Appendix E

Middle Miller Creek Site Calibration Information

Appendix E1. IFG4 Input File Middle Miller Creek (High-Medium Flow)

```
MIDDLE MILLER CREEK          IFIM   MIMILR3.IN4
Q/DATE MEASURED  127 CFS ON 1-19-89, 74 ON 12-2-88
IOC       0000000200000000000000
QARD  74.00
QARD 127.00
QARD 200.00
XSEC   1.0       0.01.00    188.8
       1.0  0.0194.5  7.9190.9  8.0190.2  9.0190.3 11.0190.1 13.0190.2
       1.0 14.8190.1 15.0189.7 16.0189.7 17.0189.8 18.0189.4 19.0189.4
       1.0 20.0189.4 21.0189.3 22.0189.5 23.0189.1 24.0189.0 25.0189.0
       1.0 26.0188.8 27.0189.2 28.0189.6 29.0189.5 30.0189.5 31.0189.3
       1.0 32.0189.4 33.0189.4 34.0189.5 35.0189.5 36.0189.5 37.0189.5
       1.0 38.0189.7 39.0189.6 40.0189.6 41.0189.3 41.9189.7 43.0190.2
       1.0 45.0190.2 47.0190.3 49.0190.3 51.0190.7 51.9190.7 53.0190.8
       1.0 59.2190.9 61.0191.2 71.0191.5 74.0192.0 77.0193.1
NS     1.0      1.80      1.80      1.80     76.50     76.50     76.50
NS     1.0     76.50     87.60     87.60     87.60     87.60     87.60
NS     1.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     1.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     1.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     1.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     1.0     87.60     87.60     87.60      8.80      8.80      8.80
NS     1.0      8.80      8.80      8.80      8.80      8.80
CAL1   1.0    190.93    132.31
VEL1   1.0             .50  .40  .80 2.20  .90 1.40 3.30 2.10 1.90 1.70
VEL1   1.0 2.80 1.90 3.60 2.60 4.00 3.00 4.20 3.60 4.10 1.00 4.00 3.60
VEL1   1.0 4.50 2.70 1.70 3.40 4.10 2.40 1.80 1.50 1.90 3.50 3.00 2.70
VEL1   1.0 2.70 1.20  .50  .30  .80  .40
CAL2   1.0    190.70     86.34
VEL2   1.0             .20 .50  .70 1.00 1.40 1.70 2.10 2.00 2.20 2.00
VEL2   1.0 2.10 2.00 3.10 3.00 2.80 1.50 2.70 3.30 4.40  .70 2.00 3.20
VEL2   1.0 3.90 3.10  .80 3.20 3.10 2.20  .70  .50 1.00 3.40 2.00 1.90
VEL2   1.0 2.00 2.10  .30 0.00
XSEC   2.0     117.01.00    188.8
       2.0  0.0193.5  1.5191.2  3.0188.0  4.0188.0  5.0187.8  6.0187.3
       2.0  7.0187.9  8.0187.4  9.0187.2 10.0187.7 11.0188.0 12.0188.5
       2.0 13.0188.0 14.0188.2 15.0188.7 16.0189.3 17.0189.5 18.0189.3
       2.0 19.0190.3 20.0190.0 21.1190.4 23.0190.5 25.0191.1 25.8191.1
       2.0 27.0191.2 27.5191.2 28.5191.7 32.0191.3 34.0191.6 39.0191.3
       2.0 45.0192.1 50.0193.2 57.0191.3 60.0192.7 62.4194.0
NS     2.0       .50       .50       .50       .50     87.60     87.60
NS     2.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     2.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     2.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     2.0     43.50  0.543.50     43.50     43.50     43.50     43.50
NS     2.0     43.50      7.90      7.90      7.90      7.90
CAL1   2.0    191.23    129.65
VEL1   2.0             .30 1.30 2.25 2.45 2.85 2.70 2.65 2.95 2.55 2.95
VEL1   2.0 3.20 4.00 2.40 2.50 2.90 2.60 1.90 2.30 2.40  .50  .90  .20
VEL1   2.0  .30
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Appendix E1. Continued

```
CAL2    2.0    190.98     81.31
VEL2    2.0            .10  .90  .90  .60 1.30 1.40 2.00 1.50 2.20 1.70
VEL2    2.0 2.50 3.00 1.80 2.20 2.70 1.90 1.50 1.00 1.70 1.80  .40
VEL2    2.0
XSEC    3.0     265.01.00    189.8
        3.0  0.0195.2  7.0191.8  9.0190.6 10.0190.3 11.0190.4 12.0190.1
        3.0 13.0190.0 14.0190.0 15.0190.1 16.0189.9 17.0190.1 18.0190.3
        3.0 19.0190.0 20.0190.0 21.0190.3 22.0190.2 23.0190.0 24.0190.0
        3.0 25.0190.0 26.0190.1 27.0190.4 28.0190.3 29.0190.3 30.0190.2
        3.0 31.0190.1 32.0190.9 32.5190.8 33.0190.8 35.0191.2 37.0191.2
        3.0 39.0191.4 39.8191.6 42.0191.8 44.0191.6 47.0191.8 52.0191.8
        3.0 60.0191.7 69.0189.8 71.0190.8 82.8197.2
NS      3.0        .50  0.3  .50        .50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      54.50      54.50      54.50      54.50      54.50      54.50
NS      3.0      54.50      54.50      54.50      54.50      43.50  1.543.50
NS      3.0      43.50        .50        .50        .50
CAL1    3.0    191.82    116.89
VEL1    3.0            2.10 1.00  .30 1.80 2.50 2.80 2.30 2.30 3.10 3.30
VEL1    3.0 3.50 3.50 3.70 3.00 2.80 2.80 2.80 2.00 2.00 4.00 3.70 3.80
VEL1    3.0 3.40 3.80 2.70 4.20 3.60 2.80 1.40  .70  .20  .70  .20
VEL1    3.0
CAL2    3.0    191.34     78.78
VEL2    3.0            .50 1.10  .10  .70 1.60 1.70 2.40 2.10 2.70 2.50
VEL2    3.0 2.70 3.80 3.30 3.20 2.50 2.90 2.80 2.30 3.10 2.80 3.30 3.00
VEL2    3.0 2.90 3.10 2.90 2.10 3.40 2.80  .30
VEL2    3.0
XSEC    4.0     117.01.00    189.8
        4.0  0.0193.3  1.6192.1  2.0191.6  5.0192.1  6.0192.1  7.0191.4
        4.0  8.0191.1  9.0191.1 10.0190.7 11.0190.5 12.0190.4 13.0190.4
        4.0 14.0190.3 15.0190.2 16.0190.3 17.0190.2 18.0189.9 19.0189.9
        4.0 20.0189.5 21.0189.6 22.0189.9 23.0190.1 24.0189.7 25.0189.6
        4.0 26.0189.6 27.0189.7 28.0189.7 29.0189.7 30.0189.7 31.0189.5
        4.0 32.0189.7 33.0189.7 34.0190.0 35.0190.1 36.0190.4 37.0190.6
        4.0 38.0190.8 39.0190.8 40.0190.8 41.0191.0 42.0190.9 43.0190.8
        4.0 44.0190.8 45.0191.0 46.0190.9 47.0190.7 47.5190.7 48.0191.1
        4.0 49.0191.1 51.0191.1 52.0191.6 53.8191.1 57.0192.5 61.3192.6
        4.0 63.8194.9
NS      4.0        .50        .50        .50        .50        .50      62.50
NS      4.0      62.50      62.50      62.50      62.50      62.50      62.50
NS      4.0      62.50      62.50      62.50      62.50      62.50      62.50
NS      4.0      74.50      74.50      74.50      74.50      74.50      74.50
NS      4.0      74.50      74.50      74.50      74.50      74.50      74.50
NS      4.0      74.50      74.50      43.50      43.50      43.50      43.50
NS      4.0      43.50      43.50      43.50      43.50      43.50      43.50
NS      4.0  1.543.50      81.50      81.50      81.50      81.50      81.50
NS      4.0      81.50      81.50       8.90       8.90       8.90       8.90
NS      4.0       8.90
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Appendix E1. Continued

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CAL1   4.0    192.08    119.86
VEL1   4.0             .80 0.00  .70  .30 1.00  .70  .70  .70  .80  .90
VEL1   4.0 1.30 1.00 1.10 1.50 2.00 2.00 2.70 3.20 3.20 3.10 2.70 2.70
VEL1   4.0 2.30 2.20 1.90 1.90 2.60 2.20 2.00 1.90 1.40 1.40  .80 1.00
VEL1   4.0  .90  .70  .50  .30  .10 0.00 0.00 0.00 0.00 0.00 0.00 0.00
VEL1   4.0 0.00 0.00 0.00
CAL2   4.0    191.61     75.12
VEL2   4.0                          .20  .80  .20  .80  .60 1.20  .90
VEL2   4.0 1.10 1.00 1.20 1.20  .60 1.90 2.50 2.30 2.10 2.10 2.30 1.60
VEL2   4.0 1.80 1.80 1.70 1.90 1.50 1.90 1.40 1.40 1.40 1.50 1.00  .90
VEL2   4.0  .70  .70  .40  .10  .10  .20 0.00 0.00 0.00 0.00 0.00 0.00
VEL2   4.0 0.00 0.00
XSEC   5.0     265.01.00    191.1
       5.0  0.0194.8  2.6192.6  4.0192.2  5.0192.0  7.0191.9  9.0191.9
       5.0 10.0191.8 11.0191.8 12.0191.7 13.0191.7 14.0191.6 15.0191.8
       5.0 16.0191.8 17.0191.9 18.0191.8 19.0191.9 20.0192.1 21.0191.7
       5.0 22.0191.7 23.0191.7 24.0191.7 25.0191.9 26.0191.8 27.0191.8
       5.0 28.0191.6 29.0191.6 30.0191.5 31.0191.6 32.0191.4 33.0191.5
       5.0 34.0191.3 35.0191.3 36.0191.3 37.0191.2 38.0191.1 39.0191.3
       5.0 40.0191.8 41.0191.2 42.0191.6 43.0191.7 44.0191.6 45.0191.7
       5.0 46.0191.7 47.0191.6 48.0191.7 49.0191.9 50.0192.4 50.1192.6
       5.0 53.0194.0 56.5194.8
NS     5.0       .50       .50       .50     65.50     65.50     65.50
NS     5.0     65.50     65.50     65.50     65.50     65.50     65.50
NS     5.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     5.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     5.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     5.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     5.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     5.0     75.50     75.50     75.50     85.50     75.50      8.70
NS     5.0      8.70      8.70
CAL1   5.0    192.64    123.75
VEL1   5.0             .70 2.40 2.20 2.50 2.60 2.80 2.50 2.70 2.10 2.70
VEL1   5.0 2.80 2.60 2.60 3.10 3.00 4.20 4.30 4.10 3.20 4.50 3.90 3.50
VEL1   5.0 3.10 3.60 2.70 1.90 1.50 1.90 2.30 2.10 3.00 3.80 3.70 3.50
VEL1   5.0 3.90 3.20 3.60 3.40 2.70 3.20 4.10 2.70 1.60 1.10  .20
VEL1   5.0
CAL2   5.0    192.23     79.45
VEL2   5.0                  .90 1.80 2.20 1.60 2.10 1.70 2.00 2.10 2.60
VEL2   5.0 2.20 1.50 1.60 1.00 2.10 3.00 2.80 3.50 2.50 2.20 2.90 3.30
VEL2   5.0 3.20 2.30 2.50 2.50 2.90 2.60 2.30 1.60 3.10 3.50 3.40 3.60
VEL2   5.0 3.40 3.10 3.10 3.00 3.80 3.30 2.20 2.00 1.10  .70
VEL2   5.0
XSEC   6.0     117.01.00    191.1
       6.0  0.0198.9 18.0193.3 19.0193.2 21.0193.2 22.0193.2 24.5193.4
       6.0 31.0193.4 33.0193.1 34.5192.9 36.0192.7 40.0192.1 42.0192.2
       6.0 45.5192.1 46.0192.7 47.0192.1 48.0192.1 49.0192.0 50.0191.8
       6.0 51.0191.7 52.0191.5 53.0191.3 54.0191.2 55.0191.1 56.0191.4
       6.0 57.0191.4 58.0191.5 59.0191.7 60.0191.8 61.0191.8 62.0191.9
       6.0 63.0191.9 64.0192.0 65.0191.9 66.0192.2 67.0192.2 68.0192.3
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Appendix E1. Continued

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        6.0 69.0192.1 70.2192.3 72.0192.4 72.6192.8 73.1193.3 73.2194.3
NS      6.0       .50       .50     57.50     57.50     57.50     57.50
NS      6.0     57.50     57.50     57.50     74.50     74.50     74.50
NS      6.0     74.50     74.50     74.50     74.50     74.50     74.50
NS      6.0     74.50     74.50     74.50     74.50     74.50     75.50
NS      6.0     75.50     75.50     75.50     75.50     75.50     65.50
NS      6.0     65.50     65.50     65.50     65.50     65.50     65.50
NS      6.0     65.50     65.50     65.50       .50       .50       .50
CAL1    6.0    193.30    134.04
VEL1    6.0            .05  .20  .10 0.00 0.00  .50  .90 1.30 2.30 3.30
VEL1    6.0 2.00 4.60 3.80 4.00 3.90 3.80 4.20 4.50 3.50 2.50 1.90 1.50
VEL1    6.0 1.70 2.30 2.10 2.40 2.70 2.60 1.70 2.20 2.30 3.00 3.20 2.80
VEL1    6.0 2.60 2.20 1.60 1.30
CAL2    6.0    192.91     91.77
VEL2    6.0                                          .40 2.00 2.20
VEL2    6.0 2.70 2.20 2.50 2.30 2.80 2.90 2.60 2.20 2.50 2.70 3.40 2.90
VEL2    6.0 2.40 2.50 1.90 1.20 1.30 1.30 1.40 2.30 2.30 1.60 1.40 1.70
VEL2    6.0  .60 0.00 0.00
ENDJ
```

Appendix E2. Summary of Calibration Details Middle Miller Creek (High-Medium Flow) MIMILR3.IN4

Calibration Information for Calculated Discharges

Transect Number	1	2	3	4	5	6
Discharge	136	131	118	118	129	130
	92	76	65	73	65	70
Stage	190.93	191.23	191.82	192.08	192.64	193.30
	190.70	190.98	195.34	191.61	192.23	192.91
Plotting Stage	2.13	2.43	2.02	2.28	1.54	2.20
	1.90	2.18	1.54	1.81	1.13	1.81

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.5155	.9302	.2222	.2277	.1729	.4642
B =	.2888	.1968	.4784	.4825	.4501	.3192
SZF=	188.8	188.8	189.8	189.8	191.1	191.1

B Coefficient Log/Log Discharge/Stage Relationship

3.46	5.08	2.09	2.07	2.22	3.13

Appendix E3. Data Changes Middle Miller Creek (High-Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical	8	VEL2	Changed	0.0	to	0.2
Transect 1	Vertical	39	VEL2	Changed	0.1	to	0.3
Transect 2	Vertical	22	VEL1	Changed	0.3	to	0.5
Transect 2	Vertical	26	Specified	Mannings	N of	0.5	
Transect 3	Vertical	2	Specified	Mannings	N of	0.3	
Transect 3	Vertical	31	VEL2	Changed	0.1	to	0.3
Transect 3	Vertical	36	Specified	Mannings	N of	1.5	
Transect 4	Vertical	9	VEL2	Changed	0.0	to	0.2
Transect 4	Vertical	43	Specified	Mannings	N of	1.5	
Transect 6	Vertical	10	VEL2	Changed	0.2	to	0.4
Transect 6	Vertical	12	VEL1	Changed	3.5	to	3.3
Transect 6	Vertical	38	VEL1	Changed	2.4	to	2.2
Transect 6	Vertical	39	VEL1	Changed	1.8	to	1.6

Appendix E4. Velocity Adjustment Factors Middle Miller Creek
(High-Medium Flow)

Transect	Flow	VAF
1.00	74.0	.982
1.00	127.0	1.004
1.00	200.0	.915
2.00	74.0	.987
2.00	127.0	1.002
2.00	200.0	.894
3.00	74.0	.991
3.00	127.0	.977
3.00	200.0	.766
4.00	74.0	.996
4.00	127.0	.986
4.00	200.0	.897
5.00	74.0	1.000
5.00	127.0	.999
5.00	200.0	.959
6.00	74.0	.873
6.00	127.0	1.007
6.00	200.0	.848

Appendix E5. IFG4 Input File Middle Miller Creek (Medium-Low Flow)

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MIDDLE MILLER CREEK      IFIM   MIMILR4.IN4
Q/DATE MEASURED  74 CFS ON 12-2-88, 5 ON 8-3-88
IOC        0000000200000000000000
QARD   5.00
QARD  74.00
XSEC   1.0        0.01.00    188.8
       1.0  0.0194.5  7.9190.9  8.0190.2  9.0190.3 11.0190.1 13.0190.2
       1.0 14.8190.1 15.0189.7 16.0189.7 17.0189.8 18.0189.4 19.0189.4
       1.0 20.0189.4 21.0189.3 22.0189.5 23.0189.1 24.0189.0 25.0189.0
       1.0 26.0188.8 27.0189.2 28.0189.6 29.0189.5 30.0189.5 31.0189.3
       1.0 32.0189.4 33.0189.4 34.0189.5 35.0189.5 36.0189.5 37.0189.5
       1.0 38.0189.7 39.0189.6 40.0189.6 41.0189.3 41.9189.7 43.0190.2
       1.0 45.0190.2 47.0190.3 49.0190.3 51.0190.7 51.9190.7 53.0190.8
       1.0 59.2190.9 61.0191.2 71.0191.5 74.0192.0 77.0193.1
NS     1.0       1.80       1.80  0.5 1.80     76.50      76.50      76.50
NS     1.0      76.50      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60       8.80       8.80       8.80
NS     1.0       8.80       8.80       8.80       8.80       8.80
CAL2   1.0     190.70      86.34
VEL2   1.0                   .50  .70 1.00 1.40 1.70 2.10 2.00 2.20 2.00
VEL2   1.0 2.10 2.00 3.10 3.00 2.80 1.50 2.70 3.30 4.40  .70 2.00 3.20
VEL2   1.0 3.90 3.10  .80 3.20 3.10 2.20  .70  .50 1.00 3.20 2.00 1.90
VEL2   1.0 2.00 2.10  .10 0.00
CAL3   1.0     189.93       5.28
VEL3   1.0                                     .50  .40  .50  .40  .60
VEL3   1.0  .50  .30  .10 1.00  .70  .40  .30  .60  .20  .10  .40  .70
VEL3   1.0  .80  .80  .30  .10  .30  .60  .10  .05  .05  .20  .10
VEL3   1.0
XSEC   2.0      117.01.00    188.8
       2.0  0.0193.5  1.5191.2  3.0188.0  4.0188.0  5.0187.8  6.0187.3
       2.0  7.0187.9  8.0187.4  9.0187.2 10.0187.7 11.0188.0 12.0188.5
       2.0 13.0188.0 14.0188.2 15.0188.7 16.0189.3 17.0189.5 18.0189.3
       2.0 19.0190.3 20.0190.0 21.1190.4 23.0190.5 25.0191.1 25.8191.1
       2.0 27.0191.2 27.5191.2 28.5191.7 32.0191.3 34.0191.6 39.0191.3
       2.0 45.0192.1 50.0193.2 57.0191.3 60.0192.7 62.4194.0
NS     2.0        .50        .50        .50        .50      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      43.50      43.50      43.50      43.50      43.50      43.50
NS     2.0      43.50       7.90       7.90       7.90       7.90
CAL2   2.0     190.98      81.31
VEL2   2.0            .10  .90  .90  .60 1.30 1.40 2.00 1.50 2.20 1.70
VEL2   2.0 2.50 3.00 1.80 2.20 2.70 1.90 1.50 1.00 1.70 1.80  .40
VEL2   2.0
CAL3   2.0     189.95       5.33
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Appendix E5. Continued

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VEL3   2.0            0.00  .10  .10  .10  .10  .30  .10  .30  .30  .40
VEL3   2.0  .20  .30  .20  .10  .10  .10  .10 0.00
VEL3   2.0
XSEC   3.0     265.01.00    189.8
       3.0  0.0195.2  7.0191.8  9.0190.6 10.0190.3 11.0190.4 12.0190.1
       3.0 13.0190.0 14.0190.0 15.0190.1 16.0189.9 17.0190.1 18.0190.3
       3.0 19.0190.0 20.0190.0 21.0190.3 22.0190.2 23.0190.0 24.0190.0
       3.0 25.0190.0 26.0190.1 27.0190.4 28.0190.3 29.0190.3 30.0190.2
       3.0 31.0190.1 32.0190.9 32.5190.8 33.0190.8 35.0191.2 37.0191.2
       3.0 39.0191.3 39.8191.6 42.0191.8 44.0191.6 47.0191.8 52.0191.8
       3.0 60.0191.7 69.0189.8 71.0190.8 82.8197.2
NS     3.0        .50        .50        .50      87.50      87.50      87.50
NS     3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS     3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS     3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS     3.0      54.50      54.50      54.50      54.50      54.50      54.50
NS     3.0      54.50      54.50      54.50      54.50      43.50      43.50
NS     3.0      43.50  1.5  .50        .50        .50
CAL2   3.0     191.34      78.78
VEL2   3.0            .50 1.10  .10  .70 1.60 1.70 2.40 2.10 2.70 2.50
VEL2   3.0 2.70 3.80 3.30 3.20 2.50 2.90 2.80 2.30 3.10 2.80 3.30 3.00
VEL2   3.0 2.90 3.10 2.90 2.10 3.40 2.80  .10
VEL2   3.0
CAL3   3.0     190.48       6.34
VEL3   3.0                     0.00  .10  .05 1.00 1.10 1.20  .90  .10
VEL3   3.0  .80 3.10 2.60 2.30  .50  .10  .10  .70 0.00  .20  .70  .50
VEL3   3.0  .10  .05
VEL3   3.0
XSEC   4.0     117.01.00    189.8
       4.0  0.0193.3  1.6192.1  2.0191.6  5.0192.1  6.0192.1  7.0191.4
       4.0  8.0191.1  9.0191.1 10.0190.7 11.0190.5 12.0190.4 13.0190.4
       4.0 14.0190.3 15.0190.2 16.0190.3 17.0190.2 18.0189.9 19.0189.9
       4.0 20.0189.5 21.0189.6 22.0189.9 23.0190.1 24.0189.7 25.0189.6
       4.0 26.0189.6 27.0189.7 28.0189.7 29.0189.7 30.0189.7 31.0189.5
       4.0 32.0189.7 33.0189.7 34.0190.0 35.0190.1 36.0190.4 37.0190.6
       4.0 38.0190.8 39.0190.8 40.0190.8 41.0191.0 42.0190.9 43.0190.8
       4.0 44.0190.8 45.0191.0 46.0190.9 47.0190.7 47.5190.7 48.0191.1
       4.0 49.0191.1 51.0191.1 52.0191.6 53.8191.1 57.0192.5 61.3192.6
       4.0 63.8194.9
NS     4.0        .50        .50        .50        .50        .50      62.50
NS     4.0      62.50      62.50      62.50      62.50      62.50      62.50
NS     4.0      62.50      62.50      62.50      62.50      62.50      62.50
NS     4.0      74.50      74.50      74.50      74.50      74.50      74.50
NS     4.0      74.50      74.50      74.50      74.50      74.50      74.50
NS     4.0      74.50      74.50      43.50      43.50      43.50      43.50
NS     4.0      43.50      43.50      43.50      43.50      43.50      43.50
NS     4.0  3.043.50      81.50      81.50      81.50      81.50      81.50
NS     4.0      81.50      81.50       8.90       8.90       8.90       8.90
NS     4.0       8.90
CAL2   4.0     191.61      75.12
```

Appendix E5. Continued

```
VEL2    4.0                                .20  .80 0.00  .80  .60 1.20  .90
VEL2    4.0 1.10 1.00 1.20 1.20  .60 1.90 2.50 2.30 2.10 2.10 2.30 1.60
VEL2    4.0 1.80 1.80 1.70 1.90 1.50 1.90 1.40 1.40 1.40 1.50 1.00  .90
VEL2    4.0  .70  .70  .40  .10  .10  .20 0.00 0.00 0.00 0.00 0.00 0.00
VEL2    4.0 0.00 0.00
CAL3    4.0    190.65      4.87
VEL3    4.0                                                0.00  .05  .05
VEL3    4.0  .05  .05  .05  .05  .05  .05  .10  .20  .10  .30  .20  .20
VEL3    4.0  .30  .40  .40  .40  .40  .30  .30  .20  .30  .30  .30  .05
VEL3    4.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
VEL3    4.0
XSEC    5.0     265.01.00    190.1
        5.0  0.0194.8  2.6192.6  4.0192.2  5.0191.8  7.0191.8  9.0191.6
        5.0 10.0191.5 11.0191.5 12.0191.5 13.0191.5 14.0191.5 15.0191.5
        5.0 16.0191.5 17.0191.6 18.0191.6 19.0191.6 20.0191.6 21.0191.6
        5.0 22.0191.6 23.0191.5 24.0191.5 25.0191.5 26.0191.5 27.0191.5
        5.0 28.0191.5 29.0191.5 30.0191.4 31.0191.5 32.0190.1 33.0191.4
        5.0 34.0191.4 35.0191.5 36.0191.3 37.0191.2 38.0191.5 39.0191.5
        5.0 40.0191.6 41.0191.1 42.0191.2 43.0191.2 44.0191.4 45.0191.4
        5.0 46.0191.6 47.0191.1 48.0191.6 49.0191.6 50.0192.2 50.1192.6
        5.0 53.0194.0 56.5194.8
NS      5.0        .50        .50        .50      65.50      65.50      65.50
NS      5.0      65.50      65.50      65.50      65.50      65.50      65.50
NS      5.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      5.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      5.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      5.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      5.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      5.0      75.50      75.50      75.50      85.50      75.50       8.70
NS      5.0       8.70       8.70
CAL2    5.0    192.23      79.45
VEL2    5.0                  .90 1.80 2.20 1.60 2.10 1.70 2.00 2.10 2.60
VEL2    5.0 2.20 1.50 1.60 1.00 2.10 3.00 2.80 3.50 2.50 2.20 2.90 3.30
VEL2    5.0 3.20 2.30 2.50 2.50 2.90 2.60 2.30 1.60 3.10 3.50 3.40 3.60
VEL2    5.0 3.40 3.10 3.10 3.00 3.80 3.30 2.20 2.00 1.10  .70
VEL2    5.0
CAL3    5.0    191.63      6.44
VEL3    5.0                                .10  .10  .10  .40  .30  .10
VEL3    5.0  .10 0.00 0.00 0.00 0.00 0.00 0.00  .05 .056  .05  .05  .10
VEL3    5.0  .30  .30  .30  .40 1.20  .80  .80  .90 1.40 1.00 2.10 1.10
VEL3    5.0 0.00 1.70 1.40 1.30  .60  .90 0.00  .10 0.00
VEL3    5.0
XSEC    6.0     117.01.00    191.1
        6.0  0.0198.9 18.0193.3 19.0193.2 21.0193.2 22.0193.2 24.5193.4
        6.0 31.0193.4 33.0193.1 34.5192.9 36.0192.7 40.0192.1 42.0192.2
        6.0 45.5192.1 46.0192.7 47.0192.1 48.0192.1 49.0191.9 50.0191.8
        6.0 51.0191.7 52.0191.5 53.0191.3 54.0191.2 55.0191.1 56.0191.4
        6.0 57.0191.4 58.0191.5 59.0191.7 60.0191.8 61.0191.8 62.0191.9
        6.0 63.0191.9 64.0191.9 65.0191.9 66.0192.2 67.0192.2 68.0192.3
        6.0 69.0192.1 70.2192.3 72.0192.4 72.6192.8 73.1193.3 73.2194.3
```

Appendix E5. Continued

```
NS      6.0        .50        .50      57.50      57.50      57.50      57.50
NS      6.0      57.50      57.50      57.50      74.50      74.50      74.50
NS      6.0      74.50      74.50      74.50      74.50      74.50      74.50
NS      6.0      74.50      74.50      74.50      74.50      74.50      75.50
NS      6.0      75.50      75.50      75.50      75.50      75.50      65.50
NS      6.0      65.50      65.50      65.50      65.50      65.50      65.50
NS      6.0      65.50  1.565.50      65.50        .50        .50        .50
CAL2    6.0     192.91      91.77
VEL2    6.0                                                  .20 2.00 2.20
VEL2    6.0 2.70 2.20 2.50 2.30 2.80 2.90 2.60 2.20 2.50 2.70 3.40 2.90
VEL2    6.0 2.40 2.50 1.90 1.20 1.30 1.30 1.40 2.30 2.30 1.60 1.40 1.70
VEL2    6.0  .60 0.00 0.00
CAL3    6.0     191.92       3.49
VEL3    6.0
VEL3    6.0        .05 0.00  .05  .05  .05  .05  .10  .20  .10  .30  .40
VEL3    6.0  .20  .30  .20  .20  .20  .30  .40  .40  .20  .10  .10 0.00
VEL3    6.0 0.00
ENDJ
```

Appendix E6. Summary of Calibration Details Middle Miller Creek (Medium-Low Flow) MIMILR4.IN4

Calibration Information for Calculated Discharges

Transect Number	1	2	3	4	5	6
Discharge	91	76	67	73	86	71
	6	5	6	4	6	1
Stage	190.70	190.98	191.34	191.61	192.23	192.91
	189.93	189.95	190.48	190.65	191.63	191.92
Plotting Stage	1.90	2.18	1.54	1.81	2.13	1.81
	1.13	1.15	0.68	0.85	1.53	0.82

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.8006	.7813	.3800	.5790	.1233	.8121
B =	.1915	.2372	.3296	.2654	.1228	.1878
SZF=	188.8	188.8	189.8	189.8	190.1	191.1

B Coefficient Log/Log Discharge/Stage Relationship

5.22	4.22	3.03	3.77	8.14	5.32

Appendix E7. Data Changes Middle Miller Creek (Medium-Low Flow)

Cell velocities changed for calibration

Transect 1	Vertical 3	Specified Mannings N of 0.5				
Transect 1	Vertical 34	VEL2	Changed	3.4	to	3.2
Transect 1	Vertical 34	VEL3	Changed	0.0	to	0.2
Transect 1	Vertical 35	VEL3	Changed	0.0	to	0.1
Transect 3	Vertical 12	VEL3	Changed	0.0	to	0.1
Transect 3	Vertical 18	VEL3	Changed	0.0	to	0.1
Transect 3	Vertical 19	VEL3	Changed	0.0	to	0.1
Transect 3	Vertical 38	Specified Mannings N of 1.5				
Transect 4	Vertical 12	VEL3	Changed	0.0	to	.05
Transect 4	Vertical 13	VEL3	Changed	0.0	to	.05
Transect 4	Vertical 14	VEL3	Changed	0.0	to	.05
Transect 4	Vertical 15	VEL3	Changed	0.0	to	.05
Transect 4	Vertical 43	Specified Mannings N of 3.0				
Transect 5	Used Depth Measurements From Low Flow Data Set					
Transect 6	Vertical 38	Specified Mannings N of 0.5				

Appendix E8. Velocity Adjustment Factors Middle Miller Creek (Medium-Low Flow)

Transect	Flow	VAF
1.00	5.0	.998
1.00	74.0	1.004
2.00	5.0	.972
2.00	74.0	1.008
3.00	5.0	.965
3.00	74.0	1.011
4.00	5.0	.997
4.00	74.0	.995
5.00	5.0	.998
5.00	74.0	.996
6.00	5.0	.984
6.00	74.0	.973

Appendix F

Upper Miller Creek Site Calibration Information

Appendix F1. IFG4 Input File Upper Miller Creek (High-Medium Flow)

```
UPPER MILLER CREEK              IFIM   UPMILR3.IN4
Q/DATE MEASURED  58 CFS ON 12-22-88, 34 ON 12-1-88
IOC        0000000200000000000000
QARD  34.00
QARD  58.00
QARD 100.00
XSEC   1.0        0.01.00    193.2
       1.0  0.0198.7  1.0194.8  2.0194.3  3.0194.1  3.5193.9  4.0193.8
       1.0  4.5193.8  5.0193.8  5.5193.8  6.0193.5  6.5193.4  7.0193.2
       1.0  7.5193.4  8.0193.3  8.5193.2  9.0193.3  9.5193.4 10.0193.2
       1.0 10.5193.3 11.0193.7 11.5193.7 12.0193.5 12.5193.7 13.0193.5
       1.0 13.5193.9 14.0193.6 15.0193.6 16.0193.7 17.0193.8 18.3193.8
       1.0 22.0194.6 24.0194.4 30.0194.6 32.0194.7 34.0194.7 35.5194.8
       1.0 36.0195.0 42.0195.5 51.7196.9
NS     1.0      12.60  1.512.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      76.60      76.60  1.576.60
NS     1.0      76.60        .50        .50
CAL1   1.0     194.81      49.43
VEL1   1.0            2.00 2.20 2.10 2.20 2.10 2.40 2.40 2.70 2.90 3.00
VEL1   1.0 2.70 2.50 2.50 2.70 2.70 2.20 2.50 2.40 2.50 2.40 2.70 2.70
VEL1   1.0 2.60 2.00 1.90 1.30 2.30 2.80  .90 1.30  .50  .40  .20
VEL1   1.0
CAL2   1.0     194.64      34.64
VEL2   1.0            1.00  .90 1.20 1.60 2.30 2.50 2.30 1.90 2.00 1.70
VEL2   1.0 2.20 2.10 1.90 2.10 2.20 2.30 2.20 2.20 1.90 1.90 2.30 2.20
VEL2   1.0 2.40 1.70 1.80 1.30 1.30 2.80 1.70 1.00 0.00
VEL2   1.0
XSEC   2.0       60.01.00    193.2
       2.0  0.0195.9   .9195.0  1.2194.4  2.1193.9  3.0193.5  4.0193.7
       2.0  5.0193.8  5.5193.1  6.0192.9  7.0192.9  7.5192.9  8.0192.9
       2.0  9.0193.2 10.0194.0 11.0193.9 12.0193.5 12.5193.5 13.0193.4
       2.0 14.0193.8 15.0193.6 16.0194.1 17.0194.4 18.0194.2 19.0194.0
       2.0 19.6194.2 22.0194.2 24.0194.1 26.0194.1 28.0194.3 30.0194.6
       2.0 32.0194.7 33.6194.8 35.0195.0 40.0195.6 49.4196.9
NS     2.0        .50        .50        .50      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      76.60      76.60      76.60        .50
CAL1   2.0     195.05      63.58
VEL1   2.0             .20  .80 1.00 1.80 2.00 1.60 2.10 2.90 3.30 2.80
VEL1   2.0  .50 3.60 2.60 1.30 1.20 1.50 2.00 1.80 2.60 3.10 2.60 1.60
VEL1   2.0 2.10 1.90 2.40 1.80 1.80 1.20  .60  .10
CAL2   2.0     194.74      46.62
VEL2   2.0                   .90  .60 1.70 1.50 2.10 1.90 2.50 2.80 3.00
```

Appendix F1. Continued

```
VEL2    2.0  .80 2.30 2.10 1.40 1.10 1.50 1.70 1.80 1.50 3.00 1.80 1.90
VEL2    2.0 1.80  .60 2.10 1.10  .70  .70  .40
XSEC    3.0     450.01.00    193.5
        3.0  0.0197.7  1.5195.2  1.9194.3  2.0194.3  4.0194.2  7.8194.2
        3.0  8.0194.2  9.0193.9 10.0194.4 11.0193.5 12.0193.7 13.0193.7
        3.0 14.0194.0 15.0193.8 16.0193.6 17.0193.7 18.0193.8 19.0193.8
        3.0 20.0193.8 21.0194.0 22.0194.2 23.0194.0 24.0194.2 25.0194.4
        3.0 26.0194.6 27.0194.8 28.0194.4 29.0194.4 31.0194.7 32.0195.0
        3.0 33.6195.2 34.0195.2 39.7196.6 42.3197.7
NS      3.0      8.90      8.90      8.90      8.90     87.60     87.60
NS      3.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      3.0     87.60     87.60     76.50     76.50     76.50     76.50
NS      3.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      3.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      3.0      7.80      7.80      7.80      7.80
CAL1    3.0    195.16     62.17
VEL1    3.0            .90 1.10 1.70 2.60 1.70 1.50 2.70 3.00 1.60 2.60
VEL1    3.0 1.80 1.30 3.10 3.00 1.90 2.40 1.60 1.20  .70  .90 1.30 2.60
VEL1    3.0 2.70 1.70 1.30 1.60  .30  .10
CAL2    3.0    194.85     38.52
VEL2    3.0            .20  .60 1.00 1.40 1.40  .70 1.50 2.70 2.40 1.70
VEL2    3.0 1.10  .90 2.00 2.50 2.00 2.40 2.20 1.40 1.20 1.10 1.40 2.00
VEL2    3.0 2.30  .90  .80  .80  .20
XSEC    4.0      60.01.00    194.3
        4.0  0.0199.3 11.5195.4 12.0195.2 12.5194.8 13.5194.6 14.0195.2
        4.0 15.0194.5 16.0194.4 17.0194.5 18.0194.7 19.0194.9 20.0194.6
        4.0 21.0194.6 22.0194.3 23.0194.6 24.0194.4 25.0194.5 26.0194.4
        4.0 27.0194.6 28.0194.6 29.0194.6 30.0194.9 31.0194.6 32.0194.5
        4.0 33.0194.5 34.0194.6 35.0194.5 36.0194.5 37.0194.6 38.0194.6
        4.0 39.0194.6 40.0194.9 41.0195.0 42.0194.9 44.0195.2 45.3195.3
        4.0 45.5195.4 46.0195.5 49.8196.8
NS      4.0       .50  1.5  .50       .50     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      4.0     87.60     87.60     97.60     87.60     87.60     87.60
NS      4.0      8.80      8.80      8.80
CAL1    4.0    195.45     53.66
VEL1    4.0           1.60 1.30 1.50 1.50 1.10  .70 2.40 2.20 2.20 2.30
VEL1    4.0 3.60 1.90 3.10 2.80 3.10 2.80 3.40 3.00 2.80 3.90 3.90 2.80
VEL1    4.0 1.80 1.90 1.90 3.50 1.60 2.40 2.30 1.80 1.70  .90  .40  .10
VEL1    4.0
CAL2    4.0    195.16     34.31
VEL2    4.0                1.10 1.70 1.90 1.50  .70 2.10 1.30 2.50 1.30
VEL2    4.0 2.20 2.40 2.00 2.40 2.40 2.90 2.80 1.50 1.90 2.30 2.60 1.10
VEL2    4.0 1.30 2.10 1.80 2.90 1.90 1.60 2.10 1.70  .35  .80 0.00
VEL2    4.0
XSEC    5.0     370.01.00    194.4
        5.0  0.0200.1  5.0195.7  7.0195.1  9.0195.2 12.5195.1 13.0195.2
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Appendix F1. Continued

```
        5.0 14.0194.6 15.0194.6 16.0195.1 17.0194.9 18.0194.9 19.0194.7
        5.0 20.0195.2 21.0195.1 22.0194.9 23.0194.7 24.0194.5 25.0194.7
        5.0 26.0194.6 27.0194.7 28.0194.7 29.0194.7 30.0194.9 31.0194.9
        5.0 32.0194.4 33.0194.7 34.0194.5 35.0194.5 36.0195.5 37.6195.6
        5.0 39.0195.6 41.0195.5 41.7195.7 43.5198.0
NS      5.0     10.50  1.510.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     76.50     76.50
NS      5.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      5.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      5.0     76.50     76.50      7.80      7.80
CAL1    5.0    195.74     54.88
VEL1    5.0            .60 1.30  .90 1.70 2.70 2.70 2.00 1.50 1.20 2.50
VEL1    5.0 2.60 2.30 3.20 2.20 2.30 2.80 1.40 2.10 2.00 2.20 1.80 2.00
VEL1    5.0 2.50 1.50 2.40 1.30 1.80 1.60 1.20  .10
CAL2    5.0    195.54     39.58
VEL2    5.0            .60  .80  .90 1.00 2.10 2.10 1.80 1.10 0.00 1.60
VEL2    5.0 2.00 2.60 2.50 2.30 2.20 2.50 1.00 1.30 2.20 1.20 1.30 1.40
VEL2    5.0 1.20 1.50 1.90 1.00 1.70 1.30 1.20
ENDJ
```

Appendix F2. Summary of Calibration Details Upper Miller Creek (High-Medium Flow) UPMILR3.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5

Discharge

53	69	59	61	52
36	42	34	31	31

Stage

194.81	195.05	195.16	195.45	195.74
194.64	194.74	194.85	195.16	195.54

Plotting Stage

1.61	1.85	1.66	1.15	1.34
1.44	1.54	1.35	0.86	1.14

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.4940	.3843	.3500	.1971	.3908
B =	.2980	.3716	.3816	.4300	.3116
SZF=	193.2	193.2	193.5	194.3	194.4

B Coefficient Log/Log Discharge/Stage Relationship

3.36	2.69	2.62	2.33	3.21

Appendix F3. Data Changes Upper Miller Creek (High-Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical	2	Specified	Mannings	N of	1.5	
Transect 1	Vertical	36	Specified	Mannings	N of	1.5	
Transect 3	Vertical	3	VEL1	Changed	1.1	to	0.9
Transect 3	Vertical	3	VEL2	Changed	0.0	to	0.2
Transect 4	Vertical	2	Specified	Mannings	N of	1.5	
Transect 5	Vertical	2	Specified	Mannings	N of	1.5	

Appendix F4. Velocity Adjustment Factors Upper Miller Creek (High-Medium Flow)

Transect	Flow	VAF
1.00	34.0	.997
1.00	58.0	.985
1.00	100.0	.862
2.00	34.0	.916
2.00	58.0	1.010
2.00	100.0	.798
3.00	34.0	.986
3.00	58.0	1.006
3.00	100.0	.908
4.00	34.0	.999
4.00	58.0	.996
4.00	100.0	.887
5.00	34.0	.967
5.00	58.0	1.002
5.00	100.0	.981

Appendix F5. IFG4 Input File Upper Miller Creek (Medium-Low Flow)

```
UPPER MILLER CREEK            IFIM   UPMILR4.IN4
Q/DATE MEASURED  34 CFS ON 12-1-88, 3 ON 8-2-88
IOC        0000000200000000000000
QARD   3.00
QARD  34.00
XSEC   1.0        0.01.00    193.2
       1.0  0.0198.7  1.0194.8  2.0194.3  3.0194.1  3.5193.9  4.0193.8
       1.0  4.5193.8  5.0193.8  5.5193.8  6.0193.5  6.5193.4  7.0193.2
       1.0  7.5193.4  8.0193.3  8.5193.2  9.0193.3  9.5193.4 10.0193.2
       1.0 10.5193.3 11.0193.7 11.5193.7 12.0193.5 12.5193.7 13.0193.5
       1.0 13.5193.9 14.0193.6 15.0193.6 16.0193.7 17.0193.8 18.3193.8
       1.0 22.0194.6 24.0194.4 30.0194.6 32.0194.7 34.0194.7 35.5194.8
       1.0 36.0195.0 42.0195.5 51.7196.9
NS     1.0      12.60      12.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      87.60      76.60      76.60      76.60
NS     1.0      76.60        .50        .50
CAL2   1.0     194.64      34.64
VEL2   1.0            1.00  .90 1.20 1.60 2.30 2.50 2.30 1.90 2.00 1.70
VEL2   1.0 2.20 2.10 1.90 2.10 2.20 2.30 2.20 2.20 1.90 1.90 2.30 2.20
VEL2   1.0 2.40 1.70 1.80 1.30 1.30 2.80 1.70 1.00 0.00
VEL2   1.0
CAL3   1.0     193.98       2.80
VEL3   1.0                        .05  .05  .10  .30  .60  .40  .40  .70
VEL3   1.0  .20  .20  .50  .30  .60  .20  .20  .60 1.00 1.00  .80  .60
VEL3   1.0  .10  .20  .20  .60  .05  .05
VEL3   1.0
XSEC   2.0       60.01.00    193.2
       2.0  0.0195.9   .9195.0  1.2194.4  2.1193.9  3.0193.5  4.0193.7
       2.0  5.0193.8  5.5193.1  6.0192.9  7.0192.9  7.5192.9  8.0192.9
       2.0  9.0193.2 10.0194.0 11.0193.9 12.0193.5 12.5193.5 13.0193.4
       2.0 14.0193.8 15.0193.6 16.0194.1 17.0194.4 18.0194.2 19.0194.0
       2.0 19.6194.2 22.0194.2 24.0194.1 26.0194.1 28.0194.3 30.0194.6
       2.0 32.0194.7 33.6194.8 35.0195.0 40.0195.6 49.4196.9
NS     2.0        .50        .50  1.5  .50      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     2.0      87.60      76.60      76.60      76.60        .50
CAL2   2.0     194.74      46.62
VEL2   2.0                  .90  .60 1.70 1.50 2.10 1.90 2.50 2.80 3.00
VEL2   2.0  .80 2.30 2.10 1.40 1.10 1.50 1.70 1.80 1.50 3.00 1.80 1.90
VEL2   2.0 1.80  .60 2.10 1.10  .70  .70  .40
CAL3   2.0     194.02       3.93
VEL3   2.0                 0.00  .30  .40  .70  .80  .50  .40  .10  .10
VEL3   2.0  .10 0.00  .20  .90  .80  .50  .50  .10 0.00 0.00 0.00 0.00
```

Appendix F5. Continued

```
VEL3    2.0
XSEC    3.0      450.01.00     193.5
        3.0  0.0197.7  1.5195.2  1.9194.3  2.0194.3  4.0194.2  7.8194.2
        3.0  8.0194.2  9.0193.9 10.0194.4 11.0193.5 12.0193.7 13.0193.7
        3.0 14.0194.0 15.0193.8 16.0193.6 17.0193.7 18.0193.8 19.0193.8
        3.0 20.0193.8 21.0194.0 22.0194.2 23.0194.0 24.0194.2 25.0194.4
        3.0 26.0194.6 27.0194.8 28.0194.4 29.0194.4 31.0194.7 32.0195.0
        3.0 33.6195.2 34.0195.2 39.7196.6 42.3197.7
NS      3.0       8.90       8.90  1.5 8.90       8.90      87.60      87.60
NS      3.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      3.0      87.60      87.60      76.50      76.50      76.50      76.50
NS      3.0      76.50      76.50      76.50      76.50      76.50      76.50
NS      3.0      76.50      76.50      76.50      76.50      76.50      76.50
NS      3.0       7.80       7.80       7.80       7.80
CAL2    3.0     194.85      38.52
VEL2    3.0             .20  .60 1.00 1.40 1.40  .70 1.50 2.70 2.40 1.70
VEL2    3.0 1.10  .90 2.00 2.50 2.00 2.40 2.20 1.40 1.20 1.10 1.40 2.00
VEL2    3.0 2.30  .90  .80  .80  .20
CAL3    3.0     194.14       4.50
VEL3    3.0                                .10  .50 0.00  .10  .30  .60
VEL3    3.0  .20  .10 1.30 1.30  .60 2.10  .40 1.20 0.00  .90 0.00  .10
VEL3    3.0 0.00
XSEC    4.0       60.01.00     194.3
        4.0  0.0199.3 11.5195.4 12.0195.2 12.5194.8 13.5194.6 14.0195.2
        4.0 15.0194.5 16.0194.4 17.0194.5 18.0194.7 19.0194.9 20.0194.6
        4.0 21.0194.6 22.0194.3 23.0194.6 24.0194.4 25.0194.5 26.0194.4
        4.0 27.0194.6 28.0194.6 29.0194.6 30.0194.9 31.0194.6 32.0194.5
        4.0 33.0194.5 34.0194.6 35.0194.5 36.0194.5 37.0194.6 38.0194.6
        4.0 39.0194.6 40.0194.9 41.0195.0 42.0194.9 44.0195.2 45.3195.3
        4.0 45.5195.4 46.0195.5 49.8196.8
NS      4.0        .50        .50        .50      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      4.0      87.60      87.60      97.60      87.60      87.60      87.60
NS      4.0       8.80       8.80       8.80
CAL2    4.0     195.16      34.31
VEL2    4.0                 1.10 1.70 1.90 1.50  .70 2.10 1.30 2.50 1.30
VEL2    4.0 2.20 2.40 2.00 2.40 2.40 2.90 2.80 1.50 1.90 2.30 2.60 1.10
VEL2    4.0 1.30 2.10 1.80 2.90 1.90 1.60 2.10 1.70  .35  .80 0.00
VEL2    4.0
CAL3    4.0     194.70       4.50
VEL3    4.0                       .10 0.00 1.20  .60  .10 0.00 0.00 1.40
VEL3    4.0  .70 1.40 1.30 1.30 1.60 1.40 1.50 1.00  .70 0.00  .10  .50
VEL3    4.0  .60  .40  .40 1.00  .60 1.30  .50
VEL3    4.0
XSEC    5.0      370.01.00     194.4
        5.0  0.0200.1  5.0195.7  7.0195.1  9.0195.2 12.5195.1 13.0195.2
        5.0 14.0194.6 15.0194.6 16.0195.1 17.0194.9 18.0194.9 19.0194.7
```

Appendix F5. Continued

```
        5.0 20.0195.2 21.0195.1 22.0194.9 23.0194.7 24.0194.5 25.0194.7
        5.0 26.0194.6 27.0194.7 28.0194.7 29.0194.7 30.0194.9 31.0194.9
        5.0 32.0194.4 33.0194.7 34.0194.5 35.0194.5 36.0195.5 37.6195.6
        5.0 39.0195.6 41.0195.5 41.7195.7 43.5198.0
NS      5.0     10.50     10.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     76.50     76.50
NS      5.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      5.0     76.50     76.50     76.50     76.50     76.50     76.50
NS      5.0     76.50     76.50      7.80      7.80
CAL2    5.0    195.54     39.58
VEL2    5.0            .60  .80  .90 1.00 2.10 2.10 1.80 1.10 0.00 1.60
VEL2    5.0 2.00 2.60 2.50 2.30 2.20 2.50 1.00 1.30 2.20 1.20 1.30 1.40
VEL2    5.0 1.20 1.50 1.90 1.00 1.70 1.30 1.20
CAL3    5.0    195.01      3.50
VEL3    5.0                      0.00  .30  .20 0.00  .20  .10  .50
VEL3    5.0 0.00 0.00  .90 1.10 1.20  .80  .78  .50  .50  .30  .60  .30
VEL3    5.0  .20  .50  .70  .70  .40
ENDJ
```

Appendix F6. Summary of Calibration Details Upper Miller Creek (Medium-Low Flow) UPMILR4.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5

Discharge

36	42	34	31	31
2	3	3	3	3

Stage

194.64	194.74	194.85	195.16	195.54
193.98	194.02	194.14	194.70	195.01

Plotting Stage

1.44	1.54	1.35	0.86	1.14
0.78	0.82	0.64	0.40	0.61

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.6441	.6598	.4591	.2657	.4436
B =	.2241	.2269	.3049	.3429	.2747
SZF=	193.2	193.2	193.5	194.3	194.4

B Coefficient Log/Log Discharge/Stage Relationship

4.46	4.41	3.28	2.92	3.64

Appendix F7. Data Changes Upper Miller Creek (Medium-Low Flow)

Cell velocities changed for calibration

Transect 1	Vertical	5	VEL3	Changed	0.0	to	.05
Transect 1	Vertical	6	VEL3	Changed	0.0	to	.05
Transect 1	Vertical	29	VEL3	Changed	0.0	to	.05
Transect 1	Vertical	30	VEL3	Changed	0.0	to	.05
Transect 2	Vertical	3	Specified	Mannings	N of	1.5	
Transect 3	Vertical	3	Specified	Mannings	N of	1.5	
Transect 4	Vertical	5	Vel3	Changed	0.0	to	0.1

Appendix F8. Velocity Adjustment Factors Upper Miller Creek (Medium-Low Flow)

Transect	Flow	VAF
1.00	3.0	1.007
1.00	34.0	1.005
2.00	3.0	.929
2.00	34.0	.997
3.00	3.0	.945
3.00	34.0	1.013
4.00	3.0	1.051
4.00	34.0	1.000
5.00	3.0	.990
5.00	34.0	1.003

Appendix G

Lower Christmas Creek Site Calibration Information

Appendix G1. IFG4 Input File Lower Christmas Creek (High-Medium Flow)

```
LOWER CHRISTMAS CREEK          IFIM   LOXMAS3.IN4
Q/DATE MEASURED  144 CFS ON 12-29-88, 66 ON 11-30-88
IOC        00000002000000000000
QARD  66.00
QARD 144.00
QARD 250.00
XSEC   1.0        0.01.00    192.2
       1.0  0.0199.5  6.0195.2  7.0195.2  8.0195.0  9.0194.9 10.0194.8
       1.0 11.0194.1 12.0194.3 13.0194.0 13.5193.1 14.0192.9 15.0193.0
       1.0 16.0192.9 17.0192.9 18.0192.8 19.0192.8 20.0192.8 21.0192.9
       1.0 22.0193.0 23.0192.2 24.0193.1 25.0193.0 26.0192.9 27.0192.9
       1.0 28.0192.9 29.0192.9 30.0193.0 31.0193.0 32.0193.2 33.0193.3
       1.0 34.0193.9 34.5193.7 36.0194.0 37.0194.2 39.0194.7 41.0194.4
       1.0 43.0194.9 45.0194.5 47.5194.7 48.0195.2 51.0195.2 56.0196.5
       1.0 65.5198.6
NS     1.0        .50        .50      36.80      36.80      93.80      93.80
NS     1.0      93.80      93.80      93.80      93.80      93.80      93.80
NS     1.0      38.80      38.80      38.80      38.80      38.80      38.80
NS     1.0      38.80      63.60      63.60      63.60      63.60      63.60
NS     1.0      63.60      63.60      63.60      63.60      63.60      63.60
NS     1.0      96.80      96.80      96.80      96.80      96.80      96.80
NS     1.0      96.80      83.50      83.50      83.50      83.50        .50
NS     1.0        .50
CAL1   1.0     195.17     163.09
VEL1   1.0                   .70  .90 1.70 2.60 3.80 4.60 4.00 3.30 3.50
VEL1   1.0 3.20 2.80 2.40 2.40 2.70 2.40 3.00 3.50 2.90 2.75 3.70 3.40
VEL1   1.0 3.70 2.20 2.50 2.30 2.50 2.10 2.40 2.60 2.30 2.30 1.70 1.00
VEL1   1.0 1.00  .80  .60
CAL2   1.0     194.73      66.21
VEL2   1.0                                  2.80 1.50 1.50 3.40 3.10
VEL2   1.0 2.50 3.00 2.30 2.80 2.80 2.50 2.60 3.20 3.40 1.20 3.60 3.60
VEL2   1.0 3.30 3.20 2.20 1.50 1.80 1.90 2.00 2.20 2.00 1.20 0.00  .30
VEL2   1.0 0.00  .50
XSEC   2.0       95.01.00    192.2
       2.0  0.0196.4   .1195.2  1.0193.9  2.0193.4  3.0192.9  4.0192.8
       2.0  5.0192.8  6.0192.5  7.0193.0  8.0191.9  9.0191.8 10.0191.8
       2.0 11.0191.7 12.0191.8 13.0191.9 14.0192.1 15.0192.1 16.0192.7
       2.0 17.0192.8 18.0192.7 19.0192.7 20.0192.8 21.0193.4 22.0193.2
       2.0 23.0193.4 24.0193.3 24.5194.1 27.0193.6 29.0193.9 31.0194.0
       2.0 33.0194.0 35.0194.0 37.0194.4 39.0194.7 41.0194.6 41.5194.8
       2.0 43.0194.9 44.1195.2 46.0194.4 49.4195.1 54.6196.6 56.2199.8
NS     2.0        .50        .50        .50      23.50      23.50      23.50
NS     2.0      23.50      23.50      23.80      23.80      23.80      23.80
NS     2.0      23.80      23.80      23.80      37.50      37.50      37.50
NS     2.0      37.50      37.50      37.50      37.50      57.80      57.80
NS     2.0      57.80      57.80      57.80      86.60      86.60      86.60
NS     2.0      86.60      86.60      86.60      86.60      86.60  0.386.60
NS     2.0      86.60      86.60      86.60      86.70      20.50      20.50
CAL1   2.0     195.19     159.59
VEL1   2.0            0.00  .05  .05  .05  .05  .30 2.80 2.75 3.10 3.25
```

Appendix G1. Continued

```
VEL1    2.0 3.15 2.50 1.80 1.65 1.35 2.10 3.10 2.70 2.50 2.30 3.20 3.80
VEL1    2.0 2.70 2.70 3.60 2.90 2.70  .90 1.40 1.00  .80  .60  .30 0.00
VEL1    2.0 0.00
CAL2    2.0    194.74     93.56
VEL2    2.0           0.00  .10  .10  .10  .10  .10  .90  .90 2.30 1.90
VEL2    2.0 1.80 2.25 2.10 1.85 1.50 1.70 2.10 2.20 2.40 2.30 3.60 3.00
VEL2    2.0 2.50 1.60 1.10 2.20 1.60  .20 1.10  .40  .30 0.00 0.00
VEL2    2.0
XSEC    3.0     220.01.00    193.2
        3.0  0.0199.5   .5195.2  3.0194.0  4.0193.6  5.0193.5  6.0193.9
        3.0  7.0193.9  8.0193.7  9.0193.5 10.0193.5 11.0194.1 12.0194.2
        3.0 13.0193.9 14.0193.5 15.0193.3 16.0193.3 17.0193.7 18.0193.4
        3.0 19.0193.3 20.0193.2 21.0193.5 22.0193.8 23.0193.6 24.0193.6
        3.0 25.0193.7 26.0194.1 27.0194.1 28.0194.0 29.0193.8 30.0193.7
        3.0 31.0194.2 33.0194.8 35.0194.6 37.0194.3 39.0194.3 41.0195.1
        3.0 42.0194.9 45.0195.2 53.0195.6 57.0196.7 61.5197.0 63.5200.1
NS      3.0        .50        .50        .50      87.70      87.70      87.70
NS      3.0      87.70      87.70      87.70      87.70      87.70      87.70
NS      3.0      87.70      87.70      87.70      75.50      75.50      75.50
NS      3.0      75.50      75.50      75.50      75.50      75.50      75.50
NS      3.0      75.50      75.50      75.50      78.50      78.50      78.50
NS      3.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      3.0      78.50      78.50      68.70      68.70        .50        .50
CAL1    3.0     195.22     143.27
VEL1    3.0            .60 1.00 2.30 2.10 2.80 3.00 3.70 4.10 4.00 4.30
VEL1    3.0 4.10 2.60 3.50 3.00 3.90 3.80 2.10 1.80 2.70 3.00 3.60 3.50
VEL1    3.0 3.10 3.70 3.80 2.90 2.40 2.40 3.50 3.00 3.10 1.00 2.80 1.60
VEL1    3.0  .60
CAL2    3.0    194.99     49.81
VEL2    3.0            .20  .60 1.20  .80 2.10 1.70 1.90 2.20 1.50 1.90
VEL2    3.0 1.90 1.90 1.70 1.50 1.70 1.30  .60  .50 1.30 2.20 2.00  .90
VEL2    3.0 1.40 2.20 1.00 1.80 1.20 1.20 1.30 2.00 1.50  .90 1.00
VEL2    3.0
XSEC    4.0     185.01.00    193.2
        4.0  0.0197.6  5.1195.3  5.5195.2  7.0195.1  8.0195.1  9.0194.6
        4.0 10.5194.8 11.0194.2 12.0194.3 13.0194.2 14.0194.0 15.0193.9
        4.0 16.0193.9 17.0193.8 18.0193.4 19.0193.3 20.0193.3 21.0193.6
        4.0 22.0193.9 23.0193.6 24.0192.7 25.0193.8 26.0194.2 27.0194.0
        4.0 28.0193.7 29.0193.7 30.0194.0 31.0193.8 32.0193.9 33.0194.2
        4.0 34.0194.0 35.0194.0 36.0194.0 37.0194.4 38.0193.9 39.0194.2
        4.0 41.0194.5 42.5194.7 43.0194.9 44.0195.2 45.0195.2 47.0195.3
        4.0 53.0195.9 60.5196.3 63.5197.3 64.6199.3 65.8202.3
NS      4.0        .50        .50        .50      68.80      68.80      68.80
NS      4.0      68.80      68.80      68.80      68.80      68.80      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.80
NS      4.0      87.80      87.80      87.80      87.80      87.80      87.80
NS      4.0      87.80      87.80      87.80      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      4.0      87.60      87.60      87.60      56.80      56.80      56.80
NS      4.0        .50        .50        .50        .50        .50
```

Appendix G1. Continued

```
CAL1   4.0    195.33    123.75
VEL1   4.0            .20 1.00  .80 1.80 2.50 1.90 3.60 2.90 3.80 3.30
VEL1   4.0 4.00 3.90 3.40 3.50 3.30 2.50 3.30 3.10 2.00 2.10 2.70 2.40
VEL1   4.0 2.90 1.60 1.30 1.50 1.40 1.10 1.30 1.30 1.30  .90 1.40 1.10
VEL1   4.0  .80  .60  .20  .10  .10
CAL2   4.0    195.08     48.98
VEL2   4.0                .60  .10  .80  .60  .90 1.90 1.70 1.50 1.50
VEL2   4.0 1.90 2.00 1.30 2.20 1.80 1.50 1.30 1.60 1.00 1.10 1.40 1.10
VEL2   4.0 1.30 1.10 1.20 1.30 1.30 1.20  .80 1.30  .80 1.20 1.00  .70
VEL2   4.0  .80  .30
XSEC   5.0     185.01.00    193.2
       5.0  0.0200.8  5.5195.5  7.0194.6  8.2194.3  9.0193.7 10.0193.7
       5.0 11.0193.5 12.0193.3 13.0193.6 14.0193.3 15.0193.4 16.0193.3
       5.0 17.0193.4 18.0193.2 19.0193.1 20.0193.1 21.0193.1 22.0193.2
       5.0 23.0193.2 24.0193.3 25.0193.3 26.0193.5 27.0193.7 28.0193.7
       5.0 29.0193.8 30.0193.9 31.0193.9 32.0194.2 33.0194.1 34.0193.9
       5.0 35.0193.8 36.5194.3 38.0194.3 40.0194.4 42.0194.6 44.0195.1
       5.0 46.0195.3 48.0195.2 49.0195.2 50.8195.5 51.0195.8 52.0196.9
       5.0 54.8197.9
NS     5.0       .50       .50     65.80     65.80     65.80     87.60
NS     5.0     87.60     87.60     87.60     87.60     87.60     85.90
NS     5.0     85.90     85.90     85.90     85.60     85.60     85.60
NS     5.0     85.60     85.60     85.60     85.60     85.60     35.90
NS     5.0     35.90     35.90     35.90     35.90     35.90     35.90
NS     5.0     35.90     35.90     78.60     78.60     78.60     86.60
NS     5.0     86.60     86.60     86.60     86.60       .50       .50
NS     5.0       .50
CAL1   5.0    195.47    133.56
VEL1   5.0            .50 1.20 1.10 1.60 1.90 1.90 1.60 2.10 2.20 2.20
VEL1   5.0 2.60 2.20 2.90 2.70 2.70 3.10 2.60 2.30 2.60 2.70 2.40 2.40
VEL1   5.0 1.90 2.20 2.20 2.50 2.40 1.60 1.40 1.80 1.30 1.00 1.10 1.20
VEL1   5.0  .90  .30  .50
CAL2   5.0    195.22     52.11
VEL2   5.0            .10  .10  .10  .90 1.30 1.30 1.00 1.10 1.20 1.10
VEL2   5.0 1.70 1.30 1.30 1.10 1.30 1.20 1.20  .90 1.40 1.30 1.00 1.10
VEL2   5.0 1.00  .90  .80 1.20 1.20  .70 1.00  .60  .40  .80  .40  .80
VEL2   5.0 0.00
XSEC   6.0     220.01.00    193.5
       6.0  0.0199.0  7.5195.7  8.0195.7  9.0194.9 10.0194.1 11.0194.7
       6.0 13.0194.8 14.0195.2 15.1195.0 16.0194.3 17.0195.1 18.0193.9
       6.0 19.0193.5 20.0193.5 21.0194.1 22.0194.1 23.0193.9 24.0194.0
       6.0 25.0193.7 26.0193.8 27.0193.9 28.0194.0 29.0193.9 30.0194.0
       6.0 31.0194.0 32.0194.2 33.0194.1 34.0193.8 35.0193.8 36.0194.0
       6.0 37.0194.2 37.5194.4 39.0194.5 41.0194.7 43.0194.6 45.0195.4
       6.0 46.0195.3 46.1195.7 48.0196.3 49.2197.7
NS     6.0     87.90     87.90     87.90     87.90     87.90     87.90
NS     6.0     87.90     87.90     87.90     87.90     58.60     58.60
NS     6.0     58.60     58.60     58.60     58.60     58.60     58.60
NS     6.0     58.60     64.60     64.60     64.60     64.60     64.60
NS     6.0     64.60     64.60     64.60     64.60     87.60     87.60
```

Appendix G2. Summary of Calibration Details Lower Christmas Creek (High-Medium Flow) LOXMAS3.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5	6

Discharge

161	159	146	109	132	148
107	92	58	50	55	58

Stage

195.17	195.19	195.22	195.33	195.47	195.74
194.73	194.74	194.99	195.08	195.22	196.46

Plotting Stage

2.97	2.99	2.02	2.13	2.27	2.24
2.53	2.54	1.79	1.88	2.02	1.96

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.4084	.6636	.1055	.1006	.1184	.1101
B =	.3906	.2968	.1304	.1598	.1334	.1421
SZF=	192.2	192.2	193.2	193.2	193.2	193.5

B Coefficient Log/Log Discharge/Stage Relationship

2.56	3.37	7.67	6.26	7.50	7.03

Appendix G3. Data Changes Lower Christmas Creek (High-Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical	7	VEL1	Changed	2.8	to	2.6
Transect 1	Vertical	35	VEL1	Changed	1.9	to	1.7
Transect 1	Vertical	36	VEL1	Changed	1.2	to	1.0
Transect 2	Vertical	8	VEL1	Changed	0.5	to	0.3
Transect 2	Vertical	9	VEL1	Changed	3.0	to	2.8
Transect 2	Vertical	9	VEL2	Changed	0.7	to	0.9
Transect 2	Vertical	27	VEL1	Changed	3.8	to	3.6
Transect 2	Vertical	30	VEL1	Changed	1.1	to	0.9
Transect 2	Vertical	33	VEL1	Changed	1.0	to	0.8
Transect 2	Vertical	33	VEL2	Changed	0.1	to	0.3
Transect 2	Vertical	36	Specified	Mannings	N of	0.3	
Transect 3	Vertical	13	VEL2	Changed	1.7	to	1.9
Transect 3	Vertical	17	VEL1	Changed	4.1	to	3.9
Transect 4	Vertical	7	VEL1	Changed	2.7	to	2.5
Transect 4	Vertical	39	VEL1	Changed	0.4	to	0.2
Transect 5	Vertical	3	VEL2	Changed	0.0	to	0.1

Appendix G4. Velocity Adjustment Factors Lower Christmas Creek
(High-Medium Flow)

Transect	Flow	VAF
1.00	66.0	.992
1.00	144.0	1.006
1.00	250.0	.960
2.00	66.0	.928
2.00	144.0	1.010
2.00	250.0	.868
3.00	66.0	1.008
3.00	144.0	1.000
3.00	250.0	.974
4.00	66.0	1.008
4.00	144.0	.993
4.00	250.0	.950
5.00	66.0	1.008
5.00	144.0	.996
5.00	250.0	.942
6.00	66.0	1.005
6.00	144.0	.999
6.00	250.0	.969

Appendix G5. IFG4 Input File Lower Christmas Creek (Medium-Low Flow)

```
LOWER CHRISTMAS CREEK        IFIM   LOXMAS4.IN4
Q/DATE MEASURED  66 CFS ON 11-30-88, 5 ON 8-5-88
IOC       0000000200000000000000
QARD   5.00
QARD  66.00
XSEC   1.0       0.01.00    192.2
       1.0  0.0199.5  6.0195.2  7.0195.2  8.0195.0  9.0194.9 10.0194.8
       1.0 11.0194.1 12.0194.3 13.0194.0 13.5193.1 14.0192.9 15.0193.0
       1.0 16.0192.9 17.0192.9 18.0192.8 19.0192.8 20.0192.8 21.0192.9
       1.0 22.0193.0 23.0192.2 24.0193.1 25.0193.0 26.0192.9 27.0192.9
       1.0 28.0192.9 29.0192.9 30.0193.0 31.0193.0 32.0193.2 33.0193.3
       1.0 34.0193.9 34.5193.7 36.0194.0 37.0194.2 39.0194.7 41.0194.4
       1.0 43.0194.9 45.0194.5 47.5194.7 48.0195.2 51.0195.2 56.0196.5
       1.0 65.5198.6
NS     1.0       .50       .50     36.80     36.80     93.80     93.80
NS     1.0  0.593.80     93.80     93.80     93.80     93.80     93.80
NS     1.0     38.80     38.80     38.80     38.80     38.80     38.80
NS     1.0     38.80     63.60     63.60     63.60     63.60     63.60
NS     1.0     63.60     63.60     63.60     63.60     63.60     63.60
NS     1.0     96.80     96.80     96.80     96.80     96.80     96.80
NS     1.0     96.80     83.50     83.50     83.50     83.50       .50
NS     1.0       .50
CAL2   1.0    194.73     66.21
VEL2   1.0                                    2.80 1.50 1.50 3.40 3.10
VEL2   1.0 2.50 3.00 2.30 2.80 2.80 2.50 2.60 3.20 3.40 1.20 3.60 3.60
VEL2   1.0 3.30 3.20 2.20 1.50 1.80 1.90 2.00 2.20 2.00 1.20 0.00  .30
VEL2   1.0 0.00  .50
CAL3   1.0    193.39      5.94
VEL3   1.0                                                 .10  .60
VEL3   1.0  .50  .60  .60  .60  .60  .60  .50  .80  .20 1.10  .30  .50
VEL3   1.0  .80  .50 1.10  .50  .50  .20 0.00
VEL3   1.0
XSEC   2.0      95.01.00    192.2
       2.0  0.0196.4   .1195.2  1.0193.9  2.0193.4  3.0192.9  4.0192.8
       2.0  5.0192.8  6.0192.5  7.0193.0  8.0191.9  9.0191.8 10.0191.8
       2.0 11.0191.7 12.0191.8 13.0191.9 14.0192.1 15.0192.1 16.0192.7
       2.0 17.0192.8 18.0192.7 19.0192.7 20.0192.8 21.0193.4 22.0193.2
       2.0 23.0193.4 24.0193.3 24.5194.1 27.0193.6 29.0193.9 31.0194.0
       2.0 33.0194.0 35.0194.0 37.0194.4 39.0194.7 41.0194.6 41.5194.8
       2.0 43.0194.9 44.1195.2 46.0194.4 49.4195.1 54.6196.6 56.2199.8
NS     2.0       .50       .50       .50     23.50     23.50     23.50
NS     2.0     23.50     23.50     23.80     23.80     23.80     23.80
NS     2.0     23.80     23.80     23.80     37.50     37.50     37.50
NS     2.0     37.50     37.50     37.50     37.50     57.80     57.80
NS     2.0     57.80     57.80     57.80     86.60     86.60     86.60
NS     2.0     86.60     86.60     86.60     86.60     86.60     86.60
NS     2.0     86.60     86.60     86.60     86.70     20.50     20.50
CAL2   2.0    194.74     93.56
VEL2   2.0           0.00  .10  .10  .10  .10  .10  .70  .90 2.30 1.90
VEL2   2.0 1.80 2.25 2.10 1.85 1.50 1.70 2.10 2.20 2.40 2.30 3.60 3.00
```

Appendix G5. Continued

```
VEL2    2.0 2.50 1.60 1.10 2.20 1.60  .20 1.10  .40  .10 0.00 0.00
VEL2    2.0
CAL3    2.0    193.41      4.85
VEL3    2.0                     0.00  .05  .05  .05  .05  .05  .10  .10
VEL3    2.0  .20  .20  .50  .80  .90  .90  .30  .40  .20  .05  .05  .05
VEL3    2.0  .05  .05
VEL3    2.0
XSEC    3.0     220.01.00    193.2
        3.0  0.0199.5   .5195.2  3.0194.0  4.0193.6  5.0193.5  6.0193.9
        3.0  7.0193.9  8.0193.7  9.0193.5 10.0193.5 11.0194.1 12.0194.2
        3.0 13.0193.9 14.0193.5 15.0193.3 16.0193.3 17.0193.7 18.0193.4
        3.0 19.0193.3 20.0193.2 21.0193.5 22.0193.8 23.0193.6 24.0193.6
        3.0 25.0193.7 26.0194.1 27.0194.1 28.0194.0 29.0193.8 30.0193.7
        3.0 31.0194.2 33.0194.8 35.0194.6 37.0194.3 39.0194.3 41.0195.1
        3.0 42.0194.9 45.0195.2 53.0195.6 57.0196.7 61.5197.0 63.5200.1
NS      3.0       .50       .50  0.5  .50     87.70     87.70     87.70
NS      3.0     87.70     87.70     87.70     87.70     87.70     87.70
NS      3.0     87.70     87.70     87.70     75.50     75.50     75.50
NS      3.0     75.50     75.50     75.50     75.50     75.50     75.50
NS      3.0     75.50     75.50     75.50     78.50     78.50     78.50
NS      3.0     78.50     78.50     78.50     78.50     78.50     78.50
NS      3.0     78.50     78.50     68.70     68.70       .50       .50
CAL2    3.0    194.99     49.81
VEL2    3.0            .20  .60 1.20  .80 2.10 1.70 1.90 2.20 1.50 1.90
VEL2    3.0 1.70 1.90 1.70 1.50 1.70 1.30  .60  .50 1.30 2.20 2.00  .90
VEL2    3.0 1.40 2.20 1.00 1.80 1.20 1.20 1.30 1.80 1.50  .90 1.00
VEL2    3.0
CAL3    3.0    193.83      5.47
VEL3    3.0                .40  .20  .50 1.20 0.00  .30  .50 0.00  .60
VEL3    3.0 0.00 1.20  .80  .50  .90 2.10 2.30 1.60 1.00 0.00  .60  .60
VEL3    3.0  .30 0.00 0.00 0.00 0.00 0.00 0.00
VEL3    3.0
XSEC    4.0     185.01.00    193.2
        4.0  0.0197.6  5.1195.3  5.5195.2  7.0195.1  8.0195.1  9.0194.6
        4.0 10.5194.8 11.0194.2 12.0194.3 13.0194.2 14.0194.0 15.0193.9
        4.0 16.0193.9 17.0193.8 18.0193.4 19.0193.3 20.0193.3 21.0193.6
        4.0 22.0193.9 23.0193.6 24.0192.7 25.0193.8 26.0194.2 27.0194.0
        4.0 28.0193.7 29.0193.7 30.0194.0 31.0193.8 32.0193.9 33.0194.2
        4.0 34.0194.0 35.0194.0 36.0194.0 37.0194.4 38.0193.9 39.0194.2
        4.0 41.0194.5 42.5194.7 43.0194.9 44.0195.2 45.0195.2 47.0195.3
        4.0 53.0195.9 60.5196.3 63.5197.3 64.6199.3 65.8202.3
NS      4.0       .50       .50       .50     68.80     68.80     68.80
NS      4.0     68.80     68.80     68.80     68.80     68.80     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.80
NS      4.0     87.80     87.80     87.80     87.80     87.80     87.80
NS      4.0     87.80     87.80     87.80     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     87.60     87.60     87.60
NS      4.0     87.60     87.60     87.60     56.80     56.80     56.80
NS      4.0       .50       .50       .50       .50       .50
CAL2    4.0    195.08     48.98
```

Appendix G5. Continued

```
VEL2    4.0                  .60  .10  .80  .60  .90 1.90 1.70 1.50 1.50
VEL2    4.0 1.90 2.00 1.30 2.20 1.80 1.50 1.30 1.60 1.00 1.10 1.40 1.10
VEL2    4.0 1.30 1.10 1.20 1.30 1.30 1.20  .80 1.30  .80 1.20 1.00  .70
VEL2    4.0  .80  .30
CAL3    4.0    194.05     5.475
VEL3    4.0                                   0.00 0.00  .40  .30  .90
VEL3    4.0  .90 1.40 1.60  .80  .50  .50  .50  .50  .90 1.10  .20  .40
VEL3    4.0  .30  .30  .30  .10 0.00 0.00 0.00 0.00 0.00
VEL3    4.0
XSEC    5.0     185.01.00    193.2
        5.0  0.0200.8  5.5195.5  7.0194.6  8.2194.3  9.0193.7 10.0193.7
        5.0 11.0193.5 12.0193.3 13.0193.6 14.0193.3 15.0193.4 16.0193.3
        5.0 17.0193.4 18.0193.2 19.0193.1 20.0193.1 21.0193.1 22.0193.2
        5.0 23.0193.2 24.0193.3 25.0193.3 26.0193.5 27.0193.7 28.0193.7
        5.0 29.0193.8 30.0193.9 31.0193.9 32.0194.2 33.0194.1 34.0193.9
        5.0 35.0193.8 36.5194.3 38.0194.3 40.0194.4 42.0194.6 44.0195.1
        5.0 46.0195.3 48.0195.2 49.0195.2 50.8195.5 51.0195.8 52.0196.9
        5.0 54.8197.9
NS      5.0       .50       .50     65.80     65.80     65.80     87.60
NS      5.0     87.60     87.60     87.60     87.60     87.60     85.90
NS      5.0     85.90     85.90     85.90     85.60     85.60     85.60
NS      5.0     85.60     85.60     85.60     85.60     85.60     35.90
NS      5.0     35.90     35.90     35.90     35.90     35.90     35.90
NS      5.0     35.90     35.90     78.60     78.60     78.60     86.60
NS      5.0     86.60     86.60     86.60     86.60       .50       .50
NS      5.0       .50
CAL2    5.0    195.22     52.11
VEL2    5.0            0.00  .10  .10  .90 1.30 1.30 1.00 1.10 1.20 1.10
VEL2    5.0 1.70 1.30 1.30 1.10 1.30 1.20 1.20  .90 1.40 1.30 1.00 1.10
VEL2    5.0 1.00  .90  .80 1.20 1.20  .70  .80  .60  .40  .80  .40  .80
VEL2    5.0 0.00
CAL3    5.0    194.08      5.19
VEL3    5.0                     0.00 0.00  .10  .10  .20  .30  .40  .30
VEL3    5.0  .30  .30  .70  .20  .70  .50  .30  .10  .20  .30  .20  .40
VEL3    5.0  .30  .10  .05 0.00 0.00 0.00 0.00
VEL3    5.0
XSEC    6.0     220.01.00    193.5
        6.0  0.0199.0  7.5195.7  8.0195.7  9.0194.9 10.0194.1 11.0194.7
        6.0 13.0194.8 14.0195.2 15.1195.0 16.0194.3 17.0195.1 18.0193.9
        6.0 19.0193.5 20.0193.5 21.0194.1 22.0194.1 23.0193.9 24.0194.0
        6.0 25.0193.7 26.0193.8 27.0193.9 28.0194.0 29.0193.9 30.0194.0
        6.0 31.0194.0 32.0194.2 33.0194.1 34.0193.8 35.0193.8 36.0194.0
        6.0 37.0194.2 37.5194.4 39.0194.5 41.0194.7 43.0194.6 45.0195.4
        6.0 46.0195.3 46.1195.7 48.0196.3 49.2197.7
NS      6.0     87.90     87.90     87.90     87.90     87.90     87.90
NS      6.0     87.90     87.90     87.90     87.90     58.60     58.60
NS      6.0     58.60     58.60     58.60     58.60     58.60     58.60
NS      6.0     58.60     64.60     64.60     64.60     64.60     64.60
NS      6.0     64.60     64.60     64.60     64.60     87.60     87.60
NS      6.0     87.60     87.60     87.60     87.60     87.60     87.60
```

Appendix G5. Continued

```
NS      6.0      87.60      87.60      87.60      82.80
CAL2    6.0     195.46      51.85
VEL2    6.0                   .90 1.10  .60  .80  .70  .70  .60  .70 1.30
VEL2    6.0 1.40 1.70 2.20 1.50 2.00 1.50 1.70 1.10 1.80 1.70 1.60 1.70
VEL2    6.0 1.60 1.80 1.70 1.40 1.40 1.20 1.40  .90 1.60  .40  .50  .10
VEL2    6.0
CAL3    6.0     194.28       5.51
VEL3    6.0                                            0.00 0.00  .10
VEL3    6.0  .50  .80  .70  .10  .50  .10  .40  .50 1.40 1.10 1.80  .20
VEL3    6.0 1.00 1.50  .40 1.00 1.30 0.00 0.00
VEL3    6.0
ENDJ
```

Appendix G6. Summary of Calibration Details Lower Christmas Creek (Medium-Low Flow) LOXMAS4.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5	6

Discharge

107	91	58	50	55	58
5	5	5	5	4	5

Stage

194.73	194.74	194.99	195.08	195.22	195.46
193.39	193.41	193.83	194.05	194.08	194.28

Plotting Stage

2.53	2.54	1.79	1.88	2.02	1.96
1.19	1.21	.63	.85	.88	.78

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.7781	.7741	.3178	.5010	.5380	.4348
B =	.2525	.2631	.4267	.3381	.3307	.3716
SZF=	192.2	192.2	193.2	193.2	193.2	193.5

B Coefficient Log/Log Discharge/Stage Relationship

3.96	3.80	2.34	2.96	3.02	2.69

Appendix G7. Data Changes Lower Christmas Creek (Medium-Low Flow)

Cell velocities changed for calibration

Transect 1	Vertical	7	Specified	Mannings	N of	0.5	
Transect 1	Vertical	11	VEL3	Changed	0.0	to	0.1
Transect 3	Vertical	3	Specified	Mannings	N of	0.5	
Transect 3	Vertical	32	VEL2	Changed	2.0	to	1.8
Transect 5	Vertical	31	VEL2	Changed	1.0	to	0.8
Transect 6	Vertical	5	VEL2	Changed	1.1	to	0.9
Transect 6	Vertical	24	VEL3	Changed	.05	to	0.2
Transect 6	Vertical	27	VEL3	Changed	0.2	to	0.4

Appendix G8. Velocity Adjustment Factors Lower Christmas Creek (Medium-Low Flow)

Transect	Flow	VAF
1.00	5.0	1.016
1.00	66.0	.999
2.00	5.0	1.003
2.00	66.0	1.064
3.00	5.0	.948
3.00	66.0	.948
4.00	5.0	.979
4.00	66.0	1.003
5.00	5.0	.945
5.00	66.0	.983
6.00	5.0	.981
6.00	66.0	.993

Appendix H

Middle Christmas Creek Site Calibration Information

Appendix H1. IFG4 Input File Middle Christmas Creek (High-Medium Flow)

```
MIDDLE CHRISTMAS CREEK        IFIM   MIXMAS3.IN4
Q/DATE MEASURED  140 CFS ON 1-5-89, 63 ON 12-3-88
IOC        0000000200000000000000
QARD  63.00
QARD 140.00
QARD 250.00
XSEC   1.0        0.01.00    190.8
       1.0  0.0201.4 19.0192.7 20.5192.3 23.0192.1 25.0192.2 27.0192.1
       1.0 29.0191.9 31.0192.1 33.0191.8 35.0191.8 37.0192.0 39.0191.7
       1.0 40.0192.2 41.0191.3 43.0191.2 45.0190.9 47.0191.7 49.0191.7
       1.0 51.0191.5 53.0191.7 55.0191.6 57.0191.5 59.0191.5 61.0191.1
       1.0 63.0191.4 65.0191.5 67.0191.4 69.0191.4 71.0191.2 73.0191.1
       1.0 75.0191.2 77.0191.0 78.5190.9 79.0190.8 79.2192.6 84.0192.8
       1.0 88.5194.7
NS     1.0        .50     86.50     86.50     86.50     87.60     87.60
NS     1.0      87.60     87.60     87.60     87.60     87.60     87.60
NS     1.0      87.60     87.60     58.60     58.60     58.60     58.60
NS     1.0      58.60     58.60     58.60     58.60     58.60     58.60
NS     1.0      58.60     58.60     58.60     46.80     46.80     46.80
NS     1.0      46.80     46.80     46.80       .50       .50       .50
NS     1.0        .50
CAL1   1.0     192.56    153.50
VEL1   1.0            1.40  .90  .80 1.50 1.20  .50 1.40  .10 1.20 1.20
VEL1   1.0 1.80 1.10 2.50 3.00 2.40 3.40 2.60 3.50 1.60 3.30 3.30 2.40
VEL1   1.0 3.10 2.80 3.50 3.30 2.50 3.40 2.70 3.50 2.20 1.60
VEL1   1.0
CAL2   1.0     192.28     65.28
VEL2   1.0                 1.00 0.00  .20  .10  .90  .90 0.00  .10  .70
VEL2   1.0 1.20 1.20 1.80 1.90 1.60 2.10  .40 2.20 1.90 2.00 1.90 2.30
VEL2   1.0 2.30 1.60 2.10 1.50 0.90 1.20 1.20 1.40  .70  .20
VEL2   1.0
XSEC   2.0      210.01.00    190.9
       2.0  0.0200.2 14.9192.7 16.0192.3 20.0192.1 23.0192.0 25.0192.0
       2.0 27.0191.9 28.0191.6 30.0191.5 32.0191.2 34.0191.2 36.0191.7
       2.0 38.0191.3 40.0191.2 42.0190.9 44.0191.0 46.0191.2 48.0191.4
       2.0 50.0191.2 52.0191.5 54.0191.5 56.0191.4 58.0191.4 60.0191.5
       2.0 62.0192.0 64.0191.6 66.0191.5 68.0191.6 70.0191.7 72.0191.7
       2.0 74.0192.2 74.6192.5 74.9192.7 76.0193.6 82.5194.5
NS     2.0      70.50     70.50     65.70     65.70     65.70     65.70
NS     2.0      65.70     87.50     87.50     87.50     87.50     46.80
NS     2.0      46.80     46.80     46.80     46.80     37.80     37.80
NS     2.0      37.80     37.80     37.80     37.80     37.80     37.80
NS     2.0      37.80     34.80     34.80     34.80     34.80     34.80
NS     2.0      34.80  0.534.80     34.80       .50       .50
CAL1   2.0     192.70    139.51
VEL1   2.0             .50  .60 1.30 1.30 1.60 1.60 1.40 1.00 2.30 2.40
VEL1   2.0 2.20 2.50 2.50 2.30 2.80 3.90 2.60 2.00 2.70 3.30 1.40 1.90
VEL1   2.0 2.40 2.60 2.00 1.80 2.00 1.90  .40 0.00
CAL2   2.0     192.40     65.45
VEL2   2.0             .10  .20  .70  .80  .80  .30  .30 1.20 1.60 1.30
```

Appendix H1. Continued

```
VEL2    2.0 2.10 1.90 1.70 1.50 1.60  .90 1.30 1.20  .80 1.70 1.10  .90
VEL2    2.0  .80 1.20 1.20 1.90 1.00  .90  .30
XSEC    3.0      65.01.00    190.9
        3.0  0.0192.7   .1192.8   .2192.6  2.0191.8  3.2192.0  4.0191.7
        3.0  5.0191.7  6.0190.8  7.0190.8  8.0190.5  9.0191.0 10.0191.0
        3.0 11.0190.4 12.0190.3 13.0190.3 14.0190.3 15.0190.4 16.0190.5
        3.0 17.0190.5 18.0190.4 19.0190.5 20.0190.5 21.0190.5 22.0190.5
        3.0 23.0190.5 24.0190.5 25.0190.6 26.0190.6 27.0190.6 28.0190.6
        3.0 29.0190.8 30.0190.9 31.0190.7 32.0190.9 33.0191.0 34.0191.1
        3.0 35.0191.2 36.0191.0 37.0191.0 38.0191.0 39.0191.0 40.0191.2
        3.0 41.0191.9 41.5191.1 42.8192.8
NS      3.0     36.60  0.528.60     28.60     28.60     28.60     28.60
NS      3.0     37.60     37.60     37.60     37.60     37.60     37.60
NS      3.0     37.60     37.60     37.60     37.60     37.60     37.60
NS      3.0     37.60     37.60     48.60     48.60     48.60     48.60
NS      3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS      3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS      3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS      3.0     48.60     48.60       .50
CAL1    3.0    192.83    134.57
VEL1    3.0             .30  .30  .90 1.30 2.10 1.10 1.50 1.70 2.20 1.40
VEL1    3.0 2.10 2.60 2.00 2.50 2.60 2.40 2.30 2.10 1.50 2.20 2.40 2.40
VEL1    3.0 2.10 1.70 2.00 2.00 2.20 1.80 1.30 1.20 1.50 1.10 1.10 1.40
VEL1    3.0 1.30 1.10 1.10  .90  .40  .20  .10  .30
CAL2    3.0    192.48     65.40
VEL2    3.0                 .30  .70 1.50 1.10  .80  .90 1.20 1.20  .80
VEL2    3.0  .70 1.30 1.30 1.30 1.50 1.40  .70 1.30  .50 1.10 1.00  .80
VEL2    3.0 1.10  .90 1.00  .80 1.40 1.20 1.30 1.10 1.10  .80  .60  .80
VEL2    3.0  .70  .80  .90  .50  .20  .30  .40  .20
XSEC    4.0     225.01.00    190.9
        4.0  0.0195.3  6.0192.9  6.5192.6  9.0192.0 10.0191.5 11.0191.4
        4.0 12.0191.3 13.0191.2 14.0191.1 15.0190.7 16.0191.0 17.0190.4
        4.0 18.0190.9 19.0190.4 20.0190.3 21.0190.0 22.0190.2 23.0190.6
        4.0 24.0190.8 25.0191.5 26.0191.5 27.0190.8 28.0191.0 29.0191.3
        4.0 30.0191.4 32.0191.2 34.0191.3 36.0191.3 38.0191.5 40.0191.6
        4.0 42.0191.7 43.0191.9 44.0192.3 44.5192.5 45.6192.9 46.0194.2
        4.0 49.5195.9
NS      4.0       .50       .50     83.60     83.60     24.70     24.70
NS      4.0     24.70     24.70     86.80     86.80     86.80     86.80
NS      4.0     86.80     86.80     86.80     86.80     86.50     86.50
NS      4.0     86.50     86.50     43.70     43.70     43.70     43.70
NS      4.0     43.70     43.70     43.70     43.70     26.80     26.80
NS      4.0     26.80       .50       .50       .50       .50       .50
NS      4.0       .50
CAL1    4.0    192.86    129.72
VEL1    4.0             .30  .80 1.10  .90 1.50 2.00 2.10 2.40 3.70 3.80
VEL1    4.0 2.85 3.15 3.00 4.50 4.00 2.40 1.65 1.90 2.70 2.30 2.30 1.50
VEL1    4.0 1.80 1.70 1.60 1.60 1.40 1.30 1.20 1.00  .60  .40
VEL1    4.0
CAL2    4.0    192.50     57.88
```

Appendix H1. Continued

```
VEL2   4.0                  .30  .60  .20  .60  .60 1.00  .90 1.50 1.90
VEL2   4.0 1.40 1.30 1.70 2.10 2.20 1.60  .80 1.70 2.80 2.20 2.30 2.10
VEL2   4.0 1.40 1.00 1.10  .60  .30  .50  .30  .10  .10
VEL2   4.0
XSEC   5.0      225.01.00    190.9
       5.0  0.0196.1  6.0192.9  7.0192.8  8.0192.8  9.0191.2 10.0191.2
       5.0 11.0191.6 12.0190.8 13.0190.6 14.0191.3 15.0191.3 16.0190.6
       5.0 17.0190.6 18.0190.6 19.0190.7 20.0190.8 21.0190.9 22.0191.0
       5.0 23.0191.3 24.0191.3 25.0191.3 26.0191.1 27.0191.4 28.0191.5
       5.0 29.0192.4 30.8191.9 33.0192.2 34.0192.6 35.0192.6 36.0192.4
       5.0 37.0192.1 38.0192.5 43.0192.7 44.5192.9 46.6194.7
NS     5.0      87.80      87.80      87.80      87.80      87.80      87.80
NS     5.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     5.0      87.60      87.60      87.60      87.60      37.60      37.60
NS     5.0      37.60      37.60      37.60      37.60      37.60      37.60
NS     5.0      87.60      87.60        .50        .50        .50        .50
NS     5.0        .50        .50        .50        .50        .50
CAL1   5.0     192.92     131.78
VEL1   5.0             .10 1.80 1.30 2.30 2.70 5.00 6.10 7.00 6.00 5.00
VEL1   5.0 5.80 3.70 3.20 2.60 2.30 1.90 1.60 2.20 1.50  .30  .30  .40
VEL1   5.0 3.70 2.50 2.90  .50  .90 1.10  .90 1.00  .10
CAL2   5.0     192.52      71.53
VEL2   5.0                      .30  .30 1.70 2.00 2.60 4.50 5.60 3.60
VEL2   5.0 3.60 4.90 3.30 2.70 1.90 1.00  .50  .40  .20 1.10 1.00  .10
VEL2   5.0 0.00  .40 1.00 0.00 0.00  .40  .20
XSEC   6.0       65.01.00    190.9
       6.0  0.0199.8  6.0193.2  9.0192.6 11.0192.5 13.0192.5 14.0192.5
       6.0 15.0193.1 16.0191.8 17.0192.1 18.0191.6 19.0192.1 20.0191.3
       6.0 21.0191.2 22.0191.5 23.0190.5 24.0191.7 25.0191.5 26.0191.4
       6.0 27.0191.8 28.0192.6 29.0192.1 30.0192.0 31.0192.1 32.0192.5
       6.0 34.0192.2 35.0192.3 36.0192.5 37.0192.5 38.0192.8 39.0193.0
       6.0 40.0192.6 41.0192.7 43.0192.3 44.0192.4 45.0192.7 46.0192.7
       6.0 47.0192.9 48.0192.9 49.0192.9 50.0192.8 51.0192.9 52.0192.9
       6.0 53.0193.1 54.0193.2 54.6193.2 55.0193.2 62.5196.9 70.8198.0
NS     6.0        .50        .50        .50      86.70      86.70      86.70
NS     6.0      86.70      86.60      86.60      86.60      86.60      86.60
NS     6.0      86.60      86.60      86.60      86.60      86.60      87.60
NS     6.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     6.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     6.0      87.60      87.60      87.60      87.60      87.60      83.80
NS     6.0      83.80      83.80      83.80      83.80      83.80      83.80
NS     6.0      83.80  0.583.80       83.80      56.80      56.80        .50
CAL1   6.0     193.25     143.78
VEL1   6.0            1.00 1.70 3.00 3.90 1.10 4.20 4.90 6.10 6.30 5.80
VEL1   6.0 4.90 6.10 4.80 3.80 3.30 3.40 2.80 2.20 1.90 3.40 1.60 4.40
VEL1   6.0 4.40 3.90 1.50 1.70 3.10 2.50 2.30 1.80 2.50 2.80 1.00 1.60
VEL1   6.0 1.40 1.50  .30 1.00 1.20 1.90  .60 0.00
CAL2   6.0     192.95      64.93
VEL2   6.0             .20 1.50 2.50 3.70 0.00 2.80 3.30 5.60 4.90 5.50
VEL2   6.0 1.30 3.40 2.30 1.80 1.20 2.40 2.20 1.50 1.60 4.40 1.60  .90
VEL2   6.0 2.00 1.70 1.10  .90 0.00 0.00 2.00  .20 1.40 2.70 1.30  .50
VEL2   6.0 0.00  .90  .50 1.10  .80  .80
ENDJ
```

Appendix H2. Summary of Calibration Details Middle Christmas Creek (High-Medium Flow) MIXMAS3.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5	6

Discharge

143	139	137	135	135	148
60	59	64	60	67	69

Stage

192.56	192.70	192.83	192.86	192.92	193.25
192.28	192.40	192.48	192.50	192.52	192.95

Plotting Stage

1.76	1.80	1.93	1.96	2.02	2.35
1.48	1.50	1.58	1.60	1.62	2.05

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.6611	.6259	.5302	.5710	.4314	.9567
B =	.1973	.2140	.2627	.2513	.3145	.1796
SZF=	190.8	190.9	190.9	190.9	190.9	190.9

B Coefficient Log/Log Discharge/Stage Relationship

5.07	4.67	3.81	3.98	3.18	5.61

Appendix H3. Data Changes Middle Christmas Creek (High-Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical	6	VEL2	Changed	0.0	to	0.2
Transect 1	Vertical	34	VEL2	Changed	0.0	to	0.2
Transect 2	Vertical	3	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical	8	VEL2	Changed	0.1	to	0.3
Transect 2	Vertical	9	VEL2	Changed	0.1	to	0.3
Transect 2	Vertical	32	Specified	Mannings	N of	0.5	
Transect 3	Vertical	2	Specified	Mannings	N of	0.5	
Transect 4	Vertical	31	VEL2	Changed	0.1	to	0.3
Transect 5	Vertical	5	VEL2	Changed	0.1	to	0.3
Transect 5	Vertical	6	VEL1	Changed	2.5	to	2.3
Transect 5	Vertical	6	VEL2	Changed	0.1	to	0.3
Transect 6	Vertical	3	VEL2	Changed	0.0	to	0.2
Transect 6	Vertical	32	VEL1	Changed	2.0	to	1.8
Transect 6	Vertical	32	VEL2	Changed	0.0	to	0.2
Transect 6	Vertical	44	Specified	Mannings	N of	0.5	

Appendix H4. Velocity Adjustment Factors Middle Christmas Creek (High-Medium Flow)

Transect	Flow	VAF
1.00	63.0	.995
1.00	140.0	1.007
1.00	250.0	.911
2.00	63.0	.996
2.00	140.0	1.000
2.00	250.0	.887
3.00	63.0	.998
3.00	140.0	.998
3.00	250.0	.940
4.00	63.0	1.007
4.00	140.0	.992
4.00	250.0	.881
5.00	63.0	.942
5.00	140.0	.981
5.00	250.0	.659
6.00	63.0	.993
6.00	140.0	1.002
6.00	250.0	.902

Appendix H5. IFG4 Input File Middle Christmas Creek (Medium-Low Flow)

```
MIDDLE CHRISTMAS CREEK        IFIM   MIXMAS4.IN4
Q/DATE MEASURED  63 CFS ON 12-3-88, 6 ON 8-4-88
IOC        0000000200000000000000
QARD   6.00
QARD  63.00
XSEC   1.0        0.01.00    190.8
       1.0  0.0201.4 19.0192.7 20.5192.3 23.0192.1 25.0192.2 27.0192.1
       1.0 29.0191.9 31.0192.1 33.0191.8 35.0191.8 37.0192.0 39.0191.7
       1.0 40.0192.2 41.0191.3 43.0191.2 45.0190.9 47.0191.7 49.0191.7
       1.0 51.0191.5 53.0191.7 55.0191.6 57.0191.5 59.0191.5 61.0191.1
       1.0 63.0191.4 65.0191.5 67.0191.4 69.0191.4 71.0191.2 73.0191.1
       1.0 75.0191.2 77.0191.0 78.5190.9 79.0190.8 79.2192.6 84.0192.8
       1.0 88.5194.7
NS     1.0        .50      86.50      86.50      86.50      87.60      87.60
NS     1.0      87.60      87.60      87.60      87.60      87.60      87.60
NS     1.0      87.60      87.60      58.60      58.60      58.60      58.60
NS     1.0      58.60      58.60      58.60      58.60      58.60      58.60
NS     1.0      58.60      58.60      58.60      46.80      46.80      46.80
NS     1.0      46.80      46.80      46.80  1.5  .50        .50        .50
NS     1.0        .50
CAL2   1.0     192.28      65.28
VEL2   1.0                  1.00 0.00 0.00  .10  .90  .90 0.00  .10  .70
VEL2   1.0 1.20 1.20 1.80 1.90 1.60 2.10  .40 2.20 1.90 2.00 1.90 2.30
VEL2   1.0 2.30 1.60 2.10 1.50 0.90 1.20 1.20 1.40  .70
VEL2   1.0
CAL3   1.0     191.69       6.82
VEL3   1.0
VEL3   1.0 0.00  .05  .20  .10 0.00 0.00  .30 0.00  .50  .80 1.90  .40
VEL3   1.0 2.20  .90  .10  .80  .80  .05  .80  .70  .10
VEL3   1.0
XSEC   2.0      210.01.00    190.9
       2.0  0.0200.2 14.9192.7 16.0192.3 20.0192.1 23.0192.0 25.0192.0
       2.0 27.0191.9 28.0191.6 30.0191.5 32.0191.2 34.0191.2 36.0191.7
       2.0 38.0191.3 40.0191.2 42.0190.9 44.0191.0 46.0191.2 48.0191.4
       2.0 50.0191.2 52.0191.5 54.0191.5 56.0191.4 58.0191.4 60.0191.5
       2.0 62.0192.0 64.0191.6 66.0191.5 68.0191.6 70.0191.7 72.0191.7
       2.0 74.0192.2 74.6192.5 74.9192.7 76.0193.6 82.5194.5
NS     2.0      70.50      70.50      65.70      65.70      65.70      65.70
NS     2.0      65.70      87.50      87.50      87.50      87.50      46.80
NS     2.0      46.80      46.80      46.80      46.80      37.80      37.80
NS     2.0      37.80      37.80      37.80      37.80      37.80      37.80
NS     2.0      37.80      34.80      34.80      34.80      34.80      34.80
NS     2.0      34.80      34.80      34.80        .50        .50
CAL2   2.0     192.40      65.45
VEL2   2.0                   .20  .70  .80  .80  .10  .10 1.20 1.60 1.30
VEL2   2.0 2.10 1.90 1.70 1.50 1.60  .90 1.30 1.20  .80 1.70 1.10  .90
VEL2   2.0  .80 1.20 1.20 1.90 1.00  .90  .30
CAL3   2.0     191.74       4.84
VEL3   2.0                                  0.00  .05  .10  .20  .20
VEL3   2.0  .50  .50  .30  .30  .10  .10  .05  .40 1.10  .60  .40  .30
```

Appendix H5. Continued

```
VEL3   2.0 0.00  .05  .20  .40  .60
XSEC   3.0      65.01.00    190.9
       3.0  0.0192.7   .1192.8   .2192.6  2.0191.8  3.2192.0  4.0191.7
       3.0  5.0191.7  6.0190.8  7.0190.8  8.0190.5  9.0191.0 10.0191.0
       3.0 11.0190.4 12.0190.3 13.0190.3 14.0190.3 15.0190.4 16.0190.5
       3.0 17.0190.5 18.0190.4 19.0190.5 20.0190.5 21.0190.5 22.0190.5
       3.0 23.0190.5 24.0190.5 25.0190.6 26.0190.6 27.0190.6 28.0190.6
       3.0 29.0190.8 30.0190.9 31.0190.7 32.0190.9 33.0191.0 34.0191.1
       3.0 35.0191.2 36.0191.0 37.0191.0 38.0191.0 39.0191.0 40.0191.2
       3.0 41.0191.9 41.5191.1 42.8192.8
NS     3.0     36.60     28.60     28.60     28.60     28.60     28.60
NS     3.0     37.60     37.60     37.60     37.60     37.60     37.60
NS     3.0     37.60     37.60     37.60     37.60     37.60     37.60
NS     3.0     37.60     37.60     48.60     48.60     48.60     48.60
NS     3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS     3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS     3.0     48.60     48.60     48.60     48.60     48.60     48.60
NS     3.0     48.60     48.60       .50
CAL2   3.0    192.48     65.40
VEL2   3.0                .30  .70 1.50 1.10  .80  .90 1.20 1.20  .80
VEL2   3.0  .70 1.30 1.30 1.30 1.50 1.40  .70 1.30  .50 1.10 1.00  .80
VEL2   3.0 1.10  .90 1.00  .80 1.40 1.20 1.30 1.10 1.10  .80  .60  .80
VEL2   3.0  .70  .80  .90  .50  .20  .30  .40  .20
CAL3   3.0    191.75      3.23
VEL3   3.0                          .10  .05  .10  .10  .05  .05  .05
VEL3   3.0  .10  .40  .10  .20  .20  .10  .10  .10  .10  .10  .05  .05
VEL3   3.0  .05  .10  .20  .10  .05  .05  .10  .10  .05  .05  .05  .05
VEL3   3.0  .05  .05  .05  .05  .05  .05 0.00
XSEC   4.0     225.01.00    190.9
       4.0  0.0195.3  6.0192.9  6.5192.6  9.0192.0 10.0191.5 11.0191.4
       4.0 12.0191.3 13.0191.2 14.0191.1 15.0190.7 16.0191.0 17.0190.4
       4.0 18.0190.9 19.0190.4 20.0190.3 21.0190.0 22.0190.2 23.0190.6
       4.0 24.0190.8 25.0191.5 26.0191.5 27.0190.8 28.0191.0 29.0191.3
       4.0 30.0191.4 32.0191.2 34.0191.3 36.0191.3 38.0191.5 40.0191.6
       4.0 42.0191.7 43.0191.9 44.0192.3 44.5192.5 45.6192.9 46.0194.2
       4.0 49.5195.9
NS     4.0       .50       .50     83.60     83.60     24.70     24.70
NS     4.0     24.70     24.70     86.80     86.80     86.80     86.80
NS     4.0     86.80     86.80     86.80     86.80     86.50     86.50
NS     4.0     86.50     86.50     43.70     43.70     43.70     43.70
NS     4.0     43.70     43.70     43.70     43.70     26.80     26.80
NS     4.0     26.80       .50       .50       .50       .50       .50
NS     4.0       .50
CAL2   4.0    192.50     57.88
VEL2   4.0                .30  .60  .20  .60  .60 1.00  .90 1.50 1.90
VEL2   4.0 1.40 1.30 1.70 2.10 2.20 1.60  .80 1.70 2.80 2.20 2.30 2.10
VEL2   4.0 1.40 1.00 1.10  .60  .30  .50  .10  .10  .10
VEL2   4.0
CAL3   4.0    191.76      4.00
VEL3   4.0                0.00  .05  .05  .40  .20  .50  .05  .05  .30
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Appendix H5. Continued

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VEL3   4.0  .30  .05  .20  .10  .20  .20  .05  .10  .40  .30  .40  .50
VEL3   4.0  .10  .20  .20  .30  .05  .05
VEL3   4.0
XSEC   5.0     225.01.00    190.9
       5.0  0.0196.1  6.0192.9  7.0192.8  8.0192.8  9.0191.2 10.0191.2
       5.0 11.0191.6 12.0190.8 13.0190.6 14.0191.3 15.0191.3 16.0190.6
       5.0 17.0190.6 18.0190.6 19.0190.7 20.0190.8 21.0190.9 22.0191.0
       5.0 23.0191.3 24.0191.3 25.0191.3 26.0191.1 27.0191.4 28.0191.5
       5.0 29.0192.3 30.8191.9 33.0192.2 34.0192.6 35.0192.6 36.0192.4
       5.0 37.0192.1 38.0192.5 43.0192.7 44.5192.9 46.6194.7
NS     5.0     87.80     87.80     87.80     87.80     87.80     87.80
NS     5.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     5.0     87.60     87.60     87.60     87.60     37.60     37.60
NS     5.0     37.60     37.60     37.60     37.60     37.60     37.60
NS     5.0     87.60     87.60       .50       .50       .50       .50
NS     5.0       .50       .50       .50       .50       .50
CAL2   5.0    192.52     71.53
VEL2   5.0                      .10  .10 1.70 2.00 2.60 4.50 5.60 3.60
VEL2   5.0 3.60 4.90 3.30 2.70 1.90 1.00  .50  .40  .20 1.10 1.00  .10
VEL2   5.0 0.00  .40 1.00 0.00 0.00  .40  .20
CAL3   5.0    191.76      3.98
VEL3   5.0                      .10  .05  .10  .10  .05  .40  .60  .30
VEL3   5.0  .60  .70  .90  .60  .30  .10  .05  .05  .05  .05  .05  .05
VEL3   5.0 0.00
XSEC   6.0      65.01.00    190.9
       6.0  0.0199.8  6.0193.2  9.0192.6 11.0192.5 13.0192.5 14.0192.5
       6.0 15.0193.1 16.0191.8 17.0192.1 18.0191.6 19.0192.1 20.0191.3
       6.0 21.0191.2 22.0191.5 23.0190.5 24.0191.7 25.0191.5 26.0191.4
       6.0 27.0191.8 28.0192.6 29.0192.1 30.0192.0 31.0192.1 32.0192.5
       6.0 34.0192.2 35.0192.3 36.0192.5 37.0192.5 38.0192.7 39.0193.0
       6.0 40.0192.6 41.0192.7 43.0192.3 44.0192.4 45.0192.7 46.0192.7
       6.0 47.0192.8 48.0192.9 49.0192.9 50.0192.8 51.0192.9 52.0192.9
       6.0 53.0193.1 54.0193.2 54.6193.2 55.0193.2 62.5196.9 70.8198.0
NS     6.0       .50       .50  1.5  .50     86.70     86.70     86.70
NS     6.0     86.70     86.60     86.60     86.60     86.60     86.60
NS     6.0     86.60     86.60     86.60     86.60     86.60     87.60
NS     6.0     87.60     87.60     87.60     87.60     87.60     87.60
NS     6.0     87.60     87.60     87.60     87.60  1.587.60     87.60
NS     6.0     87.60  1.587.60     87.60     87.60     87.60     83.80
NS     6.0  1.583.80     83.80     83.80     83.80     83.80     83.80
NS     6.0     83.80     83.80     83.80     56.80     56.80       .50
CAL2   6.0    192.95     64.93
VEL2   6.0                 1.50 2.50 3.70 0.00 2.80 3.30 5.60 4.90 5.50
VEL2   6.0 1.30 3.40 2.30 1.80 1.20 2.40 2.20 1.50 1.60 4.40 1.60  .90
VEL2   6.0 2.00 1.70 1.10  .90 0.00 0.00 2.00 0.00 1.40 2.70 1.30  .50
VEL2   6.0 0.00  .90  .50 1.10  .80  .80
CAL3   6.0    192.49      6.52
VEL3   6.0                                0.00  .40  .70  .20  .20 1.00
VEL3   6.0 1.40 2.60 1.10  .50  .60  .70 1.80 0.00  .20  .05  .10 0.00
VEL3   6.0  .10  .10 0.00 0.00 0.00 0.00 0.00 0.00  .05  .10  .05 0.00
VEL3   6.0 0.00  .05  .05  .05 0.00 0.00
ENDJ
```

Appendix H6. Summary of Calibration Details Middle Christmas Creek (Medium-Low Flow) MIXMAS4.IN4

Calibration Information for Calculated Discharges

Transect Number	1	2	3	4	5	6
Discharge	59	59	64	60	67	68
	7	4	4	4	5	12
Stage	192.28	192.40	192.48	192.50	192.52	192.95
	191.69	191.74	191.75	191.76	191.76	192.49
Plotting Stage	1.48	1.50	1.58	1.60	1.62	2.05
	0.89	0.84	0.85	0.86	0.86	1.59

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.5495	.6075	.6402	.6106	.5972	.1120
B =	.2428	.2219	.2173	.2352	.2376	.1430
SZF=	190.8	190.9	190.9	190.9	190.9	190.9

B Coefficient Log/Log Discharge/Stage Relationship

4.12	4.51	4.60	4.25	4.21	6.99

Appendix H7. Data Changes Middle Christmas Creek (Medium-Low Flow)

Cell velocities changed for calibration

Transect 1	Vertical 33	VEL3	Changed	0.0	to	0.1
Transect 1	Vertical 34	Specified	Mannings	N of	1.5	
Transect 2	Vertical 12	VEL3	Changed	0.0	to	0.2
Transect 4	Vertical 30	VEL3	Changed	0.0	to	.05
Transect 6	Vertical 3	Specified	Mannings	N of	1.5	
Transect 6	Vertical 10	VEL3	Changed	0.0	to	0.2
Transect 6	Vertical 11	VEL3	Changed	0.0	to	0.2
Transect 6	Vertical 25	VEL3	Changed	0.0	to	0.1
Transect 6	Vertical 26	VEL3	Changed	0.0	to	0.1
Transect 6	Vertical 29	Specified	Mannings	N of	1.5	
Transect 6	Vertical 32	Specified	Mannings	N of	1.5	
Transect 6	Vertical 33	VEL3	Changed	0.0	to	.05
Transect 6	Vertical 37	Specified	Mannings	N of	1.5	

Appendix H8. Velocity Adjustment Factors Middle Christmas Creek (Medium-Low Flow)

Transect	Flow	VAF
1.00	6.0	.985
1.00	63.0	1.000
2.00	6.0	.991
2.00	63.0	.999
3.00	6.0	1.038
3.00	63.0	1.002
4.00	6.0	1.018
4.00	63.0	.995
5.00	6.0	1.026
5.00	63.0	1.009
6.00	6.0	.976
6.00	63.0	1.009