

## APPENDIX B

### Sample Geological Report Forms

ID# \_\_\_\_\_

WASTE WATERTREATMENT SITE GEOLOGICAL EVALUATION  
MISSOURI DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF GEOLOGY AND LAND SURVEY  
BOX 250, ROLLA, MISSOURI 65401 314-368-2160

1. Project \_\_\_\_\_ County \_\_\_\_\_

2. Location 1/4, \_\_\_\_\_ 1/4, \_\_\_\_\_ 1/4, Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, Quad. \_\_\_\_\_

3. Latitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec. Longitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec. \_\_\_\_\_

4. Owner \_\_\_\_\_ Address \_\_\_\_\_

5. Requested by: \_\_\_\_\_  
\_\_\_\_\_

6. Previous Reports: Not Applicable: \_\_\_\_\_  
ID# \_\_\_\_\_ ID# \_\_\_\_\_ ID# \_\_\_\_\_ ID# \_\_\_\_\_ ID# \_\_\_\_\_  
Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_

7. (A) Were plans submitted? \_\_\_\_\_ (B) Was site investigated by NRCS? \_\_\_\_\_

8. Facility Type: mechanical plant , earthen lagoon with discharge , earthen holding basin ,  
land application , marsh system , other

9. Waste Type: animal , human , process/industrial , leachate , other

**General Geology**

10. Date of: a. field visit \_\_\_\_\_, b. soils investigation \_\_\_\_\_

11. Overall geologic limitations: slight , moderate , severe

12. Topography: 0%-4% , 4%-8% , greater than 15%   
On: broad upland , ridgetop , hill slope , narrow ravine , flood plain ,  
alluvial plain , terrace , sinkhole

13. Bedrock: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. Overburden (soil): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

15. Receiving stream classification: gaining ☐, losing ☐, not applicable (no discharge) ☐

16. Collapse potential: slight ☐, moderate ☐, severe ☐

17. Recommended construction procedures: installation of clay pad ☐, compaction ☐, artificial sealing ☐, diversion of subsurface flow ☐, rock excavation ☐, limit excavation depth ☐

18. Determine overburden (soil) properties: particle size analysis ☐, Atterberg limits ☐, standard proctor density ☐, overburden thickness ☐, permeability coefficient: undisturbed ☐, remolded ☐

19. Determine hydrologic conditions: groundwater elevation \_\_\_\_\_, direction of groundwater movement \_\_\_\_\_, 100-year flood level \_\_\_\_\_

20. Notify geologist: before exploration ☐, during construction ☐, after construction ☐, not necessary ☐

21. Remarks:

\*THIS DOCUMENT IS A PRELIMINARY GEOLOGIC REPORT. IT IS NOT A PERMIT. ADDITIONAL DATA MAY BE REQUIRED BY THE DEPARTMENT OF NATURAL RESOURCES PRIOR TO ISSUANCE OF A PERMIT. THIS REPORT IS VALID ONLY AT THE ABOVE LOCATION AND BECOMES INVALID ONE YEAR AFTER THE DATE BELOW.

22. Report by \_\_\_\_\_ Date \_\_\_\_\_

23. CC: \_\_\_\_\_

24. Upper \_\_\_\_\_, Lower \_\_\_\_\_

ID# \_\_\_\_\_

LOSING/GAINING STREAM CLASSIFICATION SYSTEM  
 MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 DIVISION OF GEOLOGY AND LAND SURVEY  
 BOX 250, ROLLA, MISSOURI 65401 314-368-2160

A. Project \_\_\_\_\_

County \_\_\_\_\_

Stream: \_\_\_\_\_

FROM Location \_\_\_\_\_ Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, Quad. \_\_\_\_\_

Latitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec. Longitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec.

Previous Classification:

ID# \_\_\_\_\_ ID# \_\_\_\_\_ ID# \_\_\_\_\_ ID# \_\_\_\_\_

Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_ Date: \_\_\_\_\_

**1. Valley Development:**

A. Cross Section

V shaped 0

U shaped 1

B. Longitudinal Section

Consistent gradient 0

Erratic or variable gradient 1

C. Channel

One flow path well defined 0

Braided, flat-bottomed, rectangular 1

None or sinkholes 4

D. Vegetation in channel

Limited or willows 0

Dense brush, trees, or weeds 1

E. Sorting/stratification of alluvium

Well-sorted persistent stratification 0

Poorly developed or none 1

**2. Bedrock:**

A. Low permeability 0

B. Low permeability below thin weathered zone 1

C. Persistent open fractures and/or moderate to high permeability 2

D. Karst 4

**3. Flow Characteristics:**

A. Continuous flow, constant, or increasing 0

B. No flow, intermittent flow, or pools 1

C. Continuous flow but is obviously decreasing 2

D. Obvious flow loss 4

E. No flow when adjoining streams have flow 4

**4. Depths of Potentiometric Surface:**

- A. Less than 20 ft 0
- B. Greater than or equal to 20 ft 4

**5. Structural Deformation (Faults or Folds):**

- A. Unknown or none within one mile 0
- B. Known to occur between 1/2 mile and one mile 1
- C. Known to occur less than 1/2 mile 2

**6. Water Tracing Results:**

- A. Water remains in channel 0
- B. Water loss resurges in alluvial spring(s) or seep(s) downstream in some valley 3
- C. Water loss resurges in bedrock spring(s) downstream in some valley or in another watershed 6

**7. Stream Gaging (Flow should be at least 0.2 CFS):**

- A. Gaining during low flow conditions 0
- B. Flow decreases less than 30% 0
- C. Flow decreases more than 30% 6

TOTAL \_\_\_\_\_  
 GAINING: 0-5 \_\_\_\_\_  
 LOSING: 6-34 \_\_\_\_\_

**B. Remarks:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Investigator: \_\_\_\_\_ Date: \_\_\_\_\_ Field Investigations: \_\_\_\_\_ Dye Trace \_\_\_\_\_  
 Upper \_\_\_\_\_ Lower \_\_\_\_\_

ID# \_\_\_\_\_

ASSESSMENT OF EARTHEN LAGOON COLLAPSE POTENTIAL  
 MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 DIVISION OF GEOLOGY AND LAND SURVEY  
 BOX 250, ROLLA, MISSOURI 65401 314-368-2160

Project \_\_\_\_\_ County \_\_\_\_\_

Location \_\_\_\_\_ Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, Quad. \_\_\_\_\_

Latitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec. Longitude: \_\_\_\_\_ Deg, \_\_\_\_\_ Min, \_\_\_\_\_ Sec.

**1. Stream Classification:**

- q Gaining 0
- q Losing 4

**2. Depth to Water Table:**

- q ≤ 50 ft 0
- q > 50 ft 4

**3. Residuum Thickness:**

- q < 10 ft 0
- q ≥ 10 and < 40 ft 1
- q ≥ 40 and < 100 ft 2
- q ≥ 100 ft 4

**4. Predominant Characteristics of the Upper 20 ft of Bedrock and/or Superficial Material:**

- q Solution-free bedrock, glacial drift, or alluvium with gaining conditions. 0
- q Bedrock with permeable weathered zone 10 ft thick, or minor solution features and/or associated residuum 2
- q Bedrock with significant solution voids > 10 ft below bedrock surface, and/or residuum with relict bedrock structure, or alluvium with losing conditions 4

**5. Proximity of Nearest Sinkhole to the Lagoon:**

- q ≥ 1 mile distant 0
- q ≥ 1/2 mile but < 1 mile distant 1
- q ≥ 1/4 mile but < 1/2 mile distant 4
- q ≥ 500 ft but < 1/4 mile distant 6
- q Within 500 ft 8

**6. Proximity of Nearest Underground Opening to the Lagoon:**

☐ No evidence $\geq$ 1/2 mile distant	0
☐ $\geq$ 1/4 but $<$ 1/2 mile distant	2
☐ $\geq$ 500 ft but $<$ 1/4 mile distant	4
☐ $<$ 500 ft but not beneath site	8
☐ Beneath the site	16

**7. Surface Area of the Lagoon:**

☐ $\leq$ 1 acre	1
☐ $>$ 1 acre and $\leq$ 2 acres	2
☐ $>$ 2 acres and $\leq$ 3 acres	3
☐ $>$ 3 acres and $\leq$ 4 acres	4
☐ $>$ 4 acres	5

**8. Maximum Operating Depth of Liquids:**

☐ $\leq$ 5 ft	1
☐ $>$ 5 ft and $\leq$ 10 ft	2
☐ $>$ 10 ft and $\leq$ 15 ft	3
☐ $>$ 15 ft and $\leq$ 20 ft	4
☐ $>$ 20 ft	5

TOTAL \_\_\_\_\_

Slight Potential: Total 2 to 9

Moderate 9-22

Severe  $>$  22

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Investigator: \_\_\_\_\_ Date: \_\_\_\_\_