

SUB-WATERSHED 10L
(RHOADS CREEK)

Sub-watershed 10L (Rhoads Creek)

General Discussion

This sub-watershed encompasses 27.2 square miles or 17,384 acres of land which is approximately 19.53% of the total study area. It is drained by 29.9 miles of tributaries (12.7% of the total length of all watershed tributaries) and contains 675 acres of ponds and lakes (3.88% of total subwatershed area). Most prominent among the lakes are Lake Stonycreek and Indian Lake. Commonwealth records indicate 43 surface mines and 7 deep mines in this area. We find 20 strip mines of which 11 are flowing and 20 deep mine openings of which 8 are flowing.

The following information gives the averages of the sampling station designated as SC10L1, located at the mouth of Rhoads Creek and shown on drawing 7119-6. The percentage that this station contributes in pollution load and flow to the total pollution load and flow as measured at Monitoring Station SC1 on Stony Creek also is included.

	<u>Averages</u>	<u>Percent of Total Watershed</u>
pH	5.8	
Net Cold Acidity	355.80 PPD	1.14%
Net Hot Acidity	286.80 PPD	.26%
Ferrous Iron	38.50 PPD	5.02%
Total Iron	117.25 PPD	2.62%
Sulfate	26,608 PPD	13.81%
Hardness	33,404 PPD	16.22%
Flow	32,348,160 GPD	20.27%

The following plates show the locations of all deep mine openings and strip mines where they exist within this sub-watershed, as well as the location of all sampling stations.

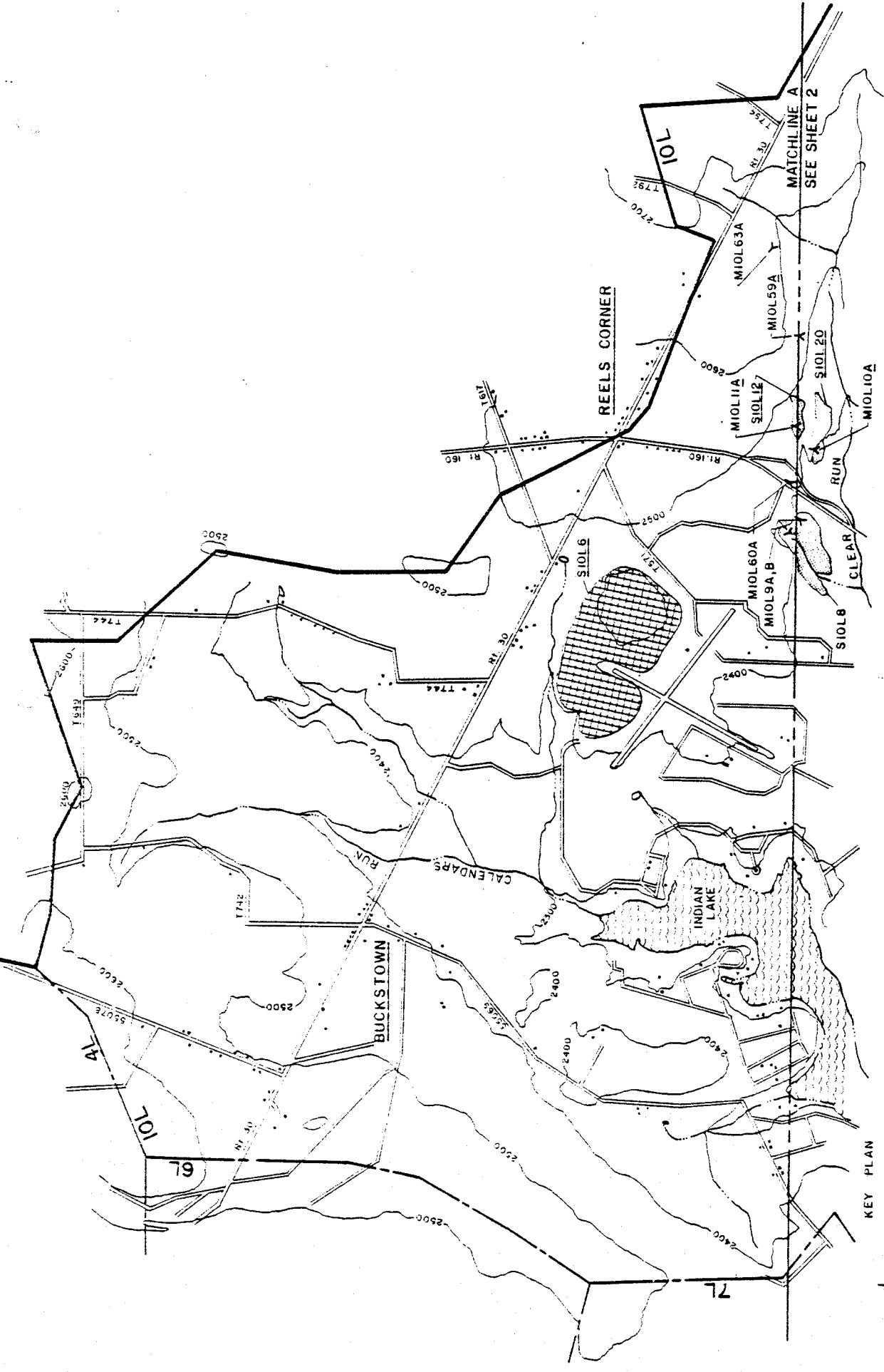
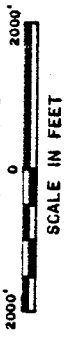
Deep Mines

The Commonwealth records indicate that there are 7 deep mines in this sub-watershed. Our field investigations locate 20 deep mine openings of which 8 are flowing. Table 37 lists the abandoned deep mines within the sub-watershed with the following information: name of mine or operator if known, available mine maps, acres and seam mined, mine opening designation, openings with flows, the estimated elevation of openings and head in feet, which is the difference in coal elevations on an up-dip mine.

Table 38 gives the averages of the abandoned deep mine flows. Directly under the averages are the percentages of flows and pollution loads that each contributes to the pollution load of the sub-watershed as measured at Sampling Station SC10L1 (Rhoads Creek). The averages, taken at mine openings, are added together where more than one opening of a mine complex has a flow.

MAP OF SUB-WATERSHED 10L

(RHOADS CREEK)
SHEET 1 of 3

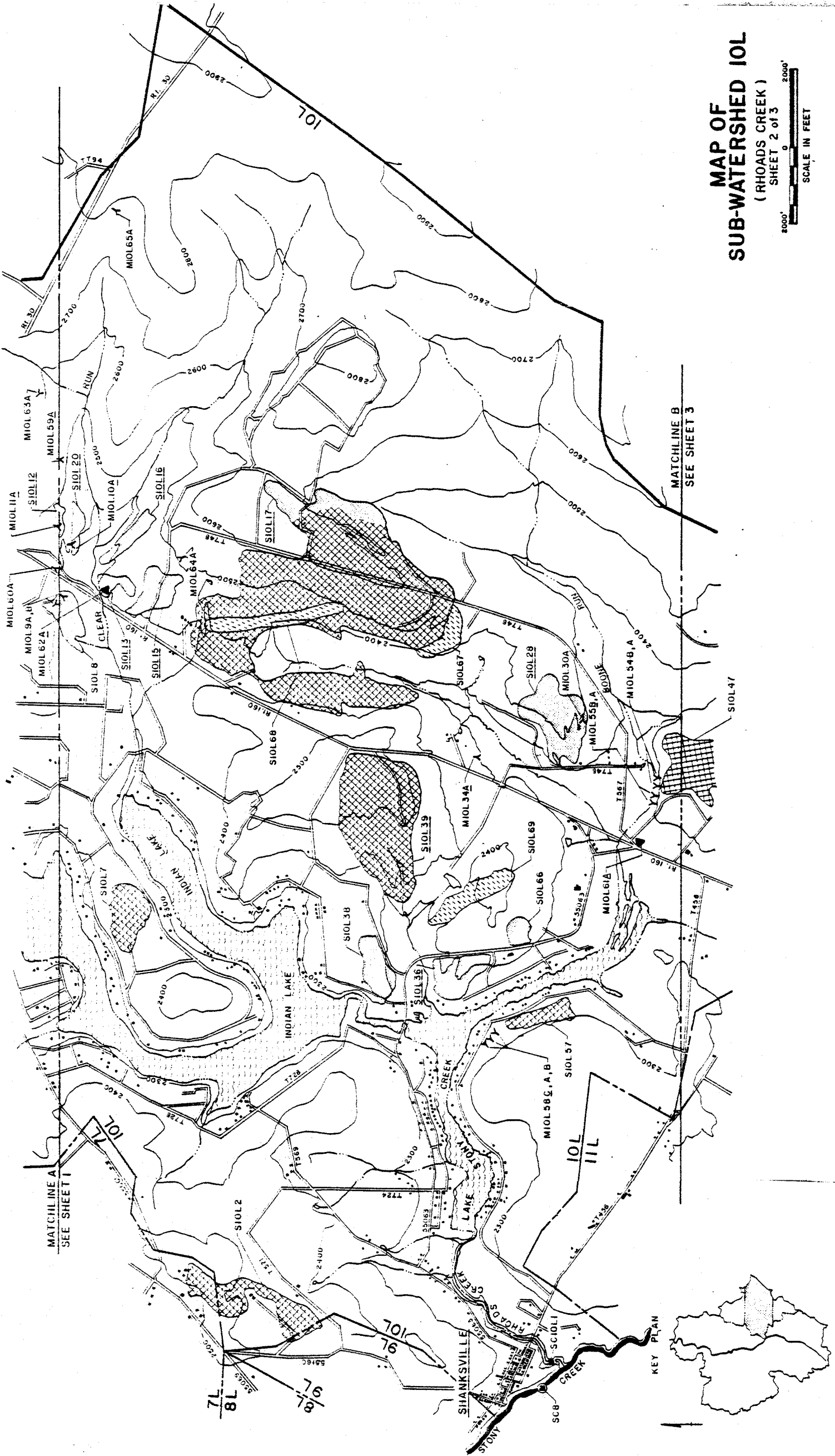


KEY PLAN



MAP OF SUB-WATERSHED IOL

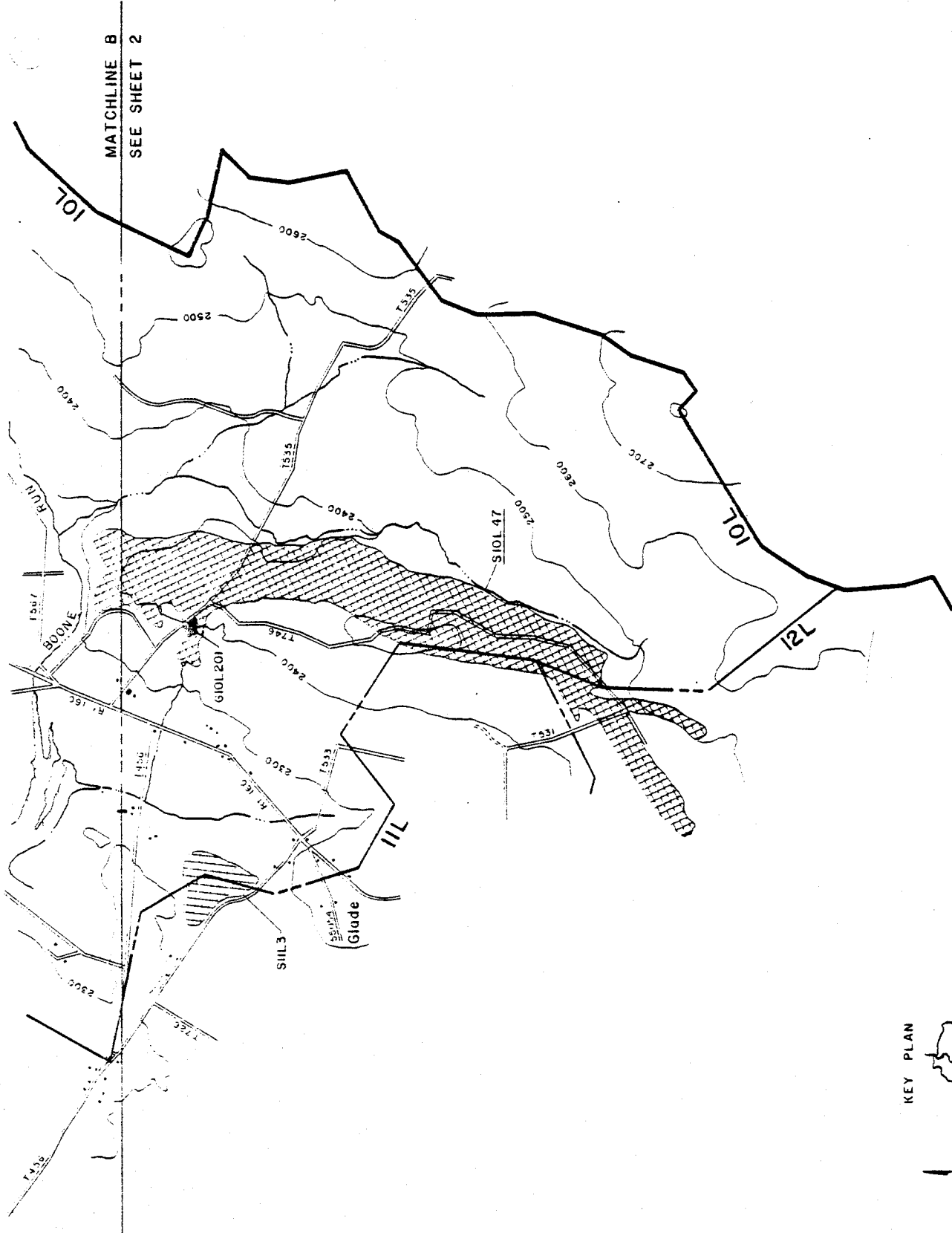
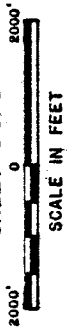
(RHODAS CREEK)
SHEET 2 of 3



MAP OF SUB-WATERSHED IOL

(RHODAS CREEK)

SHEET 3 of 3



KEY PLAN

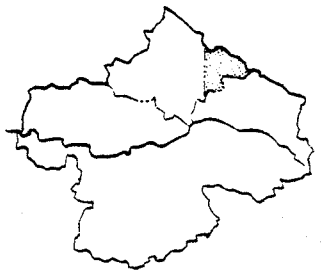


TABLE 37

Abandoned Deep Mines
Sub-watershed 10L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
✓ M10L9	Russel & Ruth Pile	No	-	E*	M10L9A	2390'	No	-
				E*	M10L9B	2390'	No	
# M10L10	Stony Creek Coal Co.	No	-	C'*	M10L10A	2390'	Yes	150'*
→ M10L11	Wm. Stutzman	No	-	C'*	M10L11A	2440'	Yes	150'*
≡ M10L30	Unknown	No	-	B*	M10L30A	2400'	No	-
M10L34	Burk Coal Co.	No	-	C'*	M10L34A	2300'	Yes	100'*
M10L54	Unknown	No	-	C'*	M10L54A	2300'	No	-
		-	-	C'*	M10L54B	2300'	No	
M10L55	Unknown	No	-	C'*	M10L55A	2280'	No	25'*
		-	-	C'*	M10L55B	2280'	Yes	
M10L58	Unknown	No	-	Brush* Creek	M10L58A	2260'	No	25'*
		-	-	Brush* Creek	M10L58B	2260'	No	
		-	-	Brush* Creek	M10L58C	2260'	Yes	
M10L59	Unknown	No	-	C'*	M10L59A	2540'	Yes	50'*
M10L60	Unknown	No	-	E*	M10L60A	2420'	No	-

TABLE 37 (contd.)

Abandoned Deep Mines
Sub-watershed 10L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M10L61	Unknown	No	-	C'*	M10L61A	2260'	Yes	150'*
M10L62	Unknown	No	-	C'*	M10L62A	2400'	Yes	150'*
M10L63	Unknown	No	-	E*	M10L63A	2630'	No	-
M10L64	Unknown	No	-	C'*	M10L64A	2520'	No	-
M10L65	Unknown	No	-	C'*	M10L65A	2790'	No	-

* Assumed

- ✓ Possible interconnection with Strip Mine S10L8.
- # Possible interconnection with Strip Mine S10L20.
- ‡ Possible interconnection with Strip Mine S10L12.
- ‡ Possible interconnection with Strip Mine S10L28.
- : Possible interconnection with Strip Mine S10L13.

TABLE 38

Abandoned Deep Mine Average Water Quality Data

Sub-watershed 10L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M10L10	7.0	0	*	.01	.06	18.58	24.9	14,400
		-	-	-	.1%	.1%	.1%	-
M10L11	4.8	3.12	-	.01	.06	3.83	3.70	30,240
		.9%	-	-	.1%	-	-	.1%
M10L34	6.6	0	0	3.60	29.21	1,100	1,269	135,360
		-	-	9.4%	24.9%	4.1%	3.8%	.4%
M10L55	3.4	131.99	340.17	3.49	18.68	1,382	1,700	106,560
		37.1%	118.6%	9.1%	15.9%	5.2%	5.1%	.3%
M10L58	6.4	0	0	.10	.22	.67	1.43	5,760
		-	-	.3%	.2%	-	-	-
M10L59	6.4	0	*	.01	.05	3.58	5.86	27,360
		-	-	-	-	-	-	.1%
M10L61	2.9	769.27	856.50	12.82	168.27	1,221	796.70	76,320
		216.2%	298.6%	33.3%	143.5%	4.6%	2.4%	.2%

TABLE 38 (contd.)

Abandoned Deep Mine Average Water Quality Data

Sub-watershed 10L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M10L62	6.4	.42	*	0	.7	4.76	18.9	28,800
		.1%	-	-	.6%	-	.1%	.1%

* Not analyzed.

Strip Mines

The Commonwealth records indicate that there are 43 strip mines in this sub-watershed. Our field investigations locate 20 surface mines with 11 flowing. Table 39 lists the abandoned strip mines within the sub-watershed with the following information: the name of the mine or operator if known, the area and seam mined, the designation we give the mine, whether or not there is a flow, and whether it connects with a deep mine.

The total acreage of abandoned surface mines in subwatershed 10L is 1,362.30 acres (7.84% of this sub-watershed area).

Table 40 gives the averages of the abandoned surface mine flows. Directly under the averages are the percentages of flows and pollution load that each contributes to the pollution load of the sub-watershed as measured at Sampling Station SC10L1, Rhoads Creek.

Where a single surface mine has more than one flow, the averages of the flows are added together.

Following Table 40 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 39

Abandoned Surface Mines

Sub-watershed 10L

Mine Number	Name of Mine or Operator	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S10L2	Wm. Schmidt C. C.	55.08	Brush Creek	No	No
S10L6	Penrod Const. Co.	112.91	Bakers-town	Yes	No
S10L7	Clear Run Coal Co. Inc	33.05	B, C, D, E	No	No
S10L8	J. E. Bigan	18.36	E	No	M10L9
S10L12	Pgh. Summit Coal Co.	4.59	B, C', D	Yes	M10L11
S10L13	Gallo-Meyers Co.	9.18	D	Yes	M10L62
S10L15	Somerset Coal Co.	23.87	E	Yes	No
S10L16	Dunlo Coal Co.	16.52	B, C', D	Yes	No
S10L17	M. E. Fetterolf Boswell Fuel Co. Lewis Murphy John P. Stoddard Denise Shade Coal Co J. J. McNally PBS Coals Co.	429.62	D E B, C', D, E C, D, E D D E, D	Yes	No
S10L20	Lewis Murphy	8.26	E, D	Yes	M10L10
S10L28	R. Long Robert H. Glessner, Jr.	54.16	E D	Yes	M10L30
S10L36	Lewis W. McIntire	28.46	Bakers-town	Yes	No
S10L38	Robert H. Glessner, Jr.	25.70	Upper Bakerstown	No	No
S10L39	McCormick- Snyder Coal Co.	142.29	Bakers-town	Yes	No

TABLE 39 (contd.)
 Abandoned Surface Mines
 Sub-watershed 10L

Mine Number	Name of Mine or Operator	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
	Franklin Brand Coal Co.		Brush Creek		
S10L47	Robert H. Glessner, Jr. P. B. S. Coals Co.	309.37	D B, C, D, E C'	Yes	No
	M. E. Fedderolf Coal Co.				
S10L57	Robert H. Glessner, Jr.	17.44	Brush Creek	No	No
S10L66	Unknown	10.10	-	No	No
S10L67	Unknown	14.69	-	No	No
S10L68	Unknown	25.70	-	No	No
S10L69	Unknown	22.95	-	No	No

TABLE 40

Abandoned Surface Mine Average Water Quality Data
Sub-watershed 10L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
S10L6	3.7	287.76 80.9%	*	1.57 4.1%	2.42 2.1%	809.59 3%	*	93,600 .3%
S10L12	4.8	4.98 1.4%	*	.08 .2%	.08 .1%	13.20 .1%	*	100,800 .3%
S10L13	2.9	4.33 1.2%	*	.02 .1%	.17 .2%	6.32 -	*	2,880 -
S10L15	4.8	16.03 4.5%	*	.19 .5%	.38 .3%	57.16 .2%	*	93,600 .3%
S10L16	5.2	6.52 1.8%	*	.26 .7%	.47 .4%	31.50 .1%	*	164,160 .5%
S10L17	6.6	1,017.58 286%	*	7.40 19.2%	26.88 22.9%	8,976.89 33.7%	*	704,160 2.2%
S10L20	5.2	1.62 .5%	*	.02 .1%	.03 -	10.93 -	*	14,400 .1%
S10L28	3.5	64.77 18.2%	*	.27 .7%	.83 .7%	177.70 .7%	*	142,560 -

TABLE 40 (contd.)

Abandoned Surface Mine Average Water Quality Data
Sub-watershed 10L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
S10L36	5.0	8.86 2.49%	*	.43 1.1%	.83 .7%	531.96 2%	*	74,880 .2%
S10L39	5.3	0 -	*	.76 2%	1.51 1.3%	4,468.67 16.8%	*	403,200 1.3%
S10L47	5.1	269.13 75.6%	*	1.41 3.7%	9.76 8.3%	819.79 3.1%	*	181,440 .6%

*Not analyzed.

Strip Mine: S10L6

Area: 112.91 acres

Location: South of U. S. Rt. 30 between Indian Lake & Reels Corner

Status: Reclaimed

Owned by: Penrod Construction Company

Seam mined: Bakerstown

Connection with deep mine: None

Flowing: Three large leaching areas

General Description:

An attempt was made to reclaim this strip. Pines and other trees were planted, but their growth is small. No natural vegetation is evident except for one small portion. Many depressions and small pits are present which ponds the water allowing it to leach through the spoil. Erosion is evident. The AMD from this strip is presently collected in ponds located on the nearby golf course. Attempts to stock the ponds with a variety of fish life has proved unsuccessful.

Recommendation:

More revegetation is called for, preferably grasses. Regrading is also necessary (30-35% of the total strip area). Diversion ditches are required to control erosion and remove water.

Cost:

Ditches	5000'	\$ 5,000
Grading	30%	20,000
Revegetation		<u>20,000</u>
		\$45,000

Strip Mine: S10L12

Area: 4.59 acres

Location: East of Pa. Rt. 160, South of U.S. Rt. 30 & Reel Corner

Status: Abandoned

Owned by: Pittsburgh Summit Coal Company

Seams mined: B, C', D

Connection with deep mine: M10L11

Flowing: One leaching area

General Description:

The strip is fairly well vegetated with pines and the longitudinal slope at the base of the 15' to 20' highwall is good. Not many depressions exist. The highwall is badly eroded. The drainage is to S10L20.

Recommendations:

Very little backfilling is necessary. A ditch on the top of the highwall will prevent general erosion. Additionally, a collector ditch at the base of the highwall should converge in to the ditch on S10L20. S10L12 and S10L20 should be reclaimed in conjunction with each other as well as the deep mine sealing of M10L11.

Cost:

Ditches	2000'	\$2,000
Grading		<u>1,000</u>
	Total	\$3,000

Strip Mine: S10L13

Area: 9.18 acres

Location: East of Pa. Rt. 160 and South of Clear Run

Status: Abandoned

Owned by: Gallo-Meyers Company

Seam mined: D

Connection with deep mine: M10L62

Flowing: One leaching area

General Description:

The strip is adequately vegetated and no ponding or depression was evident. The highwall is 15 to 20 feet high.

Recommendation:

Diversion ditches should remove water quickly before pollution can develop. Minimal backfilling and grading is required. The deep mine and strip mine reclamation should be done in conjunction with each other.

Cost:

Ditches	3000'	\$3,000
Grading		<u>1,000</u>
	Total	\$4,000

Strip Mine: S10L15

Area: 23.87 acres

Location: East of Pa. Rt. 160 & intersected by the North western part of T.R. T 748.

Owned by: Somerset Coal Co.

Seam mined: E

Connection with deep mine: None

Flowing: Three leaching areas

General Description:

There is very good, thick vegetation on this strip however there are quite a few depressions in the area collecting runoff and allowing it to leach through the spoil piles.

Recommendation:

Diversion ditches on the east and west side are necessary to remove the drainage. Some backfilling and regrading will have to be done.

Cost:

Ditches	2000'	\$2,000
Grading		<u>3,000</u>
	Total	\$5,000

Strip Mine: S10L16

Area: 16.52 acres

Location: East of Pa Rt. 160 and North of T-748

Status: Abandoned

Owned by: Dunlo Coal Company

Seams mined: B, C' and D

Connection with deep mine: None

Flowing: Two leaching areas

General Description:

Along the base of the 20' highwall is a good longitudinal slope. The strip is well vegetated and there are no extensive depressions.

Recommendation:

The ditches along the base and top of the highwall will prevent erosion and leaching. No regrading or backfilling is foreseen.

Cost:

Ditches	6,000'	\$6,000
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Strip Mine: S10L17

Area: 429.62 acres

Location: Intersected by T. R. T 748

Status: Partly reclaimed, partly active

Owned by: M. E. Fetterolf, Boswell Fuel Co., Lewis Murphy, John P. Stoddard, Denise, Shade Coal Co., J. J. McNally, P.B.S. Coals Co.

Seams Mined: B, C, C', D, and E

Connection with deep mine: None

Flowing: Twenty-three leaching areas

General Description:

Active operations are in the midst of this strip and it is difficult to distinguish between them and the abandoned areas. This is a very large strip that is partially reclaimed. Many pits and depressions exist and there are many areas bare of vegetation.

Recommendation:

Much backfilling is needed and many feet of drainage ditches are necessary. Revegetation is required. Some of this may be handled by the operator of the active strip (S10L68).

Cost:

Ditches	10,000'	\$ 10,000
Backfilling		5,000
Grading	20% @ \$1000/Ac	100,000
Revegetation		<u>50,000</u>
	Total	\$105,000

Strip Mine: S10L20

Area: 8.26 acres

Location: North of Clear Run

Status: Abandoned

Owned by: Lewis Murphy

Seams Mined: D and E

Connection with deep mine: M10L10

Flowing: One leaching area

General Description:

The strip is well vegetated. The longitudinal slope at the base of the 15' to 20' highwall is adequate for water flow. Few depressions exist.

Recommendations:

Diversion ditches above and below highwall will adequately drain and prevent erosion. Minimal earthwork is necessary however the strip reclamation will have to be done in conjunction with the deep mine.

Cost:

Ditch	3000'	\$3,000
Grading and Grubbing		<u>1,000</u>
	Total	\$4,000

Strip Mine: S10L28

Area: 54.16 acres

Location: North of Boone Run

Status: Abandoned

Owned by: R. Long & Robert H. Glessner, Jr.

Seam mined: D and E

Connection with deep mine: M10L30

Flowing: Seven leaching areas

General Description:

Depressions are creating ponding allowing leaching thru the spoil pile. Runoff from the 20' highwall is creating erosion throughout the stripped area. The discharge from deep mine M10L30 is bisecting the strip mine. There is evidence that a possible connection with a second deep mine exists. Although the openings could not be located, remains of mine buildings were seen in the area of heavy flow.

Recommendation: Complete renovation is required for this area consisting of regrading, ditching and revegetation:.

Cost:

\$2,000/acre

\$108,320

Strip Mine: S10L36

Area: 28.46 acres

Location: East of the main bend of Lake Stonycreek & intersected by L. R. 55063

Status: Reclaimed

Owned by: Lewis W. McIntire

Seam mined: Bakerstown

Connection with deep mine: None

Flowing: Three leaching areas

General Description:

There is no highwall on this well vegetated strip. Pond depressions go down the center of this strip from the road toward Lake Stonycreek.

Recommendation:

Backfill must be brought in for ponds. No regrading is necessary, however a ditch down the center of the strip and along the east side of the road is needed.

Cost:

Ditch	2500'	\$2,500
Backfilling 3 ponds @ \$250		750
Revegetation - 1 acre		<u>600</u>
	Total	\$3,850

Strip Mine: S10L39

Area: 142.29 acres

Location: West of Pa. Rt. 160

Status: Reclaimed

Owned by: McCormick-Snyder Coal Co.

Seam mined: Bakerstown

Connection with deep mine: None

Flowing: Seven leaching areas

General Description:

This strip is partly vegetated with pines and grass cover. Ponds exist near the edge of the pine area.

Recommendation:

The water from this strip mine is of such quality that it creates no pollution threat. Therefore there is no recommendation at this time.

Strip Mine: S10L47

Area: 309.37 acres

Location: South of Boone Run and East of Pa. Rt. 160

Status: Reclaimed

Owned by: Robert H. Glessner, Jr., P.B. S. Coals Co., M. E. Fetterolf Coal Company

Seams mined: B, C, D, and E

Connection with deep mine: None

Flowing: Three leaching areas

General Description:

Many varied situations exist on this strip mine. Revegetation is on about half of the strip, some depressions exist as well as some leaching and erosion on the barren areas of gob piles.

Recommendation:

A rough estimate of this extensively mined area requires regrading over the depressions, a ditch south of Rt. T 535 and revegetation over half of the strip.

Cost:

Ditch	\$ 5,000
Regrading	46,000
Revegetation	<u>90,000</u>
Total	\$141,000

Recommendations

This sub-watershed has the ability to create a potential danger to three quarters of the length of the main stream, Stony Creek, within the study area. The two large lakes, Indian Lake and Lake Stonycreek, are acting as reservoirs collecting the AMD that would normally find its way into Stony Creek. If allowed to continue, it is not unreasonable to assume the lakes, once completely filled with AMD, would again pollute the main stream after a great deal of money and energy has been expended to make Stony Creek a clean stream.

Table 41 gives the recommendations for all polluting deep and surface mines along with the cost associated with each recommendation.

An estimated effectiveness of 60% reduction of the pollution load is assigned for each recommendation.

Table 42 lists the sources abated, the amount of benefication and the costs associated with each plan.

The distance from Sampling Station SC10L1, Rhoads Creek, to the next polluting tributary down stream, SC7R1 Schrock Run, is approximately one mile. This is the minimum distance on Stony Creek that would benefit from Rhoads Creek becoming a clean stream.

TABLE 41

Recommended Abatement Procedures - Cost Benefication

Sub-watershed 10L

Rank	Number	Recommended Abatement		Total Costs		Cost \$/Pound Acid Removal		Total Acid Abate-	Total Iron Abate-	Percent of Total Sub-watershed Acid Iron	
		Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	ment ppd	ment ppd	Acid	Iron
1	M10L61	1 Seal	1 Seal	\$ 25,000	\$ 25,000	\$ 54	\$ 54	461.56	100.96	129.72	86.11
2	S10L17	429.62 Acres	-	105,000	105,000	172	172	610.55	16.13	171.60	13.76
3	S10L6	112.91 Acres	-	45,000	45,000	261	261	172.66	1.45	48.53	1.24
4	S10L15	23.87 Acres	-	5,000	5,000	520	520	9.62	.23	2.70	.20
5	M10L55	2 Seals	-	50,000	50,000	631	631	79.19	11.21	22.26	9.56
6	S10L36	28.46 Acres	-	3,850	3,850	724	724	5.32	.50	1.50	.43
7	S10L47	309.37 Acres	-	141,000	141,000	873	873	161.48	5.86	45.39	5.00
8	S10L12	4.59 Acres	1 Seal	3,000	28,000	1,003	9,365	2.99	.05	.84	.04
9	S10L16	16.52 Acres	-	6,000	6,000	1,535	1,535	3.91	.28	1.10	.24
10	S10L13	9.18 Acres	1 Seal	4,000	29,000	1,539	11,154	2.60	.10	.73	.09

NOTE: The potential costs above include known costs.

TABLE 41 (contd.)

Recommended Abatement Procedures - Cost Benefication

Sub-watershed 10L

Rank	Number	Recommended Abatement		Total Costs		Cost \$/Pound Acid Removal		Total Acid	Total Iron	Percent of Total	
		Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Abate- ment ppd	Abate- ment ppd	Sub-watershed Acid	Iron
11	S10L28	54.16 Acres	1 Seal	\$108,320	\$133,320	\$ 2,788	\$ 3,431	38.86	.50	10.92	.43
12	S10L20	8.26 Acres	1 Seal	4,000	29,000	4,124	29,897	.97	.02	.27	.02
13	M10L11	1 Seal	4.59 Acres	25,000	28,000	13,369	14,973	1.87	.04	.52	.03
14	M10L62	1 Seal	9.18 Acres	25,000	29,000	100,000	116,000	.25	.42	.07	.36

NOTE: The potential costs above include known costs.

TABLE 42

Benefication - Recommended Plans
Sub-watershed 10L

Plan	Abated	Acid		Iron		Total Construction Costs	
		ppd	% of Total Sub-water-shed	ppd	% of Total Sub-water-shed	Flowing Sources	Potential Sources
A	1 thru 14	1551.83	436%	137.75	118%	\$550,170	\$657,170
B	1 thru 7	1500.38	422%	136.34	116%	374,850	374,850
C	1 thru 5	1333.58	379%	129.98	111%	230,000	230,000
D	1 thru 3	1244.77	350%	118.54	101%	175,000	175,000

It is recommended that Plan "D" be initiated for this sub-watershed.