in appreciable storage during a 100-year storm event. Additionally, the landowner was not in favor of dry bottom basins.

A major source of sediment loading to the lake was being generated from in-stream bank erosion rather than from the surrounding watershed. The concentration of flow generated from the upstream, grassed waterways and drainage tiles, accelerated downstream bank erosion. Eroded stream banks were noted within the forested western valley and began at the outlet of the six-inch drain tile, which carried water from the grassed waterway. While the east valley exhibited little erosion along the defined grass waterway, areas downstream of the 18-inch tile outlet from the waterway had vertically cut banks measuring 1.5 to 3.5 feet high. The silt-loam soils are rated for velocities of 4 feet per second (fps) and the calculated velocity during a 5-year 24-hour storm is in excess of 6 fps.

To address the in-stream erosion and satisfy the landowner, a decision was made to construct a pond in the west basin, which possessed the appropriate sub-surface conditions for a dam. A rock chute was designed to stabilize the soils at the outlet of the tile from the eastern drainage. Additionally, it was decided to control erosion downstream of the pond and rock chute by reducing the gradient from 1 percent to 0.5 percent with rock check dams. The combination of the pond, rock chute, and the check dams are predicted to reduce in-channel velocities from the existing 6 fps to 3.4 fps. At this reduced velocity channel erosion should be minimal.

3.0 DESIGN AND CONSTRUCTION SPECIFICS

The following paragraphs describe the work to be performed for each portion of this project. Notes and calculations supporting the design criteria are in Appendix A. The plans contain additional details (Appendix B). Construction inspection forms (Appendix C) contain specifications in a check-off format for use during construction. Appendix D will contain the required permits once they are obtained.

3.1 Pond

The purpose of the pond is to intercept upstream sediment, eliminate the existing gully erosion within the area of the project, mediate peak flow volumes, and reduce downstream water velocities. The pond will be approximately 1.1 acres at normal pool. The principle outfall of the pond will be a 30-inch diameter riser pipe with a rim elevation of 932.7 msl (Appendix B). The invert of the outfall into the rock chute will be at 921.0 msl. Riprap at the outfall is designed to be three feet thick with an average diameter of 10 inches to handle the expected 60 cubic feet per second (cfs) discharge after a 5-year, 24-hour storm event. The emergency spillway is designed to be 24 feet wide to handle the 25-year, 24-hour storm event and has a designed crest elevation of 934.0 msl. The design elevation for the top of the dam is at 936.0 msl allowing 1.3 feet of potential storage. However, the designed construction height of the dam is at 937.5 msl to allow for future settling of the dam. The spillway will also outlet into the rock chute and will be vegetated with native prairie grasses.

The pond is designed with a maximum depth at normal pool of 14 feet near the dam after excavation of approximately 3200 cubic yards for construction of the dam. The base of the dam construction requires an eight-foot wide key trench cut two feet into the existing grade. The dam backfill will be compacted in six-inch soil lifts to 95 percent proctor until the design grades are reached. Installation of the outfall pipe is designed to occur during dam construction and includes three anti-seep collars to prevent water from following the outfall pipe through the dam. The dam is to be maintained free of trees and shrubs indefinitely.

3.2 Rock Chute

The purpose of the rock chute is to: protect the existing 18-inch tile outlet, eliminate erosion from the existing tile discharge, and eliminate erosion from overland flow and the emergency spillway into the channel. The rock chute is designed to handle a maximum flow of 118 cfs, and a maximum velocity of 8.4 fps. The riprap design depth is 18-inches with an average rock diameter of nine inches. The length of the chute is 40 feet with an entrance width of 20 feet and an exit width of 14 feet. The primary outfall and the spillway from the pond are designed to empty into the rock chute.

3.3 Rock Check Dams

The purpose of the check dams is to reduce the slope of the stream and reduce in-channel velocities, and thus erosion, during storm events. A series of five check dam structures are proposed along the stream between Tom Henny's property and East Stalf Road on the north side of Little Cedar Lake. The check dam structures consist of a rock key trench across the defined drainage channel or stream. The key trench will be excavated two feet below the stream grade and a minimum of four feet into the embankments of the stream. The rock used to fill the key

trench can be variable in size; however, a minimum of 50 percent of the material should be greater than nine inches in diameter. The top of the constructed rock key shall be no higher than one and one-half feet above the existing grade in the center of the channel with the outside edges sloping higher in elevation to meet existing embankment grades. Additional rock of the same size as the key trench shall be added to create a 3:1 upstream slope and a 7:1 downstream slope. The depth of all rock within the structure should be a minimum of 18 inches.

While the approximate locations of the check dams are shown on the plans by station number (distance from 18-inch tile outlet at rock chute), actual locations in the field will need to be adjusted so that the check dams are installed with within areas of higher banks and with minimal disturbance to live trees. The contractor is instructed to use caution during construction so that the channel maintains a minimum capacity of approximately 60 cubic feet throughout the area of the check dam.

3.4 Landowner Agreements

Signed landowner agreements with the potentially affected property owners are held on file at JFNew's corporate office in Walkerton, Indiana and the Tri Lakes Property Owners Association.

3.5 Permitting

Permits were not obtained during this design project due to budget limitations. Permits will be required from the Indiana Department of Environmental Management (IDEM) and the US Army Corps of Engineers (ACOE) for this project. The project should qualify for existing Nationwide or Regional General Permits. Contractors should allow approximately 60 to 90 days to obtain permits after submittal of completed applications. Permits will be placed in Appendix D.

4.0 SUMMARY OF PROBABLE CONSTRUCTION ESTIMATES

ITEM	Unit	Number of Units	Unit Cost	Total Cost
Mobilization/Demobilization	Each	1	2,000	2000
Clearing and Grubbing	Each	1	4,000	4,000
Earth Moving (includes core trench)	CubicYard	3350	4.50	15,075
Rock	Ton	400	30.00	12,000
Pond Outlet Structure	Each	1	2,500	2,500
Seed	Acre	1	1,500	1,000
Operator/Backhoe (check dams)	hours	40	100	4,000
Labor (seed and outlet structure)	hours	40	40	1,600
Subtotal				**$42,175**
Engineering oversight	hours	40	100	4,000
TOTAL				**$46,175**

5.0 MONITORING AND MAINTENANCE ACTIVITY

The dam will require maintenance mowing of vegetation on an annual basis. Trees should not be allowed on the dam as their root structure can severely damage the structure if the tree is blown over and the root mass upended. The owner should annually inspect the dam for potential muskrat damage. After major storm events, the outlet of the pond should be examined and cleared of any debris that might clog the pipe. If the primary outfall does clog and the emergency spillway is used, the owner should check for and repair any erosion damage to the backside of the dam that might occur. Muskrat damage should be repaired using compacted clay fill. Rock protection should be installed along the face of the dam if muskrat damage becomes a recurring problem.

Annual inspection of the rock chute and rock check dams are necessary to insure that water does not erode around these structures and that the majority of rocks are still in place and not washed downstream. If significant damage to the structures occurs, then the inspector should notify both the owner and the design engineer of any problems. Repair to any erosion occurring around the structures should be within the first several weeks after noticing the problem.

6.0 PROJECT SUMMARY

The Tri-Lakes Property Owners Association is addressing erosion issues within their watershed. One of the projects identified by the association was an eroding stream into Little Cedar Lake. The association contracted JFNew to complete a design project that would address the erosion issue. Discussions with the landowner, Natural Resource Conservation Staff, and association members resulted in the design of a 1.1-acre pond, rock chute, and five rock check dams within the existing drainage on the Thomas Henny Farm. The project is designed to eliminate erosion from the upper end of the drainage while reducing downstream gradients and velocities in order to prevent future erosion. The proposed project was funded in 2005 with a construction grant from LARE and is ready for construction in 2006.

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

APPENDIX A

DESIGN NOTES AND CALCULATIONS

East Lake - County Tile

Information provided by Brandon Forrester - Whitley County Surveyor

1840' of 16" Tile

0+00 to 2+40 0.5 grade

2+40 to 18+40 1.35 grade

Invert Elevation of 18" Tile outlet pipe 919.00 - Rowland Associates Survey - 8/2004

Calculated Tile Elevations

	0+00	919.00	0.5 grade
	2+40	920.2	
(930 Contour)	5+60	924.85	
(940 Contour)	14+84	937.0	
	18+40	941.8	

Proposal: Outlet Tile at Elv. 934.00 - Approx. Emergency Elevation

New 22" Smooth Tile 5+60 to 14+84 Elv. 937.0

Total 1000' w/outletting from side

0.3 grade 3.0

Outlet Elv. 934.00

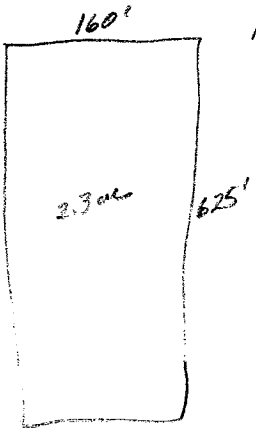
East Lake Calculations

Elv. 934.0 Proposed Emergency

Elv. 927.0 Proposed Waterline - Principal Spillway

Elv. 919.0 Bottom 8' Depth - 3:1 Side Slopes - 1/2 surface area

Elv. 921.0 Bottom 6' Depth - 3:1 Side Slopes - 1/2 surface area



Present Volume Storage at Elv. 934.00 To existing bottom

9.64 ac.ft or $\frac{419918 \text{ cu.ft}}{27}$ = 15553 cu.yds

Constructed Volume Storage

At Elv. 934.0 to Elv. 919.0 - 3:1 Side slopes for additional storage

$115' \times 290' \times 15 = \frac{500250 \text{ cu.ft}}{27} = 18528$ cu.yds

At Elv. 934.0 to Elv. 921.0 - 3:1 Side Slopes

$115' \times 290' \times 13' = \frac{433550 \text{ cu.ft}}{27} = 16057$ cu.yds

Difference in volume = cu.yds of soil to be moved

(16,057 + 18,528) - 15553 = 19,032 cu.yds

Fill 3565 cu.yds Fill to put some place 15467 cu.yds

Runoff Storage Elv. 934.0 Emergency to Elv. 927.0 Waterline

$139' \times 604' \times 7' = \frac{587692 \text{ cu.ft}}{43560} = 13.5$ ac.ft

13.5 ac.ft Storage = 5yr 24 HR Storm Event (1.6" runoff/ac)

Surface Area of Pond = 1.6 ac.

Storage Area at Elv. 934.0 = 2.3 acres

JFNew

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Design Notes:

1. Purpose – Reduce gully erosion within the project area, provide fish and wildlife habitat, reduce peak flow (reduce stream erosion), and allow some sedimentation from watershed runoff.

2. Hazard to homes downstream unknown – should a dam failure occur. Design for dams in predominantly rural or agricultural areas.

3. Watershed to Pond size = 60:1 -- This is considered high. Will require larger than normal principal spillway.

4. Minimum depth by NRCS standards is 8' over at least 25% of the pond. (I recommend 10' w/a deep hole of 12-14')

5. No woody growth should exist on the embankment or spillway or within 25'.

6. Foundation cutoff: Shall extend up the abutments and be deep enough (2' minimum) to extend into a relatively impervious layer. Bottom width of cutoff will be a minimum of 8' width to accommodate equipment for excavation, backfill and compaction. Side slopes will be know steeper than 1:1. The most impervious material available will be used backfill the cutoff trench and construct the core of the dam.

7. Top of dam shall be 12ft - width

8. Front and back slopes shall be 3:1

9. The top elevation to be minimum of 1' above the water level in the emergency spillway when flowing to design capacity. A minimum of 2' difference between crest of emergency and top of settled dam.

10. 10% settlement to be added to top of dam during construction

11. Minimum 1.5" Detention Storage or Q5yr storm

12. Emergency Spillway = Q25

JFN-001 / 2-03

JFNew

JOB

SHEET NO. OF

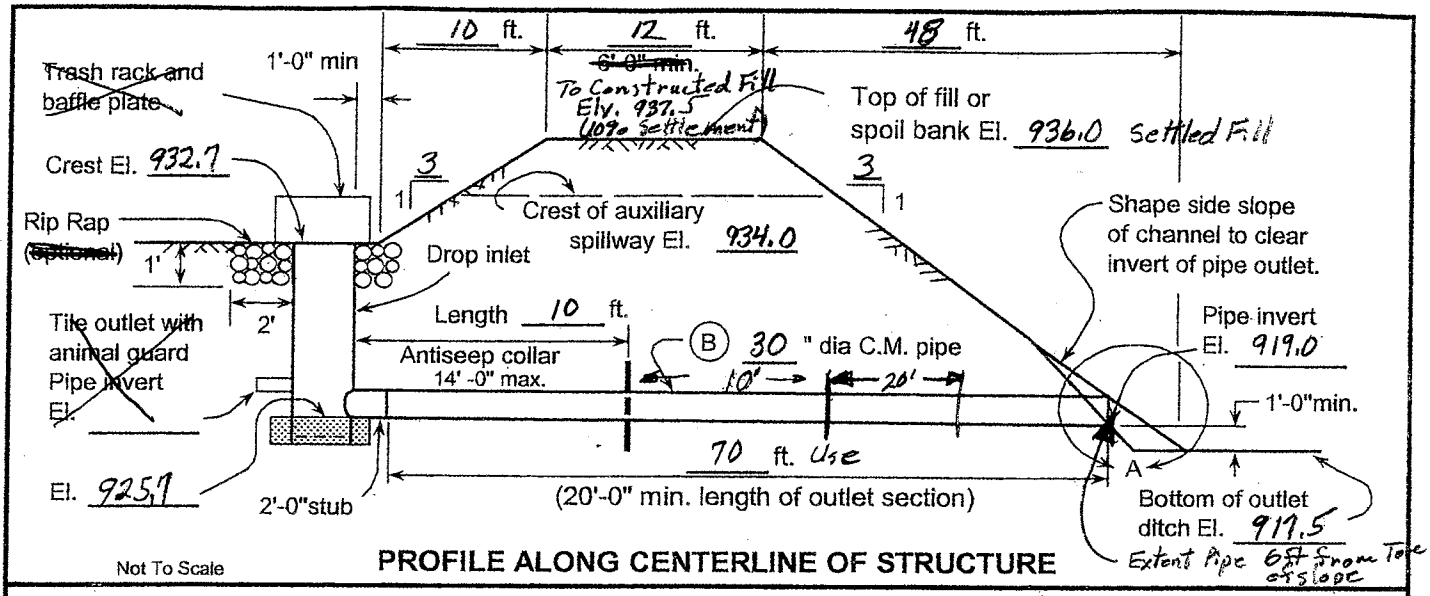
CALCULATED BY DATE

CHECKED BY DATE

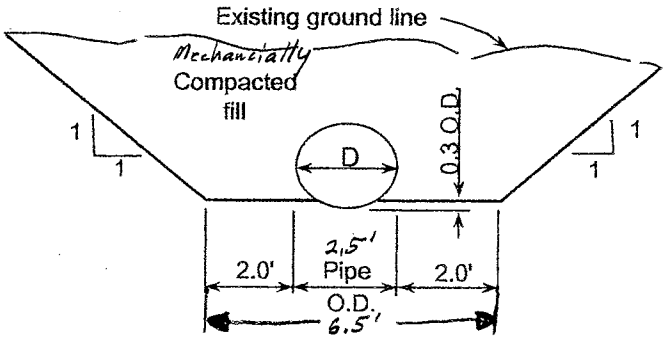
SCALE

13. Outlet Protection at Principal Spillway – Rock Rip-rap

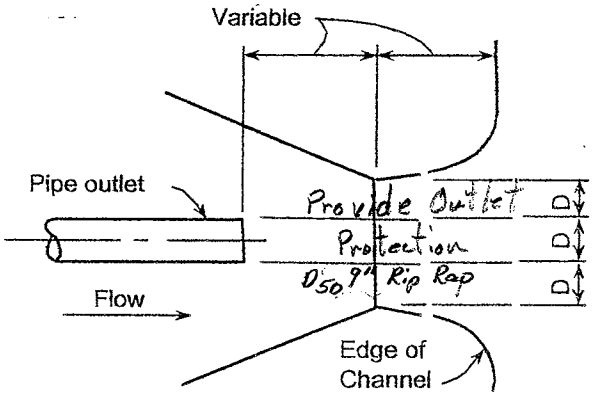
14. Outlet Protection of Emergency spillway, as needed – Rip-rap



PROFILE ALONG CENTERLINE OF STRUCTURE



TYPICAL EXCAVATION AND BACKFILL FOR PIPE INSTALLATION



PLAN VIEW DETAIL A

ESTIMATE OF MATERIALS

ITEM	QUANTITY	
Excavation Core	200	Cu. Yds
Earth Fill	2856	Cu. Yds
Pipe 30 inch diameter (B) C.M. metal thickness 0.06" (16 ga.)	70	Lin. Ft.
Riser 48 inch diameter (A) C.M.	8	Lin. Ft Total Length
metal thickness 0.06" (16 ga.) C.M. (G)	7	Lin. Ft. To Flowline
Tile stub — inch diameter	~~[illegible]~~	Lin. Ft.
Animal guard — inch diameter	~~[illegible]~~	Each
Baffle plate 6ft	1	Each
~~Trash Rack~~	—	Each
Antiseep collar	3	Each
Concrete	1.5	Cu. Yds
Seeding and mulching		Acres
Rip Rap Riser D50 5"	3	Tons
Outlet Protection D50 9"	18-20	Tons
12x18x1½D		
Clearing	0.5-0.75 Ac.	

SOIL INVESTIGATION REPORT

LOCATION OF BORINGS	DEPTH FEET	UNIFIED SOIL CLASSIFICATION

NOTE: Cutoff Trench – Extend up the abutments and be deep enough (min. 2ft) to extend into relatively impervious layer. Bottom width of 8ft to accommodate equipment for excavation, backfill and compaction. Side slopes 1:1 or flatter. Use most impervious material for back filling the cutoff trench and constructing the core of the dam.

DRAWING NO. IN-ENG-27.XLS 1(2).(REV. 5/03)

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

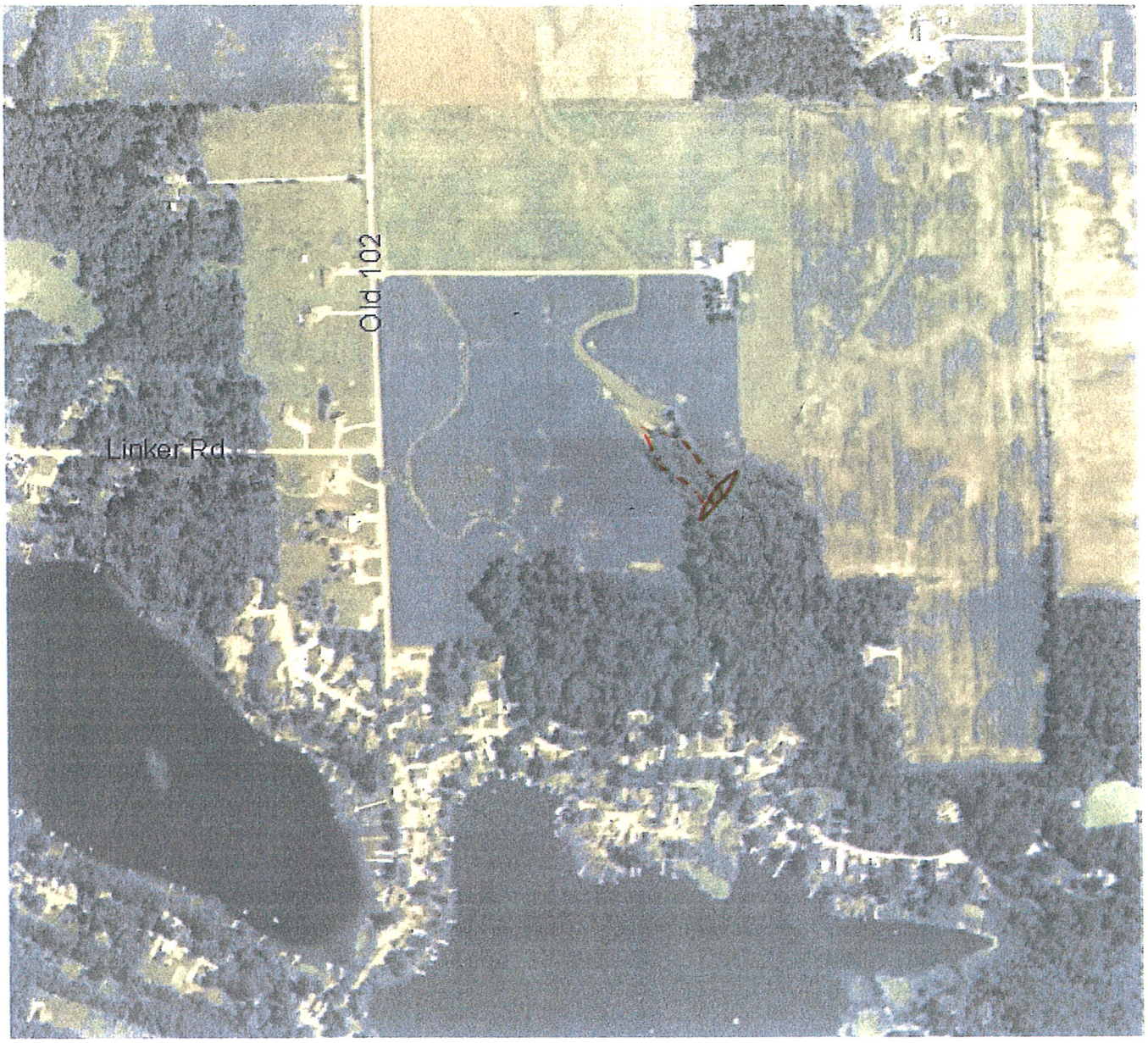
CORRUGATED METAL PIPE DROP STRUCTURE

Landuser Project No. 0301-23
Location Little Cedar Lake - LARE
Whitley County ~~SWCD~~, INDIANA
Section ____ T ____ R ____

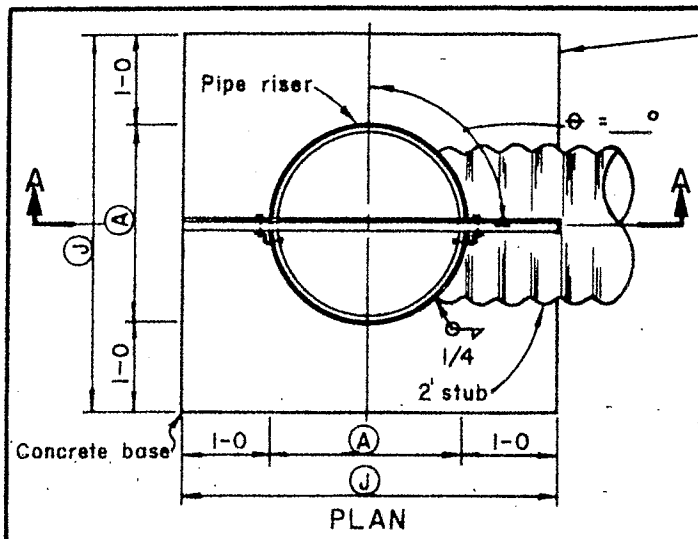
Designed Wayne Stanger Date 5/05
Drawn
Checked
Approved
Title

Sheet ___ of ___

(2)



Little Cedar Lake - LARE
Project No. 0301~~0~~123
Whitley County, Indiana
Erosion Control Pond/Structure



PLAN

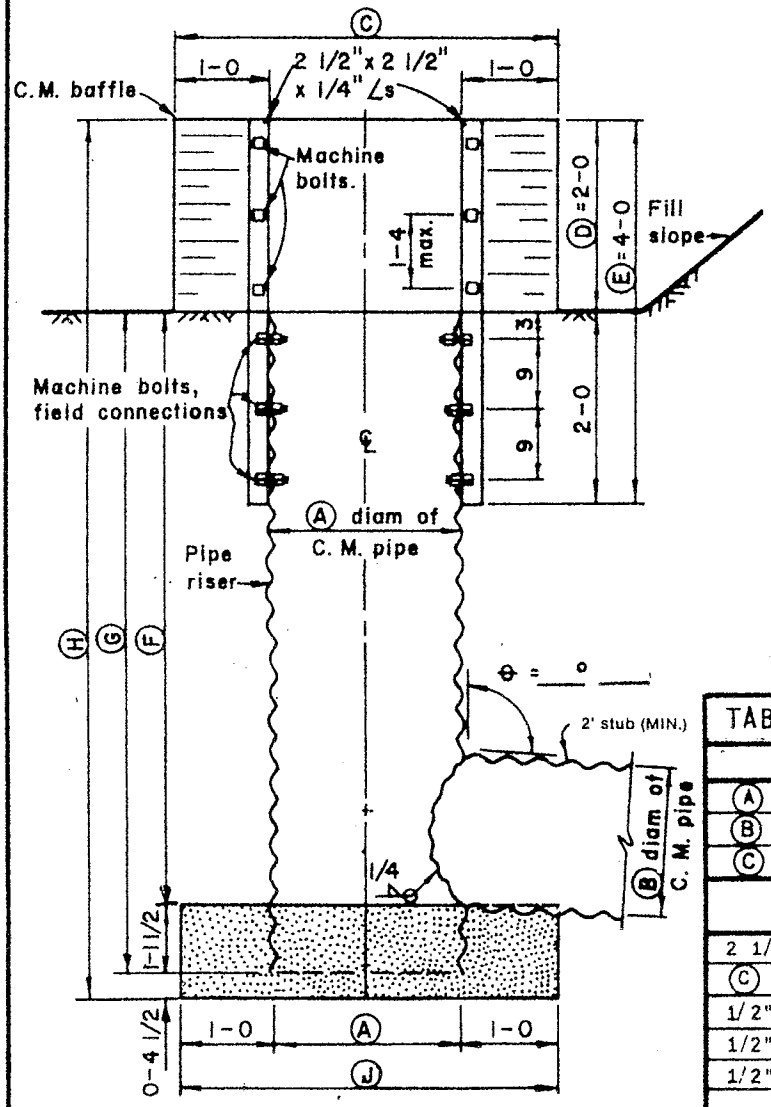
Concrete shall have a minimum compressive strength at 28 days equal to a minimum of 2500 lb./sq.in. (5 bag mix).

TABLE OF QUANTITIES FOR CONCRETE RISER BASE

DIA. OF RISER IN INCHES	18"	21"	24"	30"
CONCRETE, CU.YD.	0.68	0.78	0.89	1.12

48" - use 1.5 cu.yds
6X6' x 1-1¼' Base

INLET PROPORTIONS (MIN.)		ANTIVORTEX BAFFLE
PIPE DIA. CONDUIT (B)	RISER DIA. (A)	LENGTH FEET (C)
8 TO 12	18	3-6
15	21	3-9
18	24	4-0
21 AND 24	30	4-6
30	48	6-0



SECTION ON CENTERLINE
SECTION A-A

DETAILS OF INLET

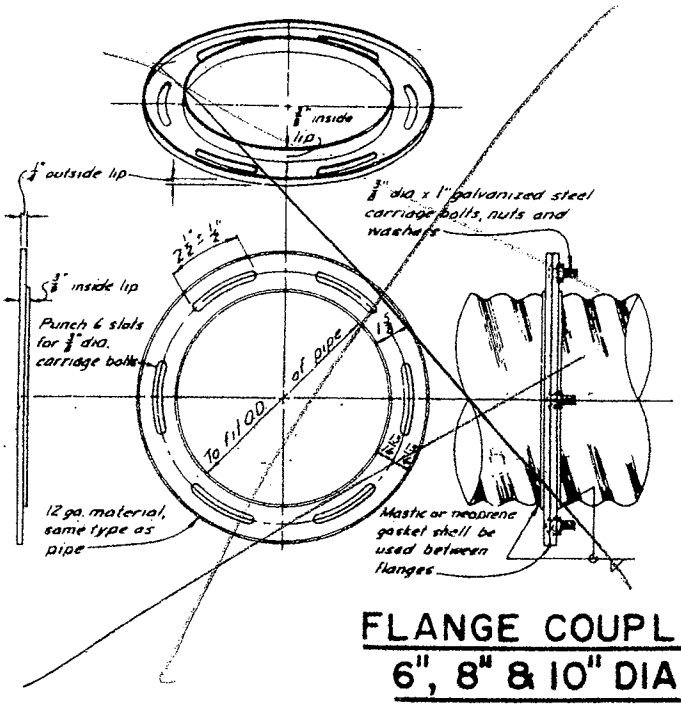
NOTES:

1. CORRUGATED METAL PIPE MAY BE MADE OF ALUMINUM OR ZINC-COATED IRON OR STEEL AND MEET FEDERAL SPECIFICATIONS, WW-P-302C OR WW-P-405A AND SHALL BE CLASS I OR II, SHAPE 1. USE 16 GAGE (THICKNESS = 0.06").
2. ALL ACCESSORIES AND FASTENERS SHALL BE OF COMPATIBLE METALS THROUGHOUT STRUCTURE. GALVANIZED OR CADMIUM PLATED BOLTS, NUTS, AND WASHERS MAY BE USED.
3. ALL HOLES FOR BOLTS SHALL BE 1/16" LARGER THAN DIAMETER OF BOLTS.
4. DROP INLET SHALL BE SHOP FABRICATED.
5. ZINC-COATED METALS, AFTER WELDING OR CUTTING, SHALL BE REPAIRED AS FOLLOWS:
   (A) THOROUGHLY CLEAN THE DAMAGED AREAS ON BOTH SIDES OF THE PIPE WITH WIRE BRUSH.
   (B) PAINT THE CLEANED AREAS WITH TWO COATS OF ZINC OXIDE - ZINC DUST PAINT.
   (C) APPLY A HEAVY COAT OF ASPHALT OVER THE PAINTED AREAS.

TABLE SHOWING DIMENSIONS AND MATERIALS

DIMENSIONS			
(A) 48"	(D) 2-0	(G) 8-0	
(B) 30"	(E) 4-0	(H) 10-3	
(C) 6-0'	(F) 7-0	(J) 6-0	

MATERIAL ITEMS	QUANTITY REQUIRED
2 1/2" X 2 1/2" X 1/4" ANGLES X (E) 4-0	2
(C) X (D) C.M. SHEET	1
1/2" X 1 1/4" MACHINE BOLTS	12
1/2" STEEL SPLIT LOCKWASHERS	12
1/2" NUTS	12

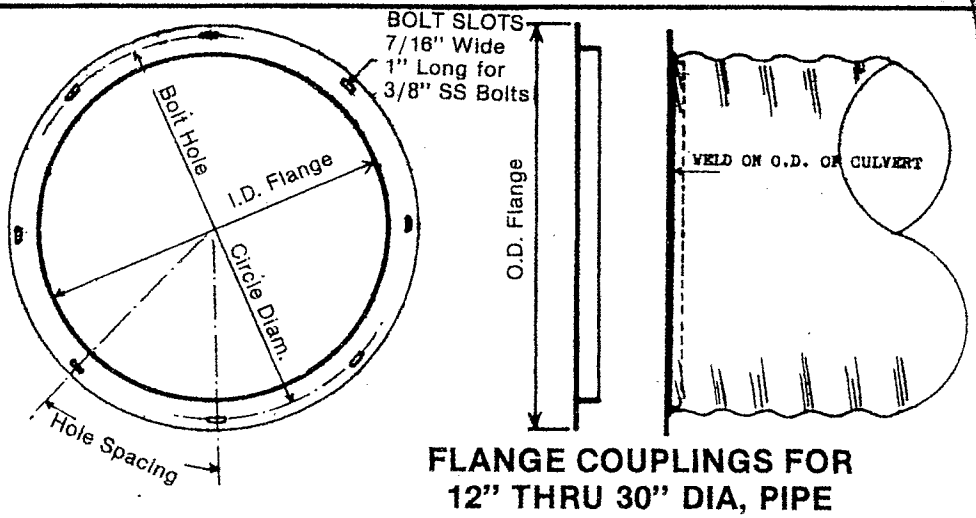


NOTES:
1. THE PIPE MAY BE HELICAL CORRUGATED METAL PIPE OR PIPE MATERIAL OF EQUIVALENT STRENGTH AND DURABILITY.
2. ALL WELDED, MARRED, AND CHECKED SURFACES SHALL BE FIELD COATED WITH A HEAVY APPLICATION OF FIBRATED ASPHALT-CEMENT.
3. COMPLETELY COAT WITH ASPHALT-CEMENT ALL CONTACT SURFACES OF FLANGES AND COLLARS BEFORE FIELD ASSEMBLY.

with this

FLANGE COUPLING FOR 6", 8" & 10" DIA. PIPE

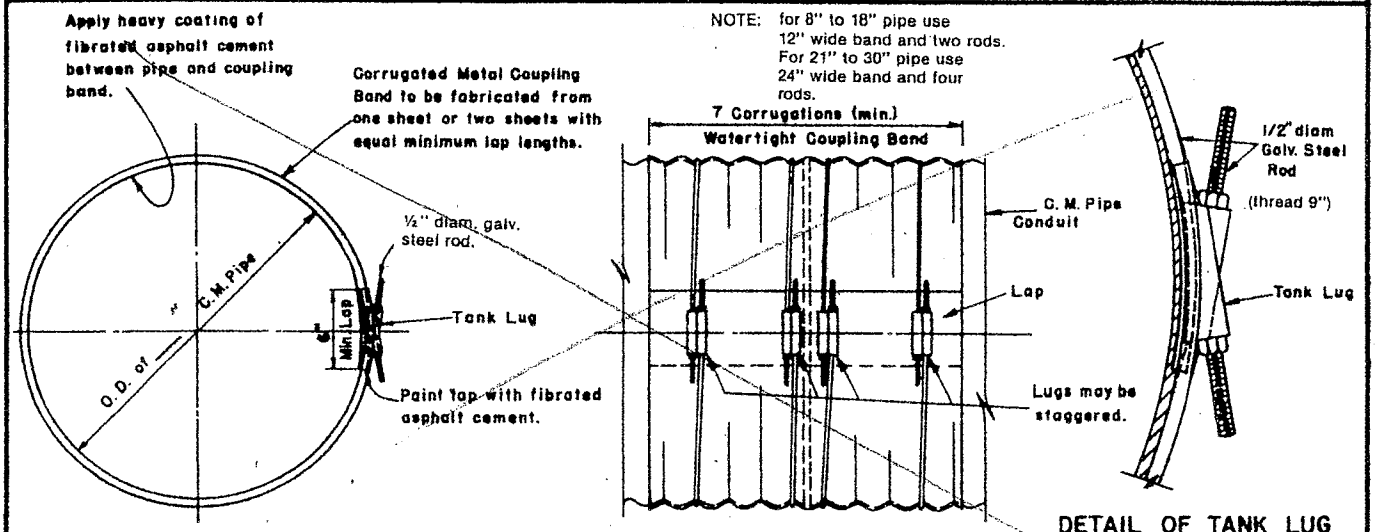
N.T.S.



Pipe Diam. Inches	Min. No. Holes	Min. Spacing Inches
12	10	4.48
15	12	4.52
18	14	4.54
21	16	4.56
24	18	4.58
30	22	4.60

FLANGE COUPLINGS FOR 12" THRU 30" DIA, PIPE

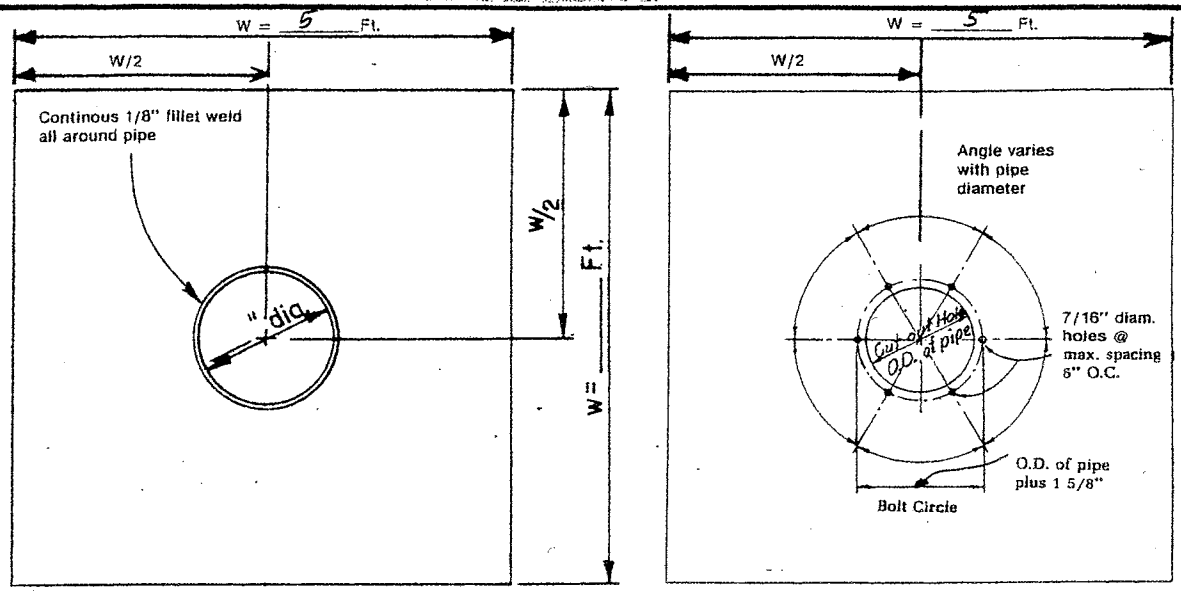
NOTE: Notes for 6", 8" & 10" flange coupling apply for 12" thru 30" flange couplings N.T.S.



DETAILS OF WATERTIGHT COUPLING BAND

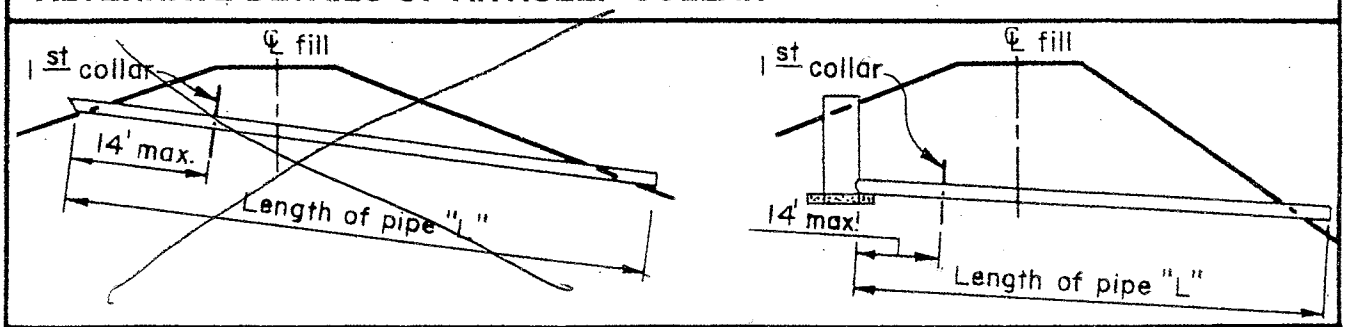
DETAIL OF TANK LUG
Not to Scale

DETAILS OF WATERTIGHT COUPLING BAND 8" THRU 30" DIA. PIPE



Notes: 1. Hot rolled sheet steel 16 ga. or aluminum sheet — min. thickness 0.06".
2. Install C.M. antiseep collar with corrugations vertical.

ALTERNATE DETAILS OF ANTISEEP COLLAR



PIPE SIZE INCHES	MAXIUM SPACING FEET		LENGTH OF PIPE "L" IN FEET															
			50		60		70		80		90		100		110		120	
	SIZE COLLAR "W" FEET		SIZE COLLAR "W" FT.															
	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5
6&8	20	25	2	2	2	2	2	2	3	3	3	3	4	3	4	4	4	4
10&12	20	25	2	2	2	2	3	2	3	3	4	3	4	4	4	4	5	4
15	19	25	2	2	3	2	3	2	4	3	4	3	5	4	5	4	6	4
18	18	25	2	2	3	2	3	2	4	3	4	3	5	4	5	4	6	4
21	15	23	2	2	3	2	4	3	4	3	5	4	5	4	6	4	7	5
24	14	21	3	2	3	2	4	3	5	3	5	4	6	4	7	5	7	5
30		18	—	2	—	3	—	3	—	4	—	4	—	5	—	5	—	6

NUMBER OF REQUIRED ANTISEEP COLLARS & spacing for 6" THRU 30" DIAMETER PIPE

BILL OF MATERIALS

QUANTITY	DESCRIPTION
3	Antiseep collar - 5 ft. or 5 ft. ~~round or~~ square
8	Flange coupling 30" 4 Joints
	Hex. HD. nuts, 3/8" x 1"
	Hex. HD. nuts, 3/8"
	Flat washers - cut steel, 7/16" I.D. x 7/8" O.D.
	Watertight coupling band, w/lug rods

ANTISEEP COLLARS AND COUPLING DEVICES FOR 6" THROU 30" C.M. PIPE

NAME _____

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date

Designed.....

Drawn.....

Checked.....

Reviewed.....

Approved by.....

Title.....

Title.....

Sheet ..... No. ..... Of. .....

Drawing No.

1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings as shown on the plans. This specification does not cover pipe designed for pressure flow.

2. MATERIALS

Zinc-coated, aluminum coated or aluminum-zinc alloy coated iron or steel corrugated pipe and fittings shall conform to the requirements of ASTM Specification A-760 for the specified type of pipe, and to the following additional requirements:

a. The sheet thickness, and the corrugation type and nominal size shall be as shown on the drawings.

b. Unless otherwise specified, circumferential shop riveted seams shall have a maximum rivet spacing of 6 inches, except that 6 rivets will be sufficient for 12-inch diameter pipe.

c. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands, the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating off the coupling bands.

d. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. If specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

e. When specified, caulked seam corrugated metal pipe shall conform to the following additional requirements:

(1) Caulked seam corrugated metal pipe shall have all circumferential and horizontal seams caulked with an asphalt compound before riveting. This shall be accomplished by applying a uniform bead (1/4) inch minimum diameter) of the asphalt compound to the inner lap surface before riveting, such that when the rivets are in place, all voids are filled and a coating of asphalt is between the lap surfaces.

(2) The asphalt compound shall consist of an asphalt base combined with inert filler material to form a heavy-bodied compound that will not sag or run out of the seam. The compound shall contain 63 to 68 percent solids by weight. It shall be similar in type and equal in quality to Trumbull 5W Asphalt Mastic, knife grade, as manufactured by the Trumbull Asphalt Company of Delaware.

3. HANDLING THE PIPE

The contractor shall furnish such equipment as is necessary to place the pipe without damaging the pipe or coating. The pipe shall be transported and handled in such a manner as to prevent bruising, scaling or breaking of the spelter coating or bituminous coating.

4. REPAIR OF DAMAGED COATINGS

Breaks or scuffs on bituminous coatings that are less than 36 square inches in area shall be repaired by the application of two coats of hot asphaltic paint or a coating of cold-applied bituminous mastic. The repair coating shall be at least 0.05 inches after hardening and shall bond securely and permanently to the pipe. The material shall meet the physical requirements for the original coating. Whenever individual breaks exceed 36 square inches in area or when the total area of breaks exceeds 0.5 percent of the total surface area of the pipe, the pipe will be rejected.

5. LAYING AND BEDDING THE PIPE

Unless otherwise specified, the pipe shall be installed in accordance with the manufacturer's recommendations. The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps at the sides at about the vertical midheight of the pipe. Field welding of corrugated galvanized iron or steel pipe will not be permitted. Unless otherwise specified, the pipe sections shall be joined with water-tight coupling bands, with a minimum width of 12 inches, or flanges for a flange-type connection. The area between pipe and coupling band shall be coated with either an asphalt cement to insure a water-tight joint or a rubber neoprene gasket 3/8 inch thick and as wide as the connecting band + 1 inch.

The trench or foundation width in or on which the pipe will be laid should be at least: (1) 2 times the pipe diameter, or (2) the pipe diameter plus 2 feet, whichever is the greater.

Pipe should be laid on a moist, compacted foundation (not wet nor hard and dry). Just before the pipe is laid, spread a 2 to 3 inch layer of moist loose soil for the pipe to be placed on. The pipe should make uniform contact with the soil along its entire length.

Perforated pipe shall be laid with perforations down and oriented symmetrically about a vertical centerline. Perforations shall be clear of any obstructions at the time the pipe is laid.

6. BACKFILLING

The pipe shall be loaded sufficiently during backfilling around the side to prevent its being lifted from the bedding.

Backfill around the pipe shall be placed in layers not more than 6 inches thick before compaction. Each layer of backfill shall be compacted with power tampers or hand tamping to a greater density than the surrounding undisturbed soil. Backfill over and around the pipe shall be brought up uniformly on all sides and shall extend a minimum of 2 feet over the pipe before earth embankment with earth moving equipment over the pipe is started. Special care shall be taken not to disturb the grade and alignment during backfill operations.

7. ADDITIONAL ITEMS WHICH APPLY TO THIS JOB

Backup Data

DESIGN DATA

DRAINAGE AREA 64 ACRES, POND AREA 1.0 ACRES, RATIO DRAINAGE AREA TO POND AREA 64:1

RUNOFF CURVE NO. 80, AVE. W.S. SLOPE: FLAT, MODERATE, STEEP (CIRCLE ONE)

TOP OF SETTLED FILL ELEV. 936.0 LOW POINT ON ℄ FILL ELEV. 922.0

Pipe outlet 921.0 into existing ditch

EMERGENCY SPILLWAY

DESIGN Q = 64 AC X 0.5 CFS/AC = 32 CFS, MAXIMUM VELOCITY 4 FT/S

RETARDANCE C, DISCHARGE q 1.5 CFS/FT. L 25 FT

BOTTOM WIDTH b (STABILITY) = $\frac{\text{DESIGN Q}}{\text{DISCHARGE q}}$ = 21.3 Use 25' FT, Hp = 1.0 FT.

BOTTOM WIDTH b (USED) 25' FT, DISCHARGE q (USED) = $\frac{\text{DESIGN Q}}{\text{b}}$ = 1.28 CFS/FT.

Hp (USED) 1.0 FT. MIN. SLOPE 1 %, MAX. SLOPE 12 %, EXIT SLOPE (ACTUAL) Greater

FREEBOARD 1.0 FT., EMERGENCY SPILLWAY CREST ELEV. 934.0

May need protection or route to flatter slopes

PRINCIPAL SPILLWAY

METHOD I - MINIMUM DETENTION STORAGE Elv. 933.0

STORAGE = ____ IN. X ____ AC./12 ____ AC. FT., REQUIRED STAGE = $\frac{\text{STORAGE (AC. FT.)}}{\text{POND AREA (AC.)}}$ = ____ FT.

PIPE DIAMETER ____ IN., TYPE ____

IS STAGE SUFFICIENT FOR PIPE FLOW: YES ____ NO ____

METHOD II - SHORTCUT FLOOD ROUTING

DESIGN STORM FREQUENCY 5 YEAR 24 HR., RAINFALL 3.4 IN., RUNOFF Vr 1.56 IN.

TYPE PIPE CMP 70' Length
n = 0.02

STAGE FT.	Vs AC. FT.	Vs IN.	TABLE A Vs Vr	TABLE A Qo Qi	TABLE A Qi CFS	TABLE A Qo CFS	TABLE B Qo CFS /AC	TABLE B Qo CFS	PIPE DATA DIA. IN.	PIPE DATA WILL PIPE FLOW FULL	PIPE DATA ACTUAL HEAD FT.	PIPE DATA Qo CFS	RISER DATA DIA. IN.	RISER DATA IS STAGE SUFFICIENT FOR Qo
1.0	1.0	0.19	.12	.84	57	48	—	—	30	Yes Flatter than 0.5.	12.5	74.1	60+	43 - No
1.3	1.3	0.24	.154	.79	57	45	—	—	30	Flatter than Critical Slope	13.5	67.9	48	57 Yes
1.4	1.4	0.26	.167	.77	73	56	—	—	30		11.5	67.9	48	57 Yes

2.5 yr

10 yr

HOOD INLET OR FLARED INLET DATA

PIPE DIA. SELECTED ____ IN., STAGE PROVIDED ____ FT., STORAGE PROVIDED ____ AC.FT.

PIPE INLET INVERT ELEV. ____, PIPE OUTLET INVERT ELEV. ____, PIPE LENGTH ____ FT.

DROP INLET DATA

PIPE DIA. 30 IN., RISER DIA. 48 IN., STAGE REQUIRED 1.3 FT.

STORAGE REQUIRED 0.24 AC.FT., PIPE LENGTH 70 FT., RISER LENGTH 8' Total 7' To Flow Line FT.

CREST OF RISER ELEV. 932.7 FT., OUTLET OF PIPE INVERT ELEV. 921.0 FT.

PHYSICAL DATA

MAXIMUM FILL HEIGHT 14 FT.

MAXIMUM WATER DEPTH 10.7 FT.

HAZARD CLASSIFICATION

2 Homes down stream which could be affected if dam fails.

DETENTION STRUCTURE DATA

NAME Cedar Lake - West Lake
Tom Henry - LARE
Project No. 03-01-01

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed Wayne Stanger	Date 5/05	Approved by	
Drawn		Title	
Checked		Title	
Reviewed		Sheet No. Of.	Drawing No.

IN-ENG-25 1(2) Rev. 6-81

~~U.S. Department of Agriculture~~
~~Soil Conservation Service~~

~~IN-ENG-10A~~
~~Rev. 10/89~~
~~File Code 210-11~~

West Lake

WORKSHEET IN-2: TIME OF CONCENTRATION AND PEAK DISCHARGE

Client LARE Tom Henny (Cedar Lake) Practice and ID Project No 03-01-01

Whitley / Noble ~~County Soil and Water Conservation District, Indiana~~

By W. Stanger Date 10/19/04 Checked by _____ Date _____

Estimating Time of Concentration

1. Data:

Rainfall Distribution Type ..... = II

Drainage Area (IN-ENG-10) ..... A = 64 acres

Runoff Curve Number (IN-ENG-10) ..... CN = 80

Watershed Slope ..... Y = 3.3 %

Flow Length ..... l = 4000 feet

2. T_c using l, Y, CN and EFM Figure 2-27 (page 2-41) ..... T_c = 0.88 hours

or using EFM Equation 2-5:

$$T_c = \frac{l^{0.8}(1000/CN - 9)^{0.7}}{1140\ Y^{0.5}} = \frac{(\quad)^{0.8}(\quad)^{0.7}}{1140\ (\quad)^{0.5}} \quad \text{..... } T_c = \_\_\_\_\_ \text{ hours}$$

Estimating Peak Discharge:

		Storm #1	Storm #2	Storm #3	
1. Frequency	year	5	25	2	10
2. Rainfall, 24-hour, inches (Figure IN-2-1)	P =	3.4	4.5	2.7	3.9
3. Initial Abstraction ..... (Use CN with EFM Table 2-4, page 2-89)	I_a =	0.500	0.500	.500	.500
4. Compute I_a/P ratios	I_a/P =	0.147	0.111	0.185	0.128
5. Unit Peak Discharge, cfs/acre/inch ..... (Use T_c and I_a/P with EFM Exhibit IN-2-II)	q_u =	0.57	0.59	0.56	0.58
6. Runoff, inches ..... (Use P and CN with EFM Figure 2-26 or Table 2-2)	Q =	1.56	2.46	1.03	1.75
7. Ponding and Swampy Area Adjustment Factor ..... (Use percentage of area and EFM Table IN-2-1)	F_p =	—	—		
8. Peak Discharge, cfs ..... (Where $q_p = q_u A Q F_p$) ~~1.64×78×0.59~~ 2.55×78×0.61	q_p =	57	93	37	73
		8.3 ac/ft		10.5 ac/ft	

1.56 × 64 × 0.57 =
2.46 × 64 × 0.59 =
1.03 × 64 × 0.56 =
1.75 × 64 × 0.58 =

~~U.S. Department of Agriculture~~
~~Soil Conservation Service~~

~~IN-ENG-10~~
~~Rev. 10/89~~
~~File Code 210-11~~

West Lake

WORKSHEET IN-1: RUNOFF CURVE NUMBER (CN)

Client LARE Tom Henny (Cedar Lake) Practice and ID Project No. 03-01-01

Whitley/Noble County ~~Soil and Water Conservation District, Indiana~~

By W. Stanger Date 10/19/04 Checked by _____ Date _____

COVER TYPE	TREATMENT 1/	HYDROLOGIC CONDITION 2/	CURVE NUMBER (CN) Hydrolocic Soil Group (EFM Table IN-2-2) A	B	C	D	AREA, ACRES	PRODUCT OF CN X ACRES
Row Crops	Straight Row	poor	72	81	88	91		
		good	67	78	85	89		
	Straight Row + CR	poor	71	80	87	90	47.0	3854
		good	64	75	82	85	10.5	788
	Contoured + CR	poor	69	78	83	87		
		good	64	74	81	85		
Small Grain	Straight Row	poor	65	76	84	88		
	Straight Row + CR	good	63	75	83	87		
Pasture or Grassland		poor	68	79	86	89		
		good	39	61	74	80		
Meadow	Not Grazed	--	30	58	71	78		
Woods		poor	45	66	77	83	3.5	231
		good	30	55	70	77		
Farmsteads		--	59	74	82	86	2.0	164
Streets and Roads	Paved w/ Curb	--	98	98	98	98		
	Paved w/ Ditches	1320'x 25' = lane	83	89	92	93	1.0	92
Residential 3/	1/4 acre lots	--	61	75	83	87		
	1/2 acre lots	--	54	70	80	85		
	1 acre lots	--	51	68	79	84		
Other (Specify)								
					TOTALS		64 ACRES	5129

1/ Crop residue cover (CR) applies if residue is on at least 5% of the surface throughout the year.
2/ See EFM Table 2-3 for definitions.
3/ Includes subdivision streets and driveways.

Weighted CN = $\frac{\text{Product Total}}{\text{Total Acres}}$ = $\frac{5129}{64}$; Use CN = 80.1

(Do not use less than CN 60 without approval of area engineer)

JFNew

JOB

SHEET NO. OF

CALCULATED BY DATE

CHECKED BY DATE

SCALE

Hydrologic Soil Groups - West Lake / East Lake

Noble	MrB2	Morley	C
	BlA	Blount	C
	Pe	Pewamo	C/D
Whitley	MsC3	Morley	C
	Wc	Wallkill	C/D
	Pw	Pewamo	C/D
	MxC3	Morley	C
	RcB	Rawson	B
	Co	Coesse	C/D
	GsB2	Glynwood	C
	BmB2	Blount	C
	RcC	Rawson	B
	HbA	Hoskins	C
	BmA	Blount	C
	GtB3	Glynwood	C
	MvB2	Morley	C
	HeG	Hennepin	B

West Lake

Watershed slope $Y = \frac{100\,CI}{A} = \frac{100(\cancel{10750}\ 9250 \times 10)}{\cancel{78}\ 64 \times 43560} = \frac{\cancel{10750000}\ 9250000}{\cancel{3399680}\ 2787840} = \cancel{3.16\%}\ 3.3$

Contour - 930	600	
940	1300	
950	1600	
960	1150	
970	2000	
980	2700	1600
990	1400	1000
	10750	
	-1500	
	9250	

B

JFNew

JOB Surface Acreage Calculations

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

#1		#2	
928 = 31	31	928 = 0	0
930 = 172	203	930 = 0	0
931 = 98	301	931 = 48	48
932 = 115	416	932 = 95	143
933 = 132	548	933 = 63	206
934 = 121	669	934 = 106	312

#3		#4		#5	
		922 = 58	58	922 =	262
924 = 233	233	924 = 158	158	924 =	273
926 = 384	384	926 = 249	249	926 =	393
928 = 455	455	928 = 330	330	928 =	481
930 = 682	682	930 = 393	393	930 =	504
931 = 43	725	931 = 31	424	931 =	558
932 = 42	767	932 = 36	460	932 =	583
933 = 33	800	933 = 40	500	933 =	620
934 = 23	823	934 = 61	561	934 =	651

Totals

922	= 320	÷ 100	= 3.2 sq in	× 1600 sq ft / IN / 43560 sq ft	0.12 Ac
924	= 664	÷ 100	= 6.64	× 1600 =	0.24 Ac
926	= 1026	÷ 100	= 10.26	× 1600 =	0.38
928	= 1277	÷ 100	= 12.77	× 1600 =	0.47
930	= 1792	÷ 100	= 17.92	× 1600 =	0.66
931	= 2036	÷ 100	= 20.36	× 1600 =	0.75
932	= 2369	÷ 100	= 23.69	× 1600 =	0.87
933	= 2674	÷ 100	= 26.74	× 1600 =	0.98
934	= 3016	÷ 100	= 30.16	× 1600 =	1.1

AVAILABLE STORAGE

Elev.	Surf. Area	Flooded Acres	Average Acres	Interval Ft.	Interval Storage Ac. Ft.	Accum. Storage Ac. Ft.
934	29.9	1.1				0
			1.05	1	1.05	
933	26.4	1.0				1.05
			0.95	1	0.95	
932	23.4	0.9				2.0
			0.80	1	0.80	
931	20.2	0.7				2.8
			0.65	1	0.65	
930	17.6	0.6				3.45
			0.55	2	1.1	
928	12.8	0.5				4.55
			0.45	2	0.9	
926	10.3	0.4				5.45
			0.3	2	0.6	
924	6.6	0.2				6.05
			0.15	2	0.3	
922	3.2	0.1				6.35

TRIAL STORAGE SURVEY DATA

128 Top-311

0+00	936.0	0	0			
0+40	926.0	10.0	15.5	7.75	40	310
0+60	924.0	12.0	21.3	18.4	20	368
0+74	921.0	15.0	31.7	26.5	14	371
1+58	936.0	0	0	15.85	84	1331

2380
476
2856

20% Settlement

Top of fill: ____ ft.
Width: ____ ft.
Side slopes: ____
Min. freeboard: ____ ft.
Max. water depth: ____ ft.
Top of fill — emerg. el.: ____ ft.
Min. spwy. width: ____ ft.
Min. spwy. el.: ____
Max. spwy. el.: ____
Min. spwy. inlet invert el.: ____
Min. spwy. outlet invert el.: ____

Seepage control adequate (yes) (no): ____
Seepage control adequate (yes) (no): ____
Pipe installation adequate (yes) (no): ____
Pipe installation adequate (yes; (no): ____

Specifications for Pond (Code

17

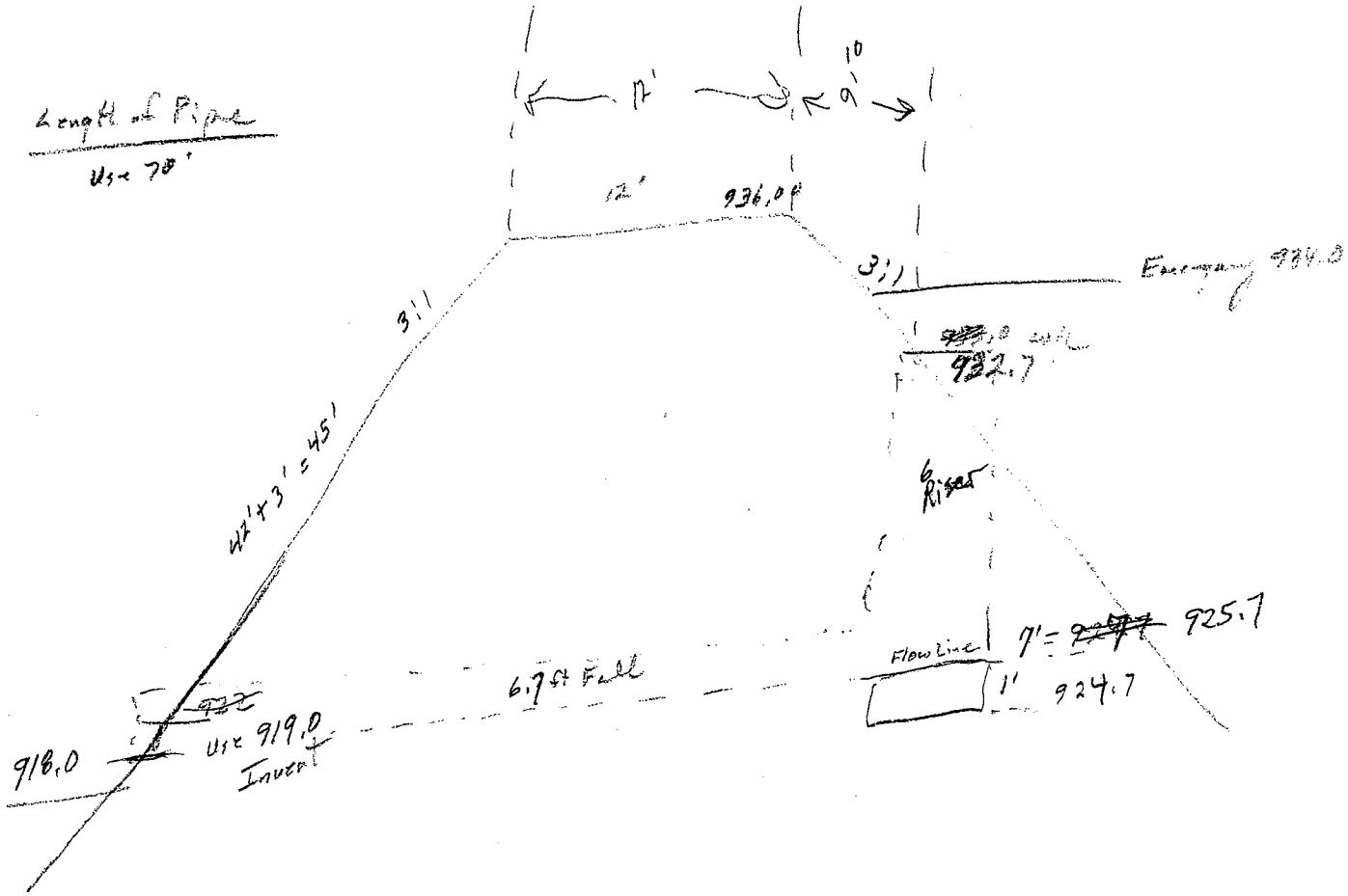
IN-ENG 25 2(2) Rev. 6-81

Head on Pipe

Principal Spillway outlet flow 921.0 + 1.5' for 0.6D = 922.5

Elv. Emergency Spillway 934.0
Elv. 0.6 D (30) above invert 922.5
14.5 Head

Length of Pipe
Use 70'



"n" = 0.025 = Critical Slope 0.11 (68 cfs) x 70' of Pipe = 7.7' Fall
Pipe Slope 6.7' is less than 7.7' or critical Slope
Barrel Pipe will run full

10yr 77cfs X .84 = 64cfs

.08

JFNew

JOB

SHEET NO. OF

CALCULATED BY DATE

CHECKED BY DATE

SCALE

Stone Calculations

Apron – 1.3' D X 6' X 20' = 156 cu.ft

Chute – 1.3' D X 11' X 20' = 286 cu.ft.

Entrance – 1.3' D X 4.5' X 20' = 117 cu.ft.

Keyway – 3.5' D X 3' W X 20' = 241 cu.ft.

Total 800 cu.ft X 110 lbs/cu.ft = 88,000 lbs or 44 Ton

44 Ton X 5 = 220 Tons plus 10% = 240 Ton

Filter Fabric = ???? Since we have Keyway

JFNew

JOB Little Cedar Lake – Pond Project No. 03-01-0

SHEET NO. _____ OF _____

CALCULATED BY W. Stanger DATE 3-1-05

CHECKED BY _____ DATE _____

SCALE _____

Cost Estimate

	Quanity	Cost Each	Total Cost
1. Earth moving			
Excavation – Cutoff Trench	200 cu. yd.	4.00	$ 800.00
Fill – Dam	2856 cu. yds	2.50	7140.00
2. Clearing / Brush Removal	0.75 ac	4000.00	3000.00
3. Rip-Rap			
Outlet Protection – Installed	20 Ton	30.00	600.00
Riser	3 Ton	25.00	75.00
4. Seeding, Fertilizer, mulch	0.7 ac	1000.00	600.00
5. Installation of Principal Spillway	Job	1000.00	1000.00
6. Principal Spillway – 30" Barrel, 48" Riser Pond Kit (Quote – Culvert Plus)			5200.00
	Sub-Total		$ 18,415.00
		10%	1742.00
	Total		$ 19,157.00

JFNew

JOB Little Cedar – Tom Henney Property

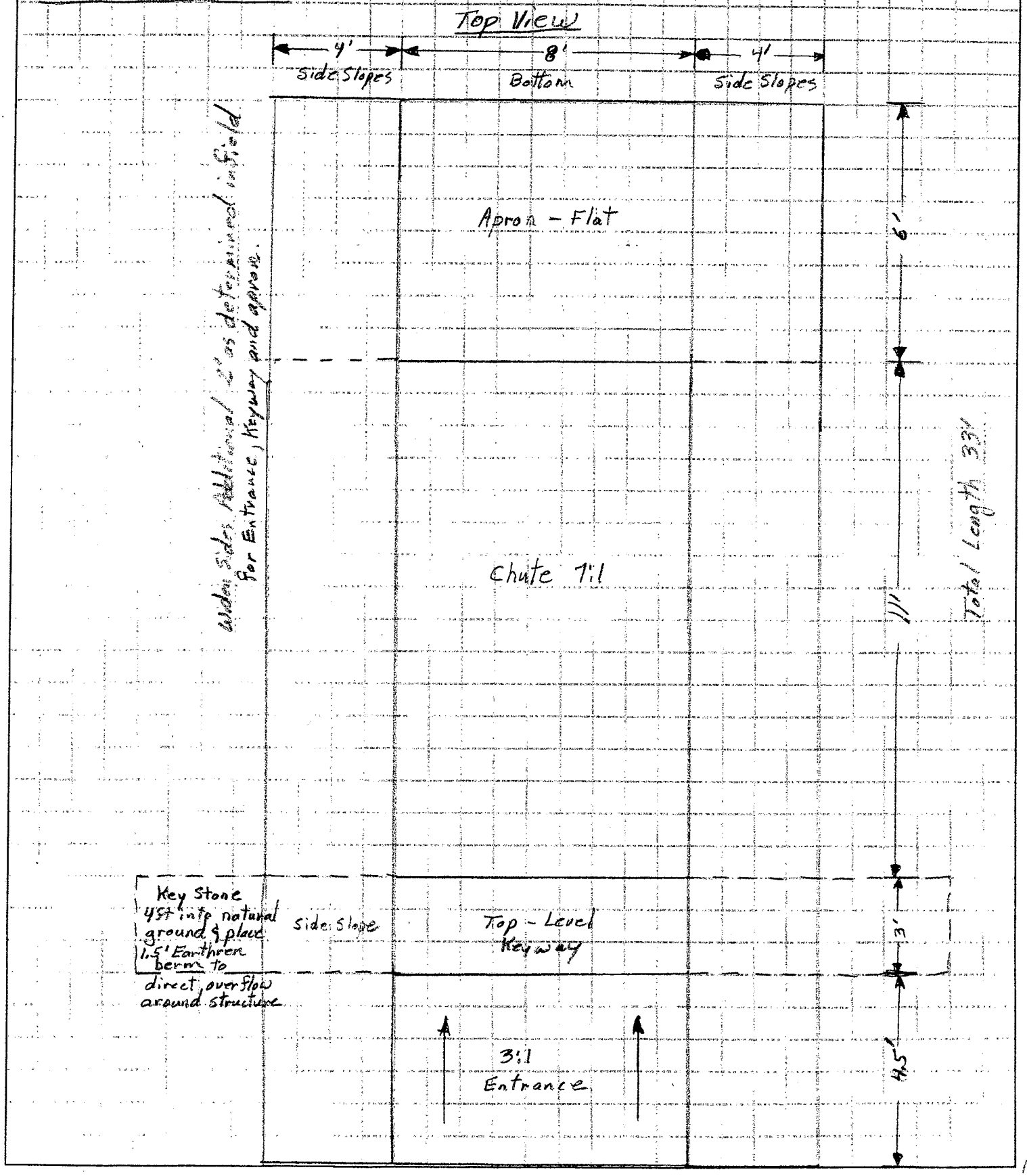
SHEET NO. 2 OF 3

CALCULATED BY W. Stanger DATE 1/21/2005

CHECKED BY DATE

SCALE Not to Scale

Rock Grade Structures – Check Dams



(5)

Rock Chute
Little Cedar Lake - LARE
Tom Henney Property
Whitley County, Indiana
Project No. 0301-123

U.S. Department of Agriculture
Natural Resources Conservation Service

IN-ENG-36Q
Rev. 1/00

ROCK LINED CHUTE QUANTITIES

Landuser: Little Cedar Lake – Tom Kenney Property County: Whitley
Designed by: W. Stanger Date: 3-1-05 Checked by: _____ Date: 3-1-05

Max. Velocity = 8.4 fps
Design Velocity = 8.3 fps

Rock Lined Chute Parameters:

Bottom Width (b):	b =	14	feet
Chute Flow Depth (d):	d =	0.9	feet
Controlled Drop (F):	F =	4	feet
Chute Profile Slope (S):	S =	6	:1
Chute Side Slopes (Z):	Z =	2	:1
Rock Size (d50):	d50 =	9	inches
Rock Lining Thickness (tr):	tr =	18	inches
Rock Density (Dr):	Dr =	110	pcf
Bedding Thickness (tb):	tb =	6	inches
Bedding Density (Db):	Db =	110	pcf

Volume of Rock:

Entrance Section:

d_e = 1.9 feet L_e = 10 feet b_e = 20 feet

Upstream End Volume of Rock/Foot (at tr = 1'):

$V_u = b_e + 2(d_e)(z^2+1)^{0.5} + A^*$ V_u = _____ cf/ft

Downstream End Volume of Rock/Foot (at tr = 1'):

$V_u = b + 2(d_e)(z^2+1)^{0.5} + A^*$ V_d = _____ cf/ft

$V_E = (V_u + V_d)\ (0.5)\ (tr)\ (L_e)$ V_E = _____ cu. ft.

17 Ave W × 1.8' × 10' = 306 cu ft
Slopes 8' × 1.8 × 10' = 144
450 × 110
25 Tons

Chute Section:

d_c = _____ feet L_c = _____ feet

Volume of Rock/Foot (at tr = 1'):

$V_c = b + 2(d_c)(z^2+1)^{0.5} + A^*$ 24' L × 1.8' D × 20' = 864 × 110 = 48 Ton V_c = _____ cf/ft

$V_C = (V_c)\ (tr)\ (F)\ (S^2+1)^{0.5}$ V_C = _____ cu. ft.

Outlet Section:

d_o = _____ feet L_d = _____ feet

Volume of Rock/Foot (at tr = 1'):

$V_o = b + 2(d_o)(z^2+1)^{0.5} + A^*$ 10' × L × 1.8' D × 20' W = V_o = _____ cf/ft

$V_O = (V_o)\ (tr)\ (L_o)$ 360 cu ft × 110 = 20 Ton V_O = _____ cu. ft.

Total Volume of Rock:

$Vr = (V_E) + (V_C) + (V_O)$ Vr = _____ cu. ft.

Quantity of Rock: (Vr) (Dr / 2000) = Total 93 tons Use 100

Volume of Bedding:

Vb = (Vr) (tb/tr) Vb = _____ cu. ft.

Quantity of Bedding: (Vb) (Db/2000) = _____ tons

Quantity of Geotextile Fabric:

gf = (Vr)/(tr) gf = 1000 sq. ft.

Add 10% for laps, ends, waste, etc.

Geotextile fabric required: Gf = (1.1) (gf) = _____ sq. ft.

Gf ÷ 9 = 111 sq. yd.

* correction for fill section (see EFM Figure IN-6-11)

DESIGN DATA

DRAINAGE AREA _____ ACRES, POND AREA _____ ACRES, RATIO DRAINAGE AREA TO POND AREA _____

RUNOFF CURVE NO. _____, AVE. W.S. SLOPE: FLAT, MODERATE, STEEP (CIRCLE ONE)

TOP OF SETTLED FILL ELEV. _____ LOW POINT ON ℄ FILL ELEV. _____

EMERGENCY SPILLWAY

26 cfs from Pond → 25 yr Storm
32 cfs Storm
58 Total

DESIGN Q = _____ AC X _____ CFS/AC = _____ CFS, MAXIMUM VELOCITY 4.0 FT/S

RETARDANCE C, DISCHARGE q 1.5 CFS/FT. L 40 FT

BOTTOM WIDTH b (STABILITY) = $\frac{\text{DESIGN Q}}{\text{DISCHARGE q}}$ = 38.7 FT, Hp = 1.0 FT.

BOTTOM WIDTH b (USED) 40 FT, DISCHARGE q (USED) = $\frac{\text{DESIGN Q}}{\text{b}}$ = 1.45 CFS/FT.

Hp (USED) 1.0 FT. MIN. SLOPE 1 %, MAX. SLOPE 12 %, EXIT SLOPE (ACTUAL) _____

FREEBOARD 1.0 FT., EMERGENCY SPILLWAY CREST ELEV. 921.4

PRINCIPAL SPILLWAY

METHOD I - MINIMUM DETENTION STORAGE

STORAGE = _____ IN. X _____ AC./12 _____ AC. FT., REQUIRED STAGE = $\frac{\text{STORAGE (AC. FT.)}}{\text{POND AREA (AC.)}}$ = _____ FT.

PIPE DIAMETER _____ IN., TYPE _____

IS STAGE SUFFICIENT FOR PIPE FLOW: YES _____ NO _____

METHOD II - SHORTCUT FLOOD ROUTING

DESIGN STORM FREQUENCY _____ YEAR 24 HR., RAINFALL _____ IN., RUNOFF Vr _____ IN.

TYPE PIPE _____

STAGE FT.	Vs AC. FT.	Vs IN.	TABLE A				TABLE B		PIPE DATA				RISER DATA	
			Vs Vr	Qo Qi	Qi CFS	Qo CFS	Qo CFS /AC	Qo CFS	DIA. IN.	WILL PIPE FLOW FULL	ACTUAL HEAD FT.	Qo CFS	DIA. IN.	IS STAGE SUFFICIENT FOR Qo

HOOD INLET OR FLARED INLET DATA

PIPE DIA. SELECTED _____ IN., STAGE PROVIDED _____ FT., STORAGE PROVIDED _____ AC.FT.

PIPE INLET INVERT ELEV. _____, PIPE OUTLET INVERT ELEV. _____, PIPE LENGTH _____ FT.

DROP INLET DATA

PIPE DIA. _____ IN., RISER DIA. _____ IN., STAGE REQUIRED _____ FT.

STORAGE REQUIRED _____ AC.FT., PIPE LENGTH _____ FT., RISER LENGTH _____ FT.

CREST OF RISER ELEV. _____ FT., OUTLET OF PIPE INVERT ELEV. _____ FT.

PHYSICAL DATA

MAXIMUM FILL HEIGHT _____ FT.

MAXIMUM WATER DEPTH _____ FT.

HAZARD CLASSIFICATION _____

DETENTION STRUCTURE DATA

NAME Rock Chute

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date	
Designed	Approved by
Drawn	Title
Checked	Title
Reviewed	Sheet No. Of. / Drawing No. 7

IN-ENG-25 1(2) Rev. 6-81

U.S. Department of Agriculture
Soil Conservation Service

IN-ENG-10A
Rev. 10/89
File Code 210-11

WORKSHEET IN-2: TIME OF CONCENTRATION AND PEAK DISCHARGE

Client Little Cedar Lake - LARE Practice and ID Rock Chute (Riprap)

Project No. 030101 County Soil and Water Conservation District, Indiana

By W. Stanger Date 10/18/04 Checked by _____ Date _____

Estimating Time of Concentration

1. Data:

Rainfall Distribution Type ..... = II

Drainage Area (IN-ENG-10) ..... A = 104 acres

Runoff Curve Number (IN-ENG-10) ..... CN = 80

Watershed Slope ..... Y = 3.8 %

Flow Length ..... l = 4500 feet

2. T_c using l, Y, CN and EFM Figure 2-27 (page 2-41) ..... T_c = 0.9 hours

or using EFM Equation 2-5:

$$T_c = \frac{l^{0.8}(1000/CN - 9)^{0.7}}{1140\ Y^{0.5}} = \frac{(\quad)^{0.8}(\quad)^{0.7}}{1140\ (\quad)^{0.5}} \text{ ..... } T_c = \_\_\_\_\_ \text{ hours}$$

Estimating Peak Discharge:

		Storm #1	Storm #2	Storm #3	
1. Frequency	year	2	5	10	25
2. Rainfall, 24-hour, inches (Figure IN-2-1)	P =	2.7	3.4	3.9	4.5
3. Initial Abstraction ..... (Use CN with EFM Table 2-4, page 2-89)	I_a =	0.5	0.5	0.5	0.5
4. Compute I_a/P ratios	I_a/P =	.185	.147	.128	.111
5. Unit Peak Discharge, cfs/acre/inch ..... (Use T_c and I_a/P with EFM Exhibit IN-2-II)	q_u =	.54	.56	.57	.58
6. Runoff, inches ..... (Use P and CN with EFM Figure 2-26 or Table 2-2)	Q =	1.03	1.56	1.96	2.46
7. Ponding and Swampy Area Adjustment Factor ..... (Use percentage of area and EFM Table IN-2-1)	F_p =				
8. Peak Discharge, cfs ..... (Where $q_p = q_u A Q F_p$)	q_p =	58	91	116	148
		8.9	13.5 AcFt	17.0	

U.S. Department of Agriculture
Soil Conservation Service

IN-ENG-10
Rev. 10/89
File Code 210-11

WORKSHEET IN-1: RUNOFF CURVE NUMBER (CN)

Client _____ Practice and ID _____

_____ County Soil and Water Conservation District, Indiana

By _____ Date _____ Checked by _____ Date _____

COVER TYPE	TREATMENT 1/	HYDROLOGIC CONDITION 2/	CURVE NUMBER (CN) Hydrolocic Soil Group (EFM Table IN-2-2) A	B	C	D	AREA, ACRES	PRODUCT OF CN X ACRES
Row Crops	Straight Row	poor	72	81	88	91		
		good	67	78	85	89		
	Straight Row + CR	poor	71	80	87	90	9.6	720
		good	64	75	82	85	72	5904
	Contoured + CR	poor	69	78	83	87		
		good	64	74	81	85		
Small Grain	Straight Row	poor	65	76	84	88		
	Straight Row + CR	good	63	75	83	87		
Pasture or Grassland		poor	68	79	86	89		
		good	39	61	74	80		
Meadow	Not Grazed	--	30	58	71	78		
Woods		poor	45	66	77	83		
		good	30	55	70	77	13	910
Farmsteads		--	59	74	82	86	3 6	222 492
Streets and Roads	Paved w/ Curb	--	98	98	98	98		
	Paved w/ Ditches	--	83	89	92	93		
Residential 3/	1/4 acre lots	--	61	75	83	87		
	1/2 acre lots	--	54	70	80	85		
	1 acre lots	--	51	68	79	84		
Other (Specify)								
						TOTALS	1036 ACRES	8248

1/ Crop residue cover (CR) applies if residue is on at least 5% of the surface throughout the year.
2/ See EFM Table 2-3 for definitions.
3/ Includes subdivision streets and driveways.

$$\text{Weighted CN} = \frac{\text{Product Total}}{\text{Total Acres}} = 79.6 \text{; Use CN} = 80$$

(Do not use less than CN 60 without approval of area engineer)

9

JFNew

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Hydrologic Soils Group – East Lake – South W/S

MxC3	C
BmB2	
GsB2	
RcB	
Co	
RcB	
GtB3	
Pw	
BmA	
MxB2	

Watershed Slope

Contour	Length
990	600
980	1500
970	3300
960	4700
950	3200
940	2600
930	850
Total	17,250

$$Y = \frac{100 \cdot CI}{A} = \frac{100(17250 \times 10)}{104 \times 43560} = \frac{17250000}{4530240} = 3.8\%$$

JFNew

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

#1

		Accumulated
924	337	337
926	113	450
928	120	570
930	86	656
932	92	748
934	93	841

#2

		Accumulated
924	29	29
926	312	341
928	217	558
930	159	717
932	117	834
934	134	968

#3

924	0	0
926	50	50
928	347	397
930	199	596
932	145	741
934	153	894

#4

924	0	0
926	0	0
928	92	92
930	408	500
932	208	708
934	145	853

#5

924	0	0
926	0	0
928	0	0
930	537	537
932	259	796
934	200	996

#6

924	0	0
926	0	0
928	0	0
930	200	200
932	274	474
934	231	705

#7

			Totals		Sq. In	× 1600 sq ft/Sq In / 43560		
924	0	0	924	366	3.66	0.13		
926	0	0	926	841	8.41	0.31		
928	0	0	928	1617	16.17	0.59		
930	13	13	930	3219	32.19	1.18		
932	125	138	932	3722	37.22	1.37	1.52	Estimated
934	100	238	934	5495	54.95	2.02	2.3	Estimated

11

JFNew

JOB Rock Chutes - Little Cedar Lake
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

Cost Estimate

1. Clearing	0.1 ac.	4000/Ac	$400.00
2. Excavation/Backfill Berms	300 cu yds	2.50/cu yd	750.00
3. D_{50} 9" RipRap installed	100 Tons	35.00/Ton	3500.00
4. Filter Fabric installed	111 sq yds		200.00
5. Seeding, mulching & fertilizer	0.25	1000.00/Ac	250.00
			$5100.00
		10%	510
		Total	$5610
6. Additional Stone for Stabilization downstream of Emergency Spillway outlet			1000.00
			$6610.00

Brian Maska

ROCK CHECK DAM DESIGN CRITERIA

LITTLE CEDAR LAKE – HENNEY PROPERTY

*** Required protection for 10 yr-24hr storm event = 153 cfs (with construction of pond)

*** Required protection for 5 yr-24 hr storm event = 127 cfs (with construction of pond)

*** Required protection for 2 yr-24 hr storm event = 69 cfs (with construction of pond)

*** Existing stream capacity at low banks = 105 cfs (high banks = 230 cfs)

*** Approximate stream capacity with "check dams" placed at high bank sites will be 68 cfs or protection for a two year storm event. (includes five dams removing eight foot or half of the existing grade) – Runoff from storm events greater than 2 yr-24 hr will flow into adjacent low areas and enter the stream at another point.

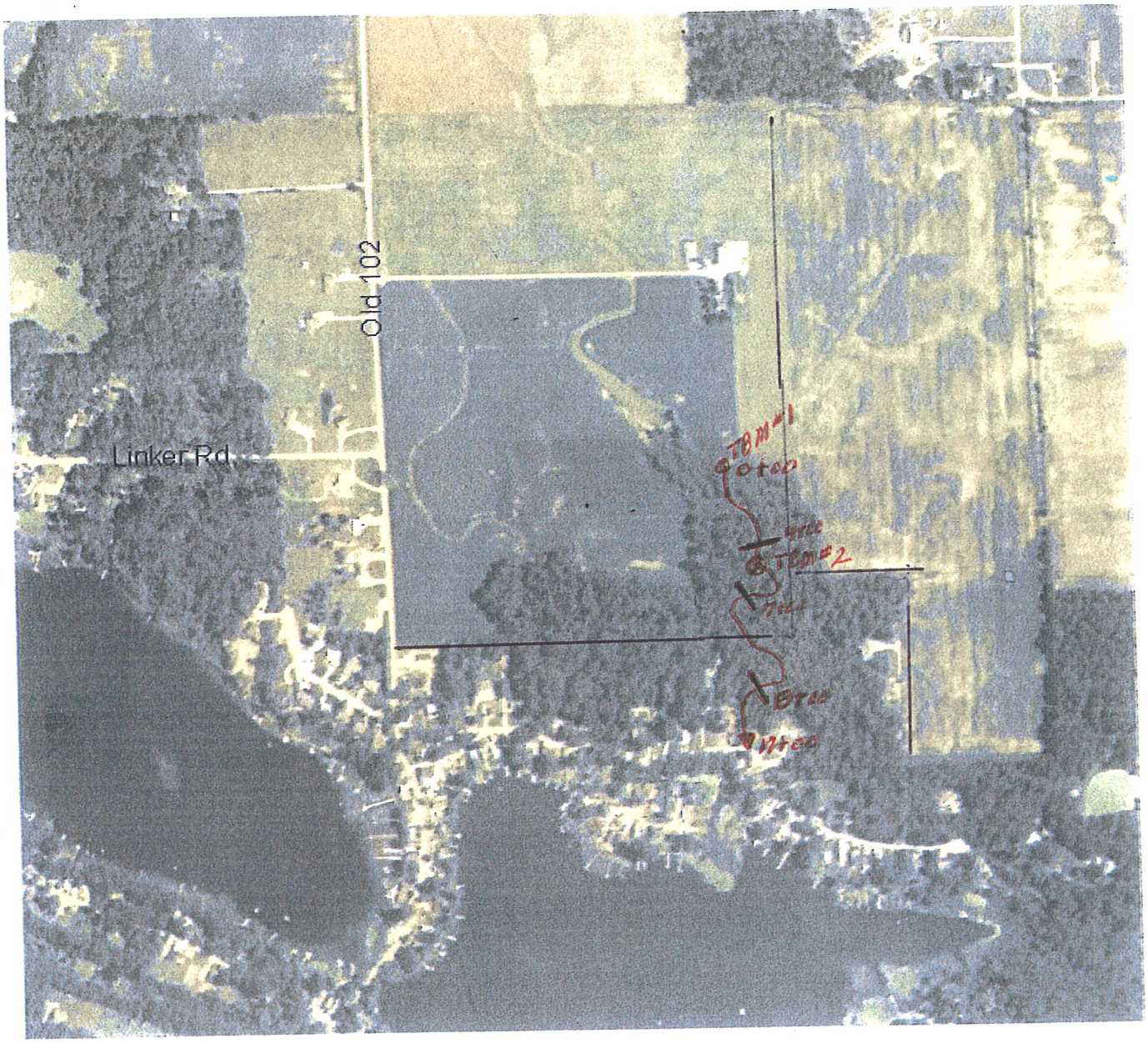
*** Reducing the stream channel grade from 1% to 0.5% will reduce the velocity from approximately 6 fps to 3.4 fps. Allowable velocity for site conditions is about 4 fps.

Assuptions:
1. Installation sites will have to be carefully selected – avoiding low banks
2. Existing stream channel erosion should be less due to the reduction of velocity. However, out of bank flow will be increased significantly into adjacent low areas creating the potential of over bank erosion as the runoff re-enters the stream and scour erosion within low areas. This will have to be monitored.
3. Due to the increased out of bank flow earthen berms should be constructed on each side of the rock dam to direct runoff around the structure into the low areas rather than eroding around the structure.

NOTE: These calculations were completed quickly and may not be totally accurate. However, it gives you an overview of what can be expected. While rock check dams will provide some degree of protection the best alternative for protection would still be dry retention basins reducing the peak discharge in combination with check dams reducing the stream grade.

Size of Stone and dimensions for check dams based on same design criteria as I have designed "rock chute" structures in the past. You and John may want to make adjustments based on your experience with check dams in the field.

2-3

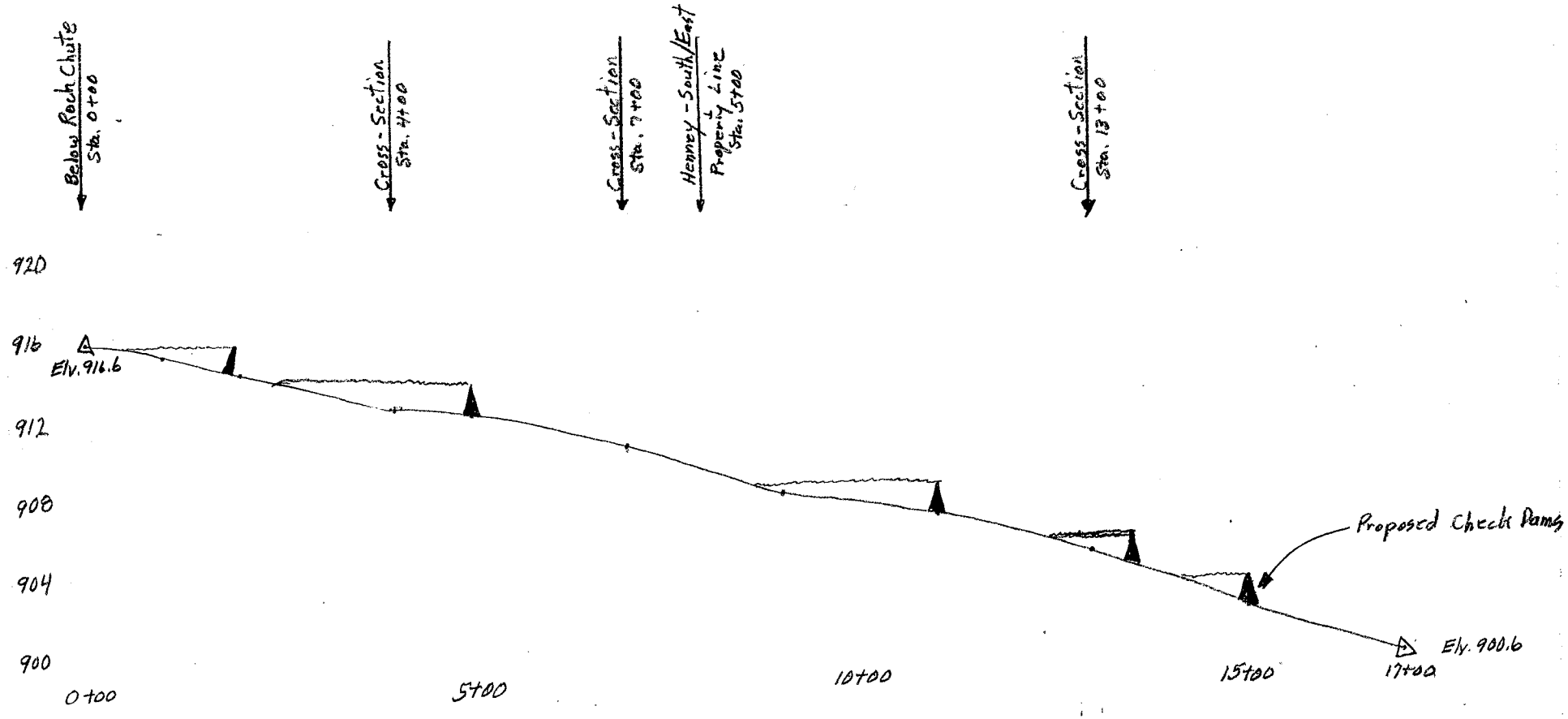


N

Rock Check Dams
Little Cedar Lake - LARE
Whitley County, Indiana
Project No. 030101

Scale 8" = 1 mile
1" = 660'

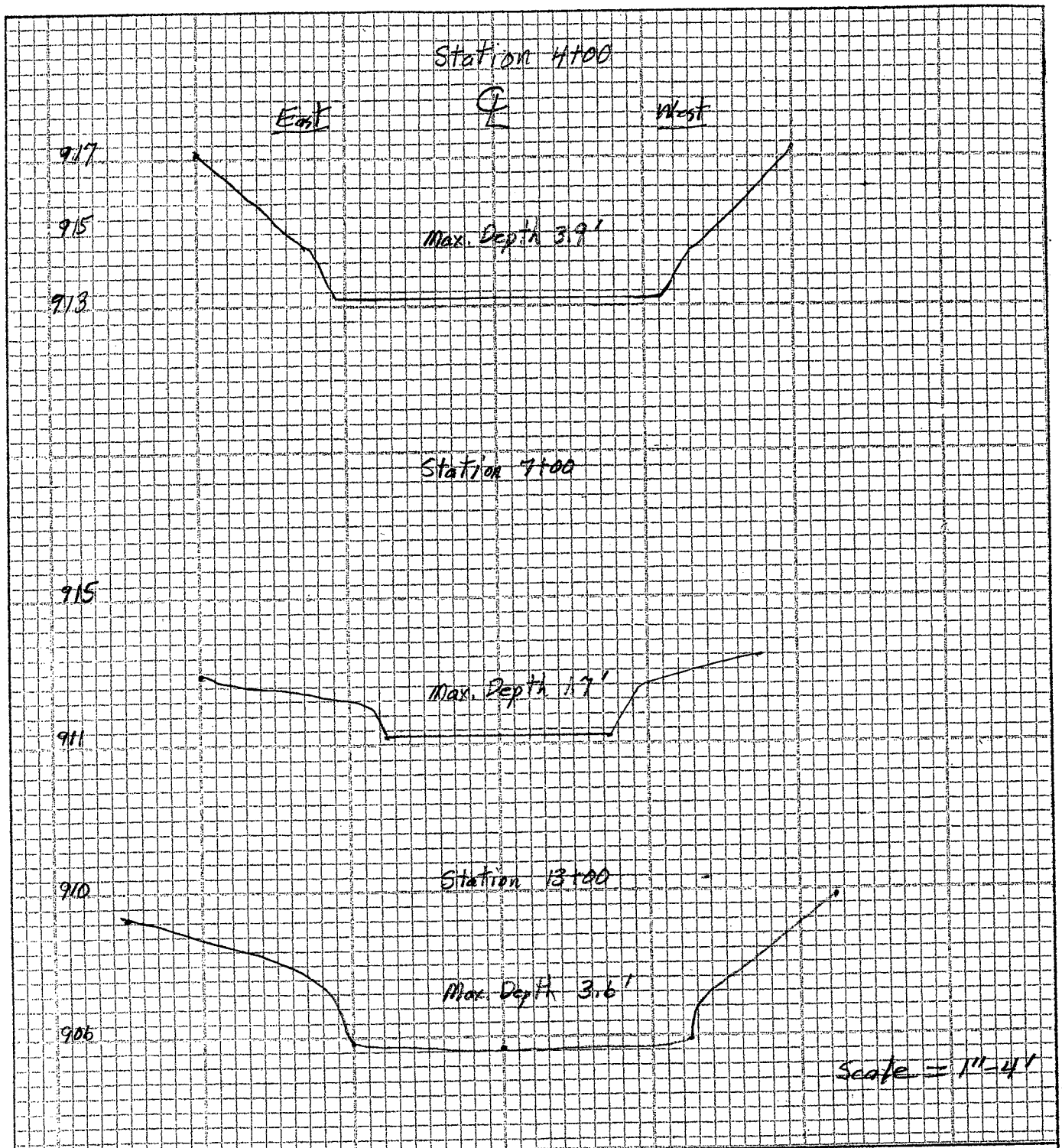
9/29/2004



Profile - Natural Channel
Little Cedar Lake - LARE
Whitley County, Indiana
Project No. 030101

W. Stanger

NOTE: Final location of check dams will be determined in the field base on channel cross-sections.



Typical Cross-Sections - Natural Channel
Little Cedar Lake - LARE
Whitley County, Indiana
Project No. 030101

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Designed W. Stanger	Approved By
Drawn	Title
Traced	Title
Checked	Sheet No of / Drawing No.

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JOB Little Cedar - Tom Henney Property

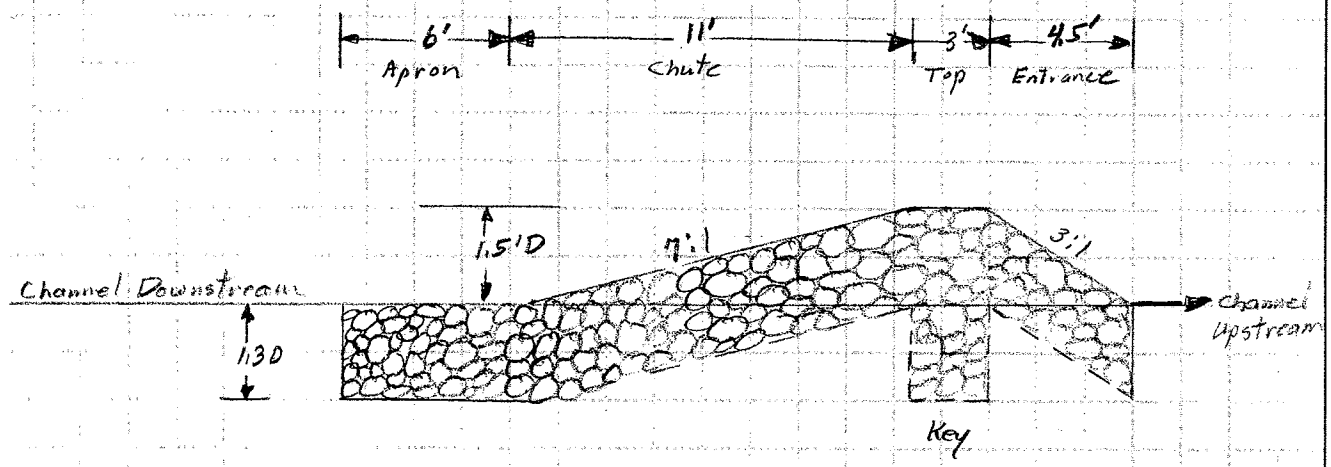
SHEET NO. 1 OF 3

CALCULATED BY _____ DATE _____

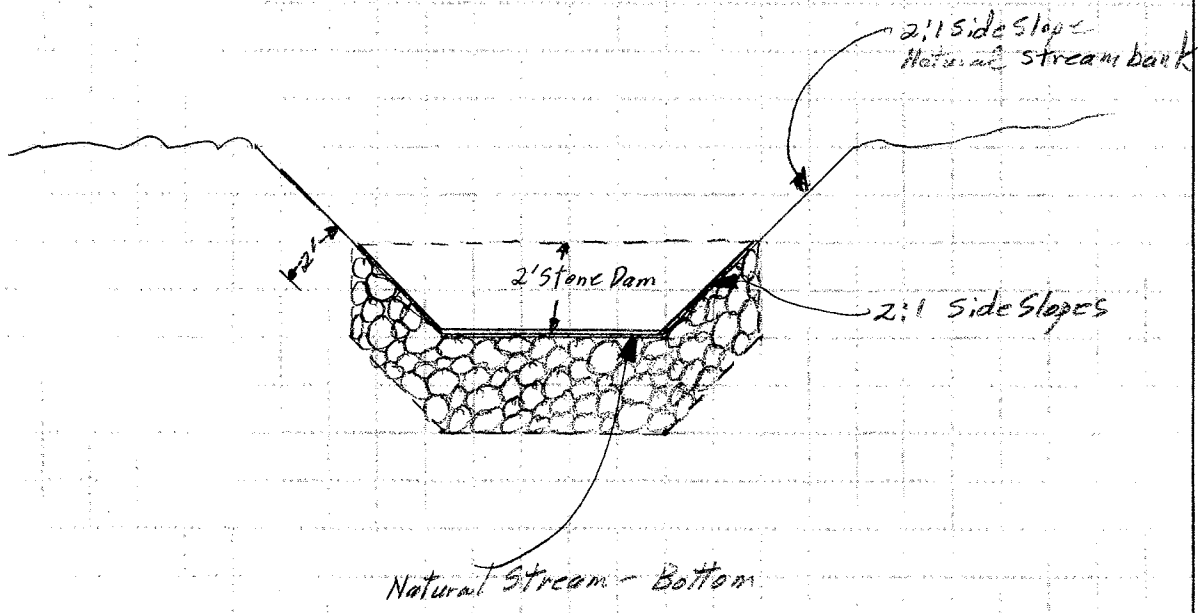
CHECKED BY _____ DATE _____

SCALE _____

Side View



Cross-Section View



JFNew

JOB Little Cedar Lake - LARE

SHEET NO. _____ OF _____

CALCULATED BY W. Stanger DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Rock Check Dams - Cost Estimate

1.	220 Ton D_{50} 8" Limestone Riprap installed (Includes clearing of bank areas)	$40.00/Ton	$8800.00
2.	Excavation for structures, backfilling including berms		2000.00
3.	Debris removal and work access lane		1200.00
			$12000.00

JFN-001 / 2-03

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

APPENDIX B

DESIGN PLANS

JFNew
http://www.jfnew.com

Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Ohio Office
8080 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3446 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982 fax 317-388-1986

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1680 fax 616-847-9970

Wisconsin Office
1402 Pankratz Street, Suite 302
Madison, Wisconsin 53704
608-240-1453

TRI-LAKES

WHITLEY COUNTY INDIANA

LAKE AND RIVER ENHANCEMENT PROJECT

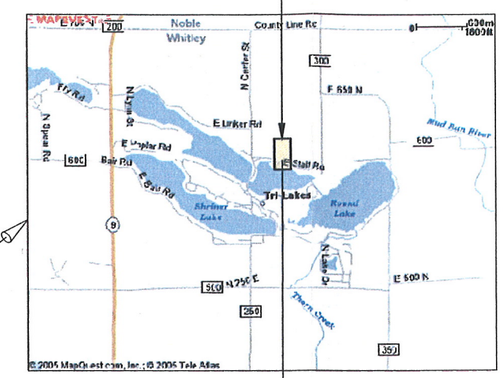
OCTOBER 2005

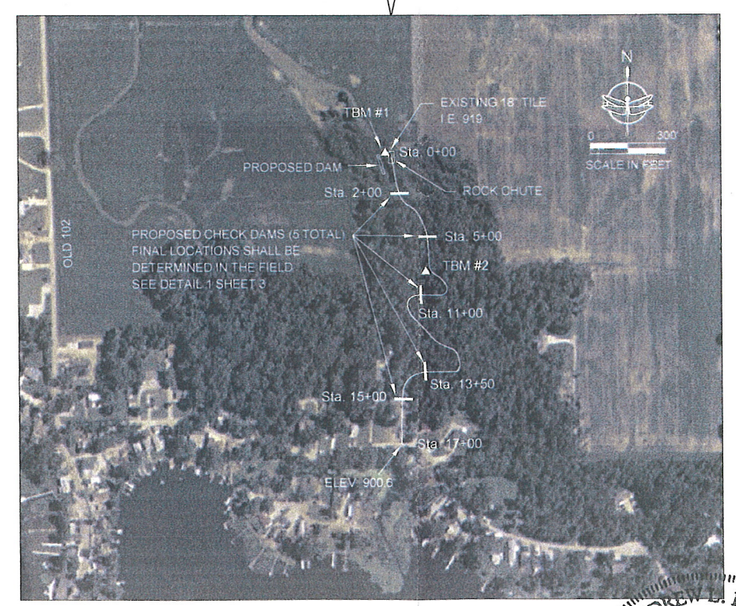
SHEET INDEX

SHEET	DESCRIPTION
1	COVER SHEET
2	SITE PLAN AND PLANTING LIST
3	DETAILS

VICINITY MAP

APPROXIMATE PROJECT LOCATION





PROJECT AREA SHOWING DAM LOCATIONS, ROCK CHUTE LOCATIONS, AND CHECK DAM LOCATIONS

ANDREW L. BENDER
REGISTERED
PE10100192
STATE OF INDIANA
PROFESSIONAL ENGINEER

12/9/05

PERMIT SUBMITTAL DRAWING
NOT APPROVED FOR CONSTRUCTION

Our mission is to provide the highest quality environmental services to our clients while positively impacting the lives of our employees and the conservation of natural resources through prosperity and stewardship.

REVISION

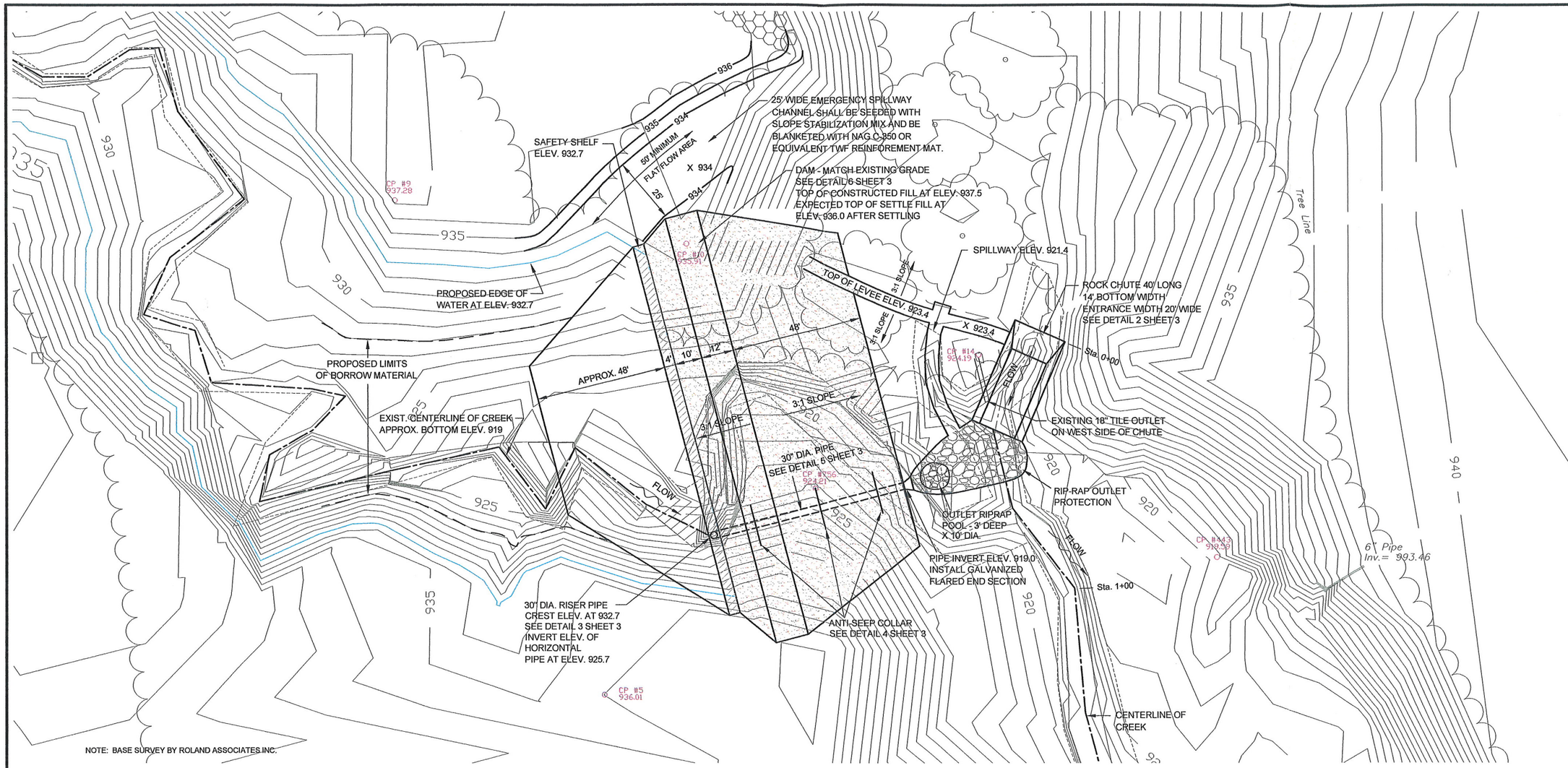
Lake and River Enhancement Project
Tri-Lakes
Cover Sheet

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

DRAWING NO.

1

OF 3



NOTE: BASE SURVEY BY ROLAND ASSOCIATES INC.

Emergent Wetland Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses/ Sedges/Rushes:		
Carex comosa	Bristly Sedge	2.00
Carex lacustris	Common lake sedge	1.50
Carex lurida	Bottlebrush Sedge	4.00
Eleocharis obtusa	Spike Rush	3.00
Juncus effusus	Common Rush	4.00
Leersia orzyoides	Rice Cut Grass	3.00
Scirpus acutus	Hard-stemmed bulrush	6.00
Scirpus pungens	Chairmakers rush	6.00
Scirpus validus	Great bulrush (Softstem)	8.00
		37.50
Temporary Cover:		
Agrostis alba	Redtop	4.00
Avena sativa	Seed oats	360.00
Lolium multiflorum	Annual rye	100.00
		464.00

Botanical Name	Common Name	PLS Ounces/Acre
Forbs:		
Acorus calamus	Sweet Flag	4.00
Asclepias incarnata	Swamp Milkweed	2.00
Alisma spp.	Water Plantain	4.00
Eupatorium maculatum	Spotted Joe Pye Weed	0.50
Hibiscus spp.	Rosemallow, various	2.00
Iris virginica shrevei	Blue Flag Iris	4.00
Lobelia cardinalis	Cardinal flower	0.75
Lobelia siphilitica	Great blue lobelia	0.75
Ludwigia alternifolia	Seedbox	0.50
Mimulus ringens	Monkey Flower	1.00
Peltandra virginica	Arrow Arum	12.00
Pontederia cordata	Pickerel Weed	8.00
Sagittaria latifolia	Broad-Leaf Arrowhead	8.00
Sparganium eurycarpum	Bur Reed	4.00
Verbena hastata	Blue Vervain	2.00
Zizania aquatica	Wild rice	12.00
		65.50

Slope Stabilization Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses:		
Andropogon gerardii	Big bluestem grass	20.00
Andropogon scoparius	Little bluestem grass	32.00
Bouteloua curtipendula	Side-oats grama	5.00
Elymus canadensis	Canada wild rye	18.00
Panicum virgatum	Switch grass	16.00
Sorghastrum nutans	Indian grass	24.00
		115.00
Temporary Cover:		
Agrostis alba	Redtop	16.00
Avena sativa	Seed oats	512.00
Lolium multiflorum	Annual rye	160.00
Phleum pratense	Timothy	64.00
		752.00

NOTES:

Construction Sequence is as Follows:

1) Clear dam footprint and area of rock chute of all trees, shrubs, roots and other herbaceous material.

2) Construct cutoff trench 2-foot deep into good soil material and 8-foot wide along the centerline of the proposed dam beginning at the top of the north slope to the bottom, across the valley, and up to the top of the south slope.

3) Dam shall be constructed in soil lifts at no more than 6 inches in depth and each lift compacted to 95% proctor.

4) Finish slopes of dam for seeding.

5) Construct outfall protection, rock chute and emergency spillway.

ANDREW P. BENDER REGISTERED PE10100192 STATE OF INDIANA PROFESSIONAL ENGINEER

PERMIT SUBMITTAL DRAWING NOT APPROVED FOR CONSTRUCTION

N

0 20'

SCALE IN FEET

JFNew
Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

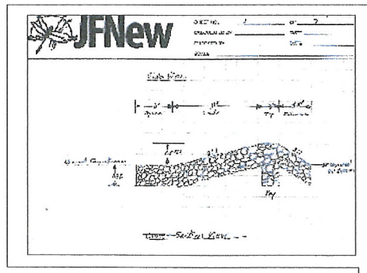
Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1882

REVISION

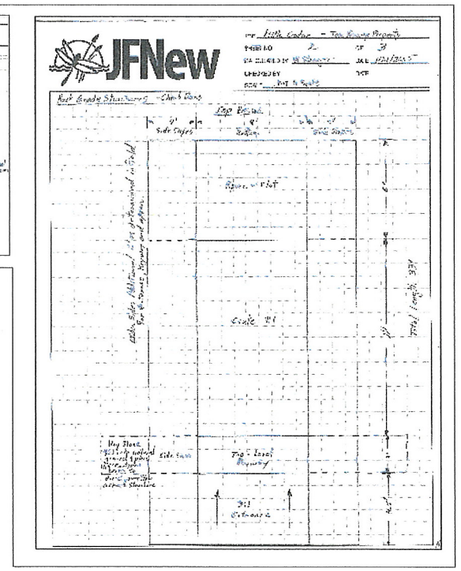
Lake and River Enhancement Project
Tri-Lakes
Site Plan and Planting List

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

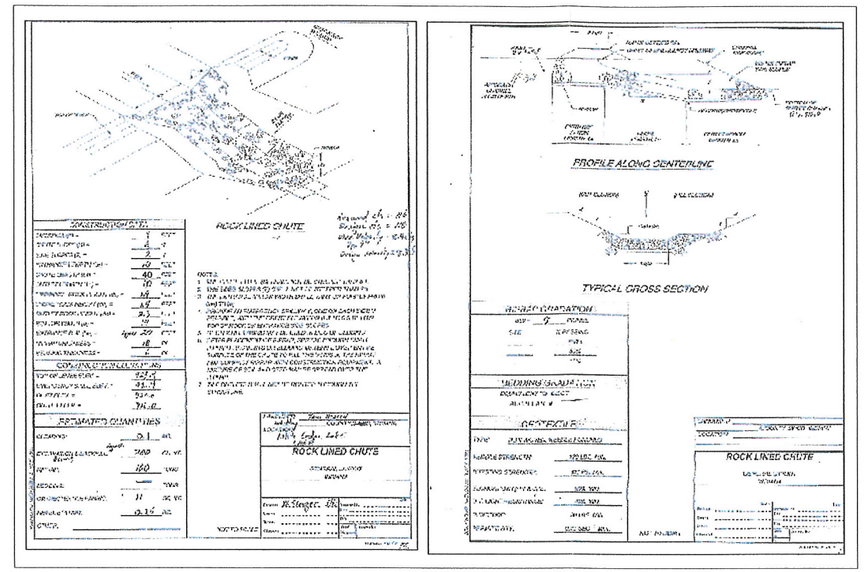
DRAWING NO. 2 OF 3



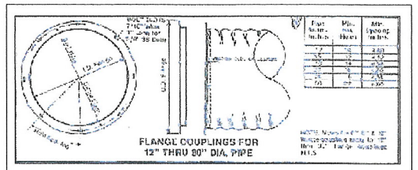
1/3 CHECK DAM DETAILS
NOT TO SCALE



PLAN VIEW

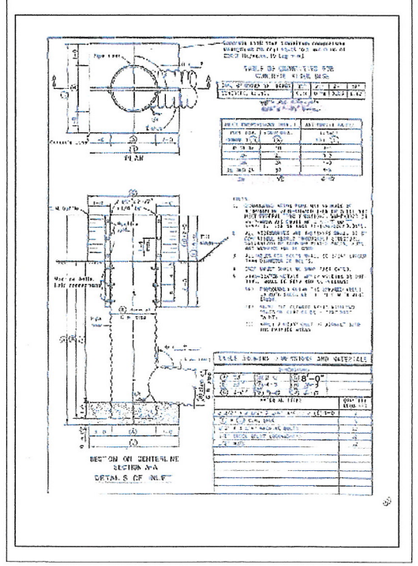


2/3 ROCK CHUTE DETAILS
NOT TO SCALE

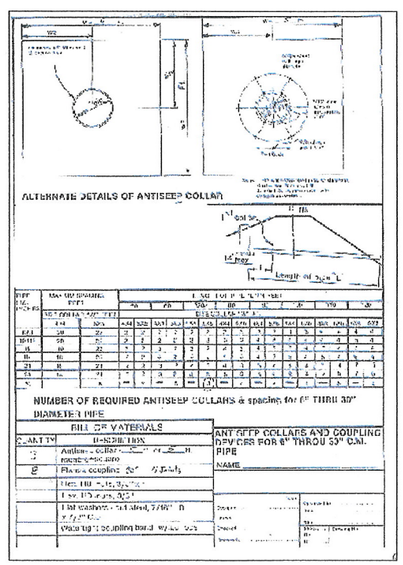


FLANGE COUPLINGS FOR 12" THRU 60" DIA. PIPE

RISER PIPE FLANGE COUPLING DETAIL



3/3 RISER PIPE DETAIL
NOT TO SCALE



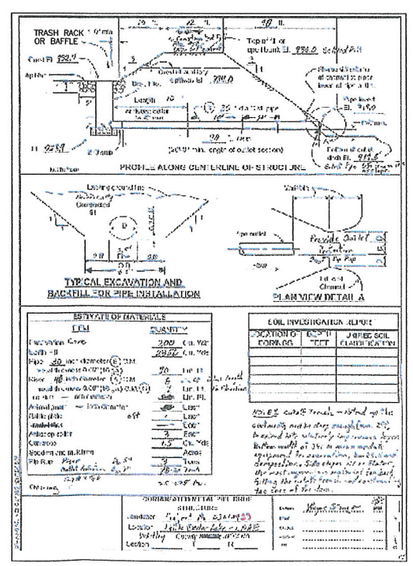
ALTERNATE DETAILS OF ANTISEEP COLLAR

NUMBER OF REQUIRED ANTISEEP COLLARS & spacing for 6" THRU 30" DIAMETER PIPE

BILL OF MATERIALS

ANTISEEP COLLARS AND COUPLING DEVICES FOR 6" THRU 59" DIA. PIPE

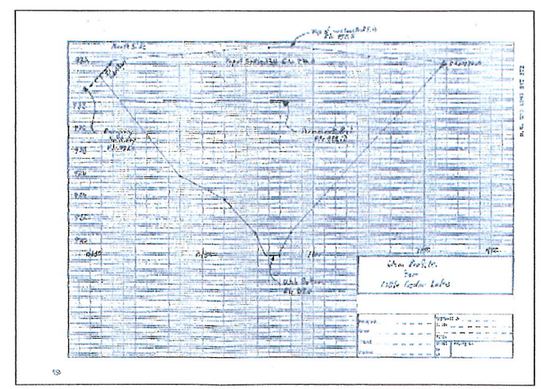
4/3 ANTI-SEEP COLLAR DETAIL
NOT TO SCALE



TYPICAL EXCAVATION AND BACKFILL FOR PIPE INSTALLATION

PLAN VIEW DETAIL A

5/3 DAM OUTLET PIPE DETAIL
NOT TO SCALE



6/3 DAM PROFILE
NOT TO SCALE

JFNew
Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982

REVISION

Lake and River Enhancement Project
Tri-Lakes
Details

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

DRAWING NO.
3
OF 3

ANDREW L. BENDER
REGISTERED
PE10100192
STATE OF INDIANA
PROFESSIONAL ENGINEER

PERMIT SUBMITTAL
NOT APPROVED FOR CONSTRUCTION

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

APPENDIX C

CONSTRUCTION INSPECTION FORMS AND SPECIFICATIONS

Tri-Lakes 03-01-23

CONSTRUCTION INSPECTION FORM

(SEE PLAN SET FOR SPECIFICATIONS)

Name of Inspector: _____

Date and Time of Inspection: _____

Weather and Site Conditions: _____

Other Personnel at Site During Inspection: _____

Estimated Percent of Work Complete: _____

TBM location: _____

TBM Elevation: _____

Part One - Pond Construction

1) Benchmark established, survey and staking (established by whom).

2) Pond and dam footprint cleared of all vegetation.

3) Core trench excavated to depth and width in specifications.

4) Fill obtained for dam from pond site suitable.

5) Fill compacted in core trench and dam in 6" lifts (95% proctor).

6) Proctor density tested at each lift and 10' centers across(length and width of dam).

7) Lateral outfall pipe installed during dam construction.

8) Vertical outfall installed per plans.

9) Final elevations as per plans checked.

10) Rock outfall installed as per plans.

11) Spillway established as per plans.

12) Dam seeded and erosion control materials installed as per plans.

Tri-Lakes 03-01-23

CONSTRUCTION INSPECTION FORM

(SEE PLAN SET FOR SPECIFICATIONS)

Part Two - Rock Chute

TBM location: _____
TBM elevation: _____

1) Bench Mark established.
2) Footprint of Rock Chute cleared of vegetation.
3) Filter blanket or seed installed in footprint of rock chute.
4) Rock installed as per plans.
5) Measurement of final grades and dimensions by whom.

6) Area of disturbance seeded and mulch applied.
   A. Dimensions.

   B. Final crest elevations.

   C. Final outlet elevations.

Part Three - Check Dams

1) Locations established as per requirements in design report.
   By whom. How established.

2) Owner permission obtained to construct if not on Henney property.
3) Areas cleared of Vegetation.
   A. Area 1 Area 2 Area 3

   Area 4 Area 5

4) Key trench into bottom and sides constructed as per plans and specifications.
5) Key trench filled with boulders, voids filled with smaller material up to grading as per specs.

6) Fore and back slope constructed as per plans and specs.
7) Measurement of final structure elevations and dimensions by whom.

	Location (by distance from 18" tile)	**Height of Key**	**Dimensions**
Area #1	_____	_____	_____
Area #2	_____	_____	_____
Area #3	_____	_____	_____
Area #4	_____	_____	_____
Area #5	_____	_____	_____

8) Final seeding and mulching of disturbed areas.

TRI-LAKES DESIGN REPORT
WHITLEY COUNTY, INDIANA

APPENDIX D

PERMIT APPLICATION FORMS

US Army Corps of Engineers Section 404

Indiana Department of Environmental Management Section 401

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-003 Expires December 31, 2004

The public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0170-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)* **J.F. New & Associates, Inc.** **c/o**
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS **708 Roosevelt Road** **Walkerton, IN 46574**
7. APPLICANT'S PHONE NOS. W/ AREA CODE a. Business b. Fax	10. AGENT'S PHONE NOS. W/ AREA CODE **a. Business 574-586-3400** **b. Fax 574-586-3446**

11. STATEMENT OF AUTHORIZATION

I hereby authorize **J.F. New & Associates, Inc.** to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(see instructions)*	14. PROJECT STREET ADDRESS *(if applicable)*
15. LOCATION OF PROJECT COUNTY STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN *(see instructions)*

17. DIRECTIONS TO THE SITE:

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? YES_____ NO_____ IF YES, DESCRIBE THE COMPLETED WORK.

24. Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list)

25. List of Other Certifications or Approvals/Denials Received from other Federal State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Completing the Regional General Permit – IDEM Notification Form

Please read these instructions carefully before completing the notification form. Sections labeled as mandatory must be completed accurately and completely in order for IDEM to process this notification. Failure to complete all mandatory sections of the form can result in the rejection of the notification by IDEM.

DO NOT use this form if your project will impact ANY isolated wetlands. Consult with IDEM staff to determine the correct application form for use with your project.

If you have any questions or are unsure if your project qualifies for or requires this authorization, contact IDEM:

Indiana Department of Environmental Management
Office of Water Quality
Section 401 Water Quality Certification/State Isolated Wetlands Program
P.O. Box 6015
Indianapolis, Indiana 46206-6015

Telephone: (317) 233-8488

Print clearly or type.
Attach additional information on 8.5" x 11" sheets only

Block 1 – Applicant Information

1. **MANDATORY:** Provide the applicant's name, address, and telephone number. Applicants MUST provide a contact name, especially in cases where the application is on behalf of a corporation or similar entity.

2. **OPTIONAL:** Provide the agent's address and telephone information (an agent is anyone representing the applicant on the project, such as an attorney or consultant). Applicants are not required to have an agent. This information should be included if a person other than the applicant is submitting the form and that person is designated as the contact point for questions regarding the proposed project.

Block 2 – Project Location

MANDATORY: Complete all blocks within this section. Most information required in this section can be obtained from the United States Geological Survey (USGS) 7.5-Minute Series Topographic Quadrangle maps, or similar computer desktop mapping software. An address or descriptive location must be provided in order to allow for compliance inspection of the project.

Block 3 – Existing Conditions

1. **MANDATORY:** This section provides information on the types of aquatic resources present on the project site PRIOR TO any proposed impacts. Circle all of the appropriate types of waterbodies and clearly denote the size of that waterbody on the project site. If a project site has more than one wetland, add all the acres of each type wetland together to provide a grand total on the form.

2. For wetlands, acreages and types must be confirmed with a jurisdictional wetland delineation conducted in accordance with the 1987 Corps of Engineers Wetland Delineation Manual. Please attach a copy of this delineation or letter of confirmation from the Corps of Engineers for all projects that will impact wetlands. In addition, a letter from the Corps of Engineers confirming that the wetlands in question are regulated under the Clean Water Act must be provided.

Block 4 – Project Impacts

1. **MANDATORY:** Complete all blocks within this section. Attach additional sheets if needed. Activity description refers to WHAT are you doing – filling a wetland, placing riprap, constructing bridge piers, placing a culvert, for example. Project description refers to WHY are you impacting a waterbody – creating a driveway, stabilizing a streambank, developing a site for commercial use, for example.

2. When calculating stream impact, all areas that are affected by placement of fill, bank armoring, culverting, excavation, or any other activity must be counted. Any proposed project involving the creation of dams or in-channel pools CANNOT use this form.

3. When calculating open water impact, all areas within lakes, rivers, streams and the like must be counted. This includes areas under new bridge piers, beaches, and boat ramps, as examples.

4. The Ordinary High Water Mark means that line on the shore of a waterbody established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, natural destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Signature of Applicant - Statement of Affirmation

MANDATORY: The name and signature must match the name of the applicant on the first page. Notification forms signed by any agent will be returned to the applicant.

NOTE - The listed supplemental information must be provided in order to verify that your project qualifies for the terms and conditions of this regional general permit. Enclose a wetland delineation report for any project that will impact wetlands as a part of the proposed activities.

Section 401 WQC Regional General Permit Notification

State Form 51937 (10-04)
Indiana Department of Environmental Management

INSTRUCTIONS: *1. Read the instruction sheet before filling out this form.*
2. All sections of this two page form must be complete.

FOR IDEM USE ONLY	***Date Rec'd:***	***IDEM ID:***

Applicant Information

Applicant:	Agent:
Contact person:	Contact person:
Address:	Address:
Phone:	Phone:
E-mail:	E-mail:

Project Location

County:		Nearest Town:	
Quad Name:	Township:	Range:	Section:
Project Address:			

Existing Conditions

Wetlands: ☐ YES ☐ NO	Total acreage onsite:
Wetland type: ☐ Emergent ☐ Scrub-shrub ☐ Forested	
Stream: ☐ YES ☐ NO	Stream name:
Open water: ☐ YES ☐ NO	Open water type:

Project Impacts

Activity Description:

Purpose of project:

Acres of wetland impact
Emergent: Scrub/shrub: Forested:

Linear feet of stream impact:	Acres of open water impact:

Riprap below the Ordinary High Water Mark
Volume *(cubic yds. per running ft.)*: Area *(sq. ft.)*:

Signature of Applicant - Statement of Affirmation

I certify that I am familiar with the information contained in this notification and, to the best of my knowledge and belief, such information is true and accurate. I certify that I have the authority to undertake and will undertake the activities as described in this notification. I am aware that there are penalties for submitting false information. I understand that any changes in project design subsequent to IDEM's granting of authorization to discharge to a water of the state are not authorized and I may be subject to civil and criminal penalties for proceeding without proper authorization. I agree to allow representatives of the IDEM to enter and inspect the project site. I understand that the granting of other permits by local, state, or federal agencies does not release me from the requirement of obtaining the authorization requested herein before commencing the project.

Applicant's Signature: _____ **Date:** _____ (mm/dd/yyyy)

Print Name: _____ **Title:** _____

Enclose copies of the following documents (ALL enclosures must be on 8.5" by 11" paper:

- ☐ Location map
- ☐ Drawings of existing site and proposed project
- ☐ At least three photos of site, labeled
- ☐ Copies of all correspondence from the U.S. Army Corps of Engineers
- ☐ Copy of wetland delineation report

Mail this form and attachments to:

Indiana Department of Environmental Management
Office of Water Quality
Section 401 WQC/State Isolated Wetlands Program
P.O. Box 6015
Indianapolis, Indiana 46206-6015

Please note:

1. IDEM will review this form and all attachments for completeness and accuracy. You will be contacted within thirty (30) days of the date of receipt of this form **only** if problems are identified. IDEM may require additional information to verify that the project meets all conditions of the Regional General Permit and the Section 401 WQC. If you are not contacted by IDEM within thirty (30) days of the date of receipt of this form by IDEM, your project is thereby authorized, subject to the terms and conditions of the Section 401 Water Quality Certification and its conditions. **You will not receive a written confirmation of authorization.**

2. Read **all** the terms and conditions of this regional general permit, including all U.S. Army Corps of Engineers and Indiana Department of Environmental Management conditions. Do not submit this form or commence work on the proposed project until you understand and are familiar with the limitations and restrictions of this regional general permit.

3. Consult this webpage for more information: http://www.in.gov/idem/water/planbr/401/rgp02.html