

Appendix E

GEOPAK Earthwork Criteria

Earthwork Calculations - ND Side of River (Station 10+00 to 17+50)
 Roadway Alternatives 1a and 2a
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
10+00.00	840	0.1116	840	0
10+50.00	840.0558	0.1116	840	0.0558
11+00.00	840.1116	0.1116	840	0.1116
11+50.00	840.1674	0.1116	840	0.1674
12+00.00	840.2232	0.1116	840	0.2232
12+50.00	840.279	0.1116	840.1376	0.1414
13+00.00	840.3348	0.1116	840.4392	-0.1044
13+50.00	840.3906	0.1116	840.428	-0.0374
14+00.00	840.4464	0.1116	840.377	0.0694
14+50.00	840.5022	0.1116	840.2687	0.2335
15+00.00	840.558	0.1116	840.1357	0.4223
15+50.00	840.6138	0.1116	839.9238	0.69
16+00.00	840.6696	0.1116	837.3127	3.3569
16+50.00	840.7254	0.1116	835.8025	4.9229
17+00.00	840.7812	0.1116	835.6883	5.0929
17+50.00	840.837	0.1116	835.139	5.698
16 samples			Sum =	21.0435

Average height = 1.32 ft
 Average end area = 52.8 sf
 length 750 ft
 volume 1466.67 cy
 GEOPAK Volume 265342.00 cy
 total volume 266808.67 cy
 compaction factor 1.20
 Adjusted Volume 320170.40 cy

USE $\equiv\equiv\equiv\equiv>>>>$ 320000.00 cy

Input File: p:\nndot\13817\geopak\input\earth_alt2a.inp
Output File: EW_ALT2A_102104

```
1 1 1
/*****/
1 2 2 /*
*/
1 3 3 /* EARTH
*/
1 4 4 /*
*/
1 5 5 /* This input file computes earthwork for the preliminary
components of */
1 6 6 /* of a proposed cross section graphics file. This file does
cut and */
1 7 7 /* fill only. No grading grade or subcuts are needed.
*/
1 8 8 /*
*/
1 9 9 /* Written by: CAES office
*/
1 10 10 /* Date of last modification: 12-13-99
*/
1 11 11 /*
*/
1 12 12
/*****/
1 13 13
1 14 14
1 15 15
1 16 16 earthwork
1 17 17 tolerance = 0.009
1 18 18
1 19 19 xs dgn = p:\nndot\13817\drawings\13817_xs2A.dgn
/* file with x-sects */
1 20 20
1 21 21 proposed finish grade
1 22 22 soil type = SUIT_GRADING /* general fill
class */
1 23 23 type = line
1 24 24 lv = 24,41,45,48 /* proposed roadway,
shoulder, top of topsoil */
1 25 25
1 26 26 existing ground line
1 27 27 soil type = SUIT_GRADING /* excavation
class */
1 28 28 type = line
1 29 29 lv = 2 /* existing
ground line */
1 30 30
1 31 31
1 32 32 write earthwork shapes /* file with
x-sects */
1 33 33 plot param
1 34 34 lv = 62
1 35 35 lc = 4
1 36 36 stratify shape color
1 37 37
1 38 38
```

```

/*****
1   39   39 /* Uncomment and fill in the following three options as needed
*/
1   40   40
/*****
1   41   41
1   42   42 /* calculate only between excavation limits */
1   43   43
1   44   44
1   45   45 /* skip areas
1   46   46         from 1+00.0 r 1 to 2+00.0 r 1
1   47   47         from 4+00.0 r 1 to 5+00.0 r 1 */
1   48   48
1   49   49
1   50   50 /* volume adjustment
1   51   51         station = 1+00 r 1
1   52   52         soil type = SUIT_GRADING
1   53   53         common excavation volume = ? */
common excavation volume = ?, subgrade excavation volume = ?, or fill volume =
? */
1   54   54
1   55   55
/*****
1   56   56
1   57   57         process earthwork for baseline = alt2a
1   58   58         job number = 001
1   59   59
1   60   60 /* BEG STA = ???
1   61   61         END STA = ??? */
1   62   62

```

MAPPING DGN FILE p:\nnddot\13817\drawings\13817_xs2A.dgn INTO MEMORY
COMPUTING EARTHWORKS FOR BASELINE = ALT2A
COMPUTING EARTHWORKS FOR JOB = 001
FORMING LIST OF XSCHELLS
BEGINNING EARTHWORKS COMPUTATION

Station	Material Name	End Areas (sq. ft.)	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	Mass Ordinate
17+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1664.22	0	0	1.00	0
18+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2288.97	3660	3660	1.00	-3660
18+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2343.58	4289	4289	1.00	-7949
19+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2523.70	4507	4507	1.00	-12456
19+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2795.60	4925	4925	1.00	-17381
20+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3074.58	5435	5435	1.00	-22816
20+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3286.34	5890	5890	1.00	-28706
21+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3510.07	6293	6293	1.00	-34999
21+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3778.37	6749	6749	1.00	-41748

22+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4100.60	7295	7295	1.00	-49043
22+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4372.07	7845	7845	1.00	-56888
23+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4525.31	8238	8238	1.00	-65126
23+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4727.70	8568	8568	1.00	-73694
24+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	5304.62	9289	9289	1.00	-82983
24+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	5414.79	9925	9925	1.00	-92908
25+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4507.37	9187	9187	1.00	-102095
25+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4434.13	8279	8279	1.00	-110374
26+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4456.33	8232	8232	1.00	-118606
26+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	

	Subsoil Exc	0.00	0	0	1.00	
	Fill	4484.01	8278	8278	1.00	-126884
27+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4474.07	8295	8295	1.00	-135179
27+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4354.96	8175	8175	1.00	-143354
28+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3027.81	6836	6836	1.00	-150190
28+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1997.49	4653	4653	1.00	-154843
29+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1169.24	2932	2932	1.00	-157775
30+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	654.42	3377	3377	1.00	-161152
30+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	636.04	1195	1195	1.00	-162347
31+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	603.17	1147	1147	1.00	-163494
31+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	578.23	1094	1094	1.00	-164588
32+00.00	SUIT_GRADING					

Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	536.81	1032	1032	1.00	-165620
32+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	503.97	964	964	1.00	-166584
33+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	482.61	914	914	1.00	-167498
33+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	483.94	895	895	1.00	-168393
34+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	491.69	903	903	1.00	-169296
34+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	490.64	910	910	1.00	-170206
35+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	474.70	894	894	1.00	-171100
35+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	462.56	868	868	1.00	-171968
36+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	464.42	858	858	1.00	-172826
36+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	484.52	879	879	1.00	-173705

37+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	492.10	904	904	1.00	-174609
37+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	476.56	897	897	1.00	-175506
38+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	482.44	888	888	1.00	-176394
38+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	527.13	935	935	1.00	-177329
39+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	306.08	771	771	1.00	-178100
39+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	565.53	807	807	1.00	-178907
40+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	480.60	969	969	1.00	-179876
40+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	452.47	864	864	1.00	-180740
41+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	457.59	843	843	1.00	-181583
41+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	

	Subsoil Exc	0.00	0	0	1.00	
	Fill	468.15	857	857	1.00	-182440
42+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	472.41	871	871	1.00	-183311
42+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	473.61	876	876	1.00	-184187
43+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	471.12	875	875	1.00	-185062
43+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	470.36	872	872	1.00	-185934
44+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	500.45	899	899	1.00	-186833
44+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	538.48	962	962	1.00	-187795
45+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	579.74	1035	1035	1.00	-188830
45+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	657.90	1146	1146	1.00	-189976
46+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	796.41	1347	1347	1.00	-191323
46+50.00	SUIT_GRADING					

Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	1055.57	1715	1715	1.00	-193038
47+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	1092.14	1989	1989	1.00	-195027
47+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	681.61	1642	1642	1.00	-196669
48+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	596.23	1183	1183	1.00	-197852
48+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	673.41	1176	1176	1.00	-199028
49+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	1104.65	1646	1646	1.00	-200674
49+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	1724.67	2620	2620	1.00	-203294
50+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	2237.08	3668	3668	1.00	-206962
50+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	2628.70	4505	4505	1.00	-211467
51+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	2848.02	5071	5071	1.00	-216538

51+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3038.28	5450	5450	1.00	-221988
52+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3118.27	5701	5701	1.00	-227689
52+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3336.36	5977	5977	1.00	-233666
53+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3525.14	6353	6353	1.00	-240019
53+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3716.89	6706	6706	1.00	-246725
54+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3836.69	6994	6994	1.00	-253719
54+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3916.61	7179	7179	1.00	-260898
54+80.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4082.46	4444	4444	1.00	-265342

G R A N D		S U M M A R Y		T O T A L S	
Material Name		Unadjusted	Adjusted	Mult	
		Volumes	Volumes	Factor	
		(cu. yd.)	(cu. yd.)		

SUIT_GRADING					
	Common Exc	0	0	1.00	
	Subgrade Exc	0	0	1.00	
	Subsoil Exc	0	0	1.00	
	Fill	265342	265342	1.00	

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Appendix
Roadway Alternative 1
Earthwork - MN Side

Earthwork Calculations - Minnesota Side of River
 Roadway Alternative 1A
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
62+80.00	845.0009	-0.0968	825	20.0009
63+00.00	844.9815	-0.0968	825	19.9815
63+50.00	844.9331	-0.0968	825	19.9331
64+00.00	844.8847	-0.0968	825	19.8847
64+50.00	844.8363	-0.0968	825	19.8363
65+00.00	844.7879	-0.0968	826.201	18.5869
65+50.00	844.7395	-0.0968	827.5942	17.1453
66+00.00	844.6911	-0.0968	828.9874	15.7037
66+50.00	844.6427	-0.0968	830	14.6427
67+00.00	844.5943	-0.0968	830	14.5943
67+50.00	844.5459	-0.0968	830.0227	14.5232
68+00.00	844.4975	-0.0968	830.1605	14.337
68+50.00	844.4491	-0.0968	830.2984	14.1507
69+00.00	844.4007	-0.0968	830.4362	13.9645
69+50.00	844.3524	-0.0968	830.574	13.7784
70+00.00	844.304	-0.0968	830.7119	13.5921
70+50.00	844.2556	-0.0968	830.8497	13.4059
71+00.00	844.2072	-0.0968	830.9875	13.2197
71+50.00	844.1588	-0.0968	831.1254	13.0334
72+00.00	844.1104	-0.0968	831.2632	12.8472
72+50.00	844.062	-0.0968	831.401	12.661
73+00.00	844.0136	-0.0968	831.5388	12.4748
73+50.00	843.9652	-0.0968	831.6767	12.2885
74+00.00	843.9168	-0.0968	831.8145	12.1023
74+50.00	843.8684	-0.0968	831.9523	11.9161
75+00.00	843.82	-0.0968	832.0902	11.7298
75+50.00	843.7716	-0.0968	832.228	11.5436
76+00.00	843.7232	-0.0968	832.3658	11.3574
76+50.00	843.6748	-0.0968	832.5037	11.1711
77+00.00	843.6264	-0.0968	832.6415	10.9849
77+50.00	843.578	-0.0968	832.7793	10.7987
78+00.00	843.5296	-0.0968	832.9171	10.6125
78+50.00	843.4812	-0.0968	833.055	10.4262
79+00.00	843.4328	-0.0968	833.1928	10.24
79+50.00	843.3844	-0.0968	833.3306	10.0538
80+00.00	843.336	-0.0968	833.4685	9.8675
80+50.00	843.2876	-0.0968	833.6063	9.6813
81+00.00	843.2392	-0.0968	833.7441	9.4951
81+50.00	843.1908	-0.0968	833.882	9.3088
82+00.00	843.1424	-0.0968	834.0198	9.1226
82+50.00	843.094	-0.0968	834.1576	8.9364
83+00.00	843.0456	-0.0968	834.2954	8.7502
83+50.00	842.9972	-0.0968	834.4333	8.5639
84+00.00	842.9489	-0.0968	834.5711	8.3778
84+50.00	842.9005	-0.0968	834.7089	8.1916
85+00.00	842.8521	-0.0968	834.8468	8.0053
85+50.00	842.8037	-0.0968	834.9846	7.8191
86+00.00	842.7553	-0.0968	838.4496	4.3057
86+50.00	842.7069	-0.0968	840.1054	2.6015
87+00.00	842.6585	-0.0968	840.2809	2.3776
87+50.00	842.6101	-0.0968	840.4564	2.1537

Earthwork Calculations - Minnesota Side of River
 Roadway Alternative 1A
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
88+00.00	842.5617	-0.0968	840.6319	1.9298
88+50.00	842.5133	-0.0968	840.8073	1.706
89+00.00	842.4649	-0.0968	840.9828	1.4821
89+50.00	842.4165	-0.0968	841	1.4165
90+00.00	842.3681	-0.0968	841	1.3681
90+50.00	842.3197	-0.0968	841	1.3197
91+00.00	842.2713	-0.0968	841	1.2713
91+50.00	842.2229	-0.0968	841	1.2229
92+00.00	842.1745	-0.0968	841	1.1745
92+50.00	842.1261	-0.0968	841	1.1261
93+00.00	842.0777	-0.0968	841	1.0777
93+50.00	842.0293	-0.0968	841	1.0293
94+00.00	841.9809	-0.0968	841	0.9809
94+50.00	841.9325	-0.0968	841	0.9325
95+00.00	841.8841	-0.0968	841	0.8841
95+50.00	841.8357	-0.0968	841	0.8357
96+00.00	841.7873	-0.0968	841	0.7873
96+50.00	841.7389	-0.0968	841	0.7389
97+00.00	841.6905	-0.0968	841	0.6905
97+50.00	841.6421	-0.0968	841	0.6421
98+00.00	841.5937	-0.0968	841	0.5937
98+50.00	841.5454	-0.0968	841	0.5454
99+00.00	841.497	-0.0968	841	0.497
99+50.00	841.4486	-0.0968	841	0.4486
100+00.00	841.4002	-0.0968	841	0.4002
100+50.00	841.3518	-0.0968	841	0.3518
101+00.00	841.3034	-0.0968	841	0.3034
101+50.00	841.255	-0.0968	841	0.255
102+00.00	841.2066	-0.0968	841	0.2066
102+50.00	841.1582	-0.0968	841	0.1582
103+00.00	841.1098	-0.0968	841	0.1098
103+50.00	841.0614	-0.0968	841	0.0614
104+00.00	841.013	-0.0968	841	0.013
104+13.42	841	-0.0968	841	0
85 samples			sum =	631.6404

Average fill height = 7.43 ft
 Average end area = 673.11 sf
 length = 4133.42 ft
 volume = 103046.16 cy
 compaction factor = 1.2
 Adjusted Emb. = 123655.39 cy

Use =====>>> 130000 cy

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APPENDIX

Roadway Alternative 2

Earthwork - MN side

Earthwork Calculations - MN side of River
 Roadway Alternative 2A
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
62+80.00	845.0005	-0.1029	825	20.0005
63+00.00	844.9799	-0.1029	825	19.9799
63+50.00	844.9285	-0.1029	825	19.9285
64+00.00	844.877	-0.1029	825	19.877
64+50.00	844.8256	-0.1029	825	19.8256
65+00.00	844.7741	-0.1029	826.197	18.5771
65+50.00	844.7227	-0.1029	827.5855	17.1372
66+00.00	844.6712	-0.1029	828.9741	15.6971
66+50.00	844.6198	-0.1029	830	14.6198
67+00.00	844.5684	-0.1029	830	14.5684
67+50.00	844.5169	-0.1029	830.0092	14.5077
68+00.00	844.4655	-0.1029	830.0831	14.3824
68+50.00	844.414	-0.1029	830.157	14.257
69+00.00	844.3626	-0.1029	830.2309	14.1317
69+50.00	844.3111	-0.1029	830.3049	14.0062
70+00.00	844.2597	-0.1029	830.3788	13.8809
70+50.00	844.2082	-0.1029	830.4527	13.7555
71+00.00	844.1568	-0.1029	830.5266	13.6302
71+50.00	844.1053	-0.1029	830.6005	13.5048
72+00.00	844.0539	-0.1029	830.6744	13.3795
72+50.00	844.0024	-0.1029	830.7483	13.2541
73+00.00	843.951	-0.1029	830.8222	13.1288
73+50.00	843.8995	-0.1029	830.8961	13.0034
74+00.00	843.8481	-0.1029	830.97	12.8781
74+50.00	843.7967	-0.1029	831.0439	12.7528
75+00.00	843.7452	-0.1029	831.1178	12.6274
75+50.00	843.6938	-0.1029	831.1917	12.5021
76+00.00	843.6423	-0.1029	831.2657	12.3766
76+50.00	843.5909	-0.1029	831.3396	12.2513
77+00.00	843.5394	-0.1029	831.4135	12.1259
77+50.00	843.488	-0.1029	831.4874	12.0006
78+00.00	843.4365	-0.1029	831.5613	11.8752
78+50.00	843.3851	-0.1029	831.6352	11.7499
79+00.00	843.3336	-0.1029	831.7091	11.6245
79+50.00	843.2822	-0.1029	831.783	11.4992
80+00.00	843.2307	-0.1029	831.8569	11.3738
80+50.00	843.1793	-0.1029	831.9308	11.2485
81+00.00	843.1278	-0.1029	832.0047	11.1231
81+50.00	843.0764	-0.1029	832.0786	10.9978
82+00.00	843.0249	-0.1029	832.1525	10.8724
82+50.00	842.9735	-0.1029	832.2265	10.747
83+00.00	842.9221	-0.1029	832.3004	10.6217
83+50.00	842.8706	-0.1029	832.3743	10.4963
84+00.00	842.8192	-0.1029	832.4482	10.371
84+50.00	842.7677	-0.1029	832.5221	10.2456
85+00.00	842.7163	-0.1029	832.596	10.1203
85+50.00	842.6648	-0.1029	832.6699	9.9949
86+00.00	842.6134	-0.1029	832.7438	9.8696
86+50.00	842.5619	-0.1029	832.8177	9.7442

Earthwork Calculations - MN side of River
 Roadway Alternative 2A
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
87+00.00	842.5105	-0.1029	832.8916	9.6189
87+50.00	842.459	-0.1029	832.9655	9.4935
88+00.00	842.4076	-0.1029	833.0394	9.3682
88+50.00	842.3561	-0.1029	833.1133	9.2428
89+00.00	842.3047	-0.1029	833.1873	9.1174
89+50.00	842.2532	-0.1029	833.2612	8.992
90+00.00	842.2018	-0.1029	833.3351	8.8667
90+50.00	842.1504	-0.1029	833.409	8.7414
91+00.00	842.0989	-0.1029	833.4829	8.616
91+50.00	842.0475	-0.1029	833.5568	8.4907
92+00.00	841.996	-0.1029	833.6307	8.3653
92+50.00	841.9446	-0.1029	833.7046	8.24
93+00.00	841.8931	-0.1029	833.7785	8.1146
93+50.00	841.8417	-0.1029	833.8524	7.9893
94+00.00	841.7902	-0.1029	833.9263	7.8639
94+50.00	841.7388	-0.1029	834.0002	7.7386
95+00.00	841.6873	-0.1029	834.0741	7.6132
95+50.00	841.6359	-0.1029	834.1481	7.4878
96+00.00	841.5844	-0.1029	834.222	7.3624
96+50.00	841.533	-0.1029	834.2959	7.2371
97+00.00	841.4815	-0.1029	834.3698	7.1117
97+50.00	841.4301	-0.1029	834.4437	6.9864
98+00.00	841.3786	-0.1029	834.5176	6.861
98+50.00	841.3272	-0.1029	834.5915	6.7357
99+00.00	841.2758	-0.1029	834.6654	6.6104
99+50.00	841.2243	-0.1029	834.7393	6.485
100+00.00	841.1729	-0.1029	834.8132	6.3597
100+50.00	841.1214	-0.1029	834.8871	6.2343
101+00.00	841.07	-0.1029	834.961	6.109
101+50.00	841.0185	-0.1029	840.6481	0.3704
101+68.00	841	-0.1029	841	0
80 Samples			Sum =	881.5465

Average height = 11.02 ft
 Average end area = 1211.8 sf
 length 3888 ft
 volume 174499.20 cy
 compaction factor 1.2
 Adjusted Emb. 209399.04 cy

Use =====>>> 210000 cy

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Appendix

Roadway Alternative 3

Earthwork - NO side

Input File: p:\nndot\13817\geopak\input\earth_alt3a.inp

Output File: ew_alt3a_102604.log

```

1      1      1
/*****/
1      2      2 /*
      */
1      3      3 /*                EARTH
      */
1      4      4 /*
      */
1      5      5 /* This input file computes earthwork for the preliminary components
of      */
1      6      6 /* of a proposed cross section graphics file. This file does cut
and    */
1      7      7 /* fill only. No grading grade or subcuts are needed.
      */
1      8      8 /*
      */
1      9      9 /*                Written by: CAES office
      */
1     10     10 /*                Date of last modification: 12-13-99
      */
1     11     11 /*
      */
1     12     12
/*****/
1     13     13
1     14     14
1     15     15
1     16     16      earthwork
1     17     17      tolerance = 0.009
1     18     18
1     19     19      xs dgn = p:\nndot\13817\drawings\13817_xs3A.dgn      /*
file with x-sects */
1     20     20
1     21     21      proposed finish grade
1     22     22      soil type = SUIT_GRADING      /* general fill
class */
1     23     23      type = line
1     24     24      lv = 24,41,45,48 /* proposed roadway, shoulder, top
of topsoil */
1     25     25
1     26     26      existing ground line
1     27     27      soil type = SUIT_GRADING      /* excavation class
*/
1     28     28      type = line
1     29     29      lv = 2      /* existing ground
line */
1     30     30
1     31     31
1     32     32      write earthwork shapes      /* file with
x-sects */
1     33     33      plot param
1     34     34      lv = 62
1     35     35      lc = 4
1     36     36      stratify shape color
1     37     37
1     38     38      /*****/
1     39     39 /* Uncomment and fill in the following three options as needed */
1     40     40 /*****/
1     41     41
1     42     42 /* calculate only between excavation limits */
1     43     43

```

```

1 44 44
1 45 45 /* skip areas
1 46 46 from 1+00.0 r 1 to 2+00.0 r 1
1 47 47 from 4+00.0 r 1 to 5+00.0 r 1 */
1 48 48
1 49 49
1 50 50 /* volume adjustment
1 51 51 station = 1+00 r 1
1 52 52 soil type = SUIT_GRADING
1 53 53 common excavation volume = ? /* /* common
excavation volume = ?, subgrade excavation volume = ?, or fill volume = ? */
1 54 54
1 55 55 /*****
1 56 56
1 57 57 process earthwork for baseline = alt3a
1 58 58 job number = 001
1 59 59
1 60 60 /* BEG STA = ???
1 61 61 END STA = ??? */
1 62 62

```

MAPPING DGN FILE p:\nndot\13817\drawings\13817_xs3A.dgn INTO MEMORY
 COMPUTING EARTHWORKS FOR BASELINE = ALT3A
 COMPUTING EARTHWORKS FOR JOB = 001
 FORMING LIST OF XSCHELLS
 BEGINNING EARTHWORKS COMPUTATION

Station	Material Name	End Areas (sq. ft.)	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	Mass Ordinate
17+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1675.15	0	0	1.00	0
18+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2303.68	3684	3684	1.00	-3684
18+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2359.71	4318	4318	1.00	-8002
19+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2541.14	4538	4538	1.00	-12540
19+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2814.52	4959	4959	1.00	-17499
20+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	

ew_alt3a_102604.log

Subsoil Exc	0.00	0	0	1.00	
Fill	3094.81	5472	5472	1.00	-22971
20+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	3308.12	5929	5929	1.00	-28900
21+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	3533.25	6335	6335	1.00	-35235
21+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	3803.02	6793	6793	1.00	-42028
22+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	4126.96	7343	7343	1.00	-49371
22+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	4399.43	7895	7895	1.00	-57266
23+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	4553.61	8290	8290	1.00	-65556
23+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	4756.40	8620	8620	1.00	-74176
24+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	5333.42	9342	9342	1.00	-83518
24+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	5443.65	9979	9979	1.00	-93497
25+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	4537.01	9241	9241	1.00	-102738

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25+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4464.69	8335	8335	1.00	-111073
26+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4488.26	8290	8290	1.00	-119363
26+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4516.78	8338	8338	1.00	-127701
27+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4508.75	8357	8357	1.00	-136058
27+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	4394.67	8244	8244	1.00	-144302
28+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3060.09	6903	6903	1.00	-151205
28+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2025.61	4709	4709	1.00	-155914
29+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1193.49	2981	2981	1.00	-158895
29+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	787.49	1834	1834	1.00	-160729
30+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	671.99	1351	1351	1.00	-162080
30+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	

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Subsoil Exc	0.00	0	0	1.00	
Fill	653.76	1228	1228	1.00	-163308
31+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	621.22	1181	1181	1.00	-164489
31+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	596.41	1127	1127	1.00	-165616
32+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	555.15	1066	1066	1.00	-166682
32+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	522.55	998	998	1.00	-167680
33+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	501.62	948	948	1.00	-168628
33+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	503.59	931	931	1.00	-169559
34+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	511.90	940	940	1.00	-170499
34+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	511.23	947	947	1.00	-171446
35+00.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	495.53	932	932	1.00	-172378
35+50.00 SUIT_GRADING					
Common Exc	0.00	0	0	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	483.75	907	907	1.00	-173285

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36+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	486.12	898	898	1.00	-174183
36+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	506.85	919	919	1.00	-175102
37+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	514.94	946	946	1.00	-176048
37+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	499.67	939	939	1.00	-176987
38+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	506.32	931	931	1.00	-177918
38+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	551.83	980	980	1.00	-178898
39+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	327.15	814	814	1.00	-179712
39+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	591.53	851	851	1.00	-180563
40+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	505.69	1016	1016	1.00	-181579
40+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	477.63	910	910	1.00	-182489
41+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	

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	Subsoil Exc	0.00	0	0	1.00
	Fill	483.29	890	890	1.00 -183379
41+50.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	494.35	905	905	1.00 -184284
42+00.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	499.10	920	920	1.00 -185204
42+50.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	500.80	926	926	1.00 -186130
43+00.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	498.66	925	925	1.00 -187055
43+50.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	498.19	923	923	1.00 -187978
44+00.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	529.28	951	951	1.00 -188929
44+50.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	568.44	1016	1016	1.00 -189945
45+00.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	610.88	1092	1092	1.00 -191037
45+50.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	690.58	1205	1205	1.00 -192242
46+00.00	SUIT_GRADING				
	Common Exc	0.00	0	0	1.00
	Subgrade Exc	0.00	0	0	1.00
	Subsoil Exc	0.00	0	0	1.00
	Fill	833.34	1411	1411	1.00 -193653

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46+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1097.21	1788	1788	1.00	-195441
47+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1139.85	2071	2071	1.00	-197512
47+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	710.40	1713	1713	1.00	-199225
48+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	630.95	1242	1242	1.00	-200467
48+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	726.63	1257	1257	1.00	-201724
49+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1098.90	1690	1690	1.00	-203414
49+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	1640.62	2537	2537	1.00	-205951
50+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2108.30	3471	3471	1.00	-209422
50+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	2543.13	4307	4307	1.00	-213729
51+00.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3004.66	5137	5137	1.00	-218866
51+50.00	SUIT_GRADING					
	Common Exc	0.00	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	

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Material Name	Exc	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	
Subsoil	Exc	0	0	1.00	
Fill		3375.56	5908	1.00	-224774
52+00.00 SUIT_GRADING					
Common	Exc	0.00	0	1.00	
Subgrade	Exc	0.00	0	1.00	
Subsoil	Exc	0.00	0	1.00	
Fill		4111.21	6932	1.00	-231706
52+10.00 SUIT_GRADING					
Common	Exc	0.00	0	1.00	
Subgrade	Exc	0.00	0	1.00	
Subsoil	Exc	0.00	0	1.00	
Fill		4234.73	1546	1.00	-233252
<div style="display: flex; justify-content: space-between;"> GRAND SUMMARY TOTALS </div>					

SUIT_GRADING					
Common	Exc	0	0	1.00	
Subgrade	Exc	0	0	1.00	
Subsoil	Exc	0	0	1.00	
Fill		233252	233252	1.00	

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Appendix

Roadway Alternative 3

Earthwork - MN Side

Earthwork Calculations - MN side of River
 Roadway Alternative 3A
 Merrifield Road Feasibility Study
 10/26/2004
 BAO

Station	Proposed Elevation	Proposed Grade	Existing Elevation	Delta
61+30.00	845.0003	-0.0967	825.4078	19.5925
61+50.00	844.9809	-0.0967	825.5327	19.4482
62+00.00	844.9325	-0.0967	825.845	19.0875
62+50.00	844.8842	-0.0967	826.1572	18.727
63+00.00	844.8358	-0.0967	826.4695	18.3663
63+50.00	844.7875	-0.0967	826.7818	18.0057
64+00.00	844.7391	-0.0967	827.094	17.6451
64+50.00	844.6907	-0.0967	827.4063	17.2844
65+00.00	844.6424	-0.0967	827.7186	16.9238
65+50.00	844.594	-0.0967	828.0308	16.5632
66+00.00	844.5456	-0.0967	828.3431	16.2025
66+50.00	844.4973	-0.0967	828.6553	15.842
67+00.00	844.4489	-0.0967	828.9676	15.4813
67+50.00	844.4005	-0.0967	829.2799	15.1206
68+00.00	844.3522	-0.0967	829.5921	14.7601
68+50.00	844.3038	-0.0967	829.9044	14.3994
69+00.00	844.2554	-0.0967	830	14.2554
69+50.00	844.2071	-0.0967	830	14.2071
70+00.00	844.1587	-0.0967	830.0418	14.1169
70+50.00	844.1103	-0.0967	830.1188	13.9915
71+00.00	844.062	-0.0967	830.1958	13.8662
71+50.00	844.0136	-0.0967	830.2728	13.7408
72+00.00	843.9653	-0.0967	830.3498	13.6155
72+50.00	843.9169	-0.0967	830.4267	13.4902
73+00.00	843.8685	-0.0967	830.5037	13.3648
73+50.00	843.8202	-0.0967	830.5807	13.2395
74+00.00	843.7718	-0.0967	830.6577	13.1141
74+50.00	843.7234	-0.0967	830.7347	12.9887
75+00.00	843.6751	-0.0967	830.8117	12.8634
75+50.00	843.6267	-0.0967	830.8886	12.7381
76+00.00	843.5783	-0.0967	830.9656	12.6127
76+50.00	843.53	-0.0967	831.0426	12.4874
77+00.00	843.4816	-0.0967	831.1196	12.362
77+50.00	843.4332	-0.0967	831.1966	12.2366
78+00.00	843.3849	-0.0967	831.2735	12.1114
78+50.00	843.3365	-0.0967	831.3505	11.986
79+00.00	843.2881	-0.0967	831.4275	11.8606
79+50.00	843.2398	-0.0967	831.5045	11.7353
80+00.00	843.1914	-0.0967	831.5815	11.6099
80+50.00	843.143	-0.0967	831.6585	11.4845
81+00.00	843.0947	-0.0967	831.7354	11.3593
81+50.00	843.0463	-0.0967	831.8124	11.2339
82+00.00	842.998	-0.0967	831.8894	11.1086
82+50.00	842.9496	-0.0967	831.9664	10.9832
83+00.00	842.9012	-0.0967	832.0434	10.8578
83+50.00	842.8529	-0.0967	832.1204	10.7325
84+00.00	842.8045	-0.0967	832.1973	10.6072
84+50.00	842.7561	-0.0967	832.2743	10.4818
85+00.00	842.7078	-0.0967	832.3513	10.3565
85+50.00	842.6594	-0.0967	832.4283	10.2311
86+00.00	842.611	-0.0967	832.5053	10.1057

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Appendix

Overson Channel Alternative 1

Earthwork

Input File: p:\nnddot\13817\geopak\input\earth_ditch.inp
Output File: ew_ditch1_101504

```
1 1 1
/*****/
1 2 2 /*
*/
1 3 3 /* EARTH
*/
1 4 4 /*
*/
1 5 5 /* This input file computes earthwork for the preliminary
components of */
1 6 6 /* of a proposed cross section graphics file. This file does
cut and */
1 7 7 /* fill only. No grading grade or subcuts are needed.
*/
1 8 8 /*
*/
1 9 9 /* Written by: CAES office
*/
1 10 10 /* Date of last modification: 12-13-99
*/
1 11 11 /*
*/
1 12 12
/*****/
1 13 13
1 14 14
1 15 15
1 16 16 earthwork
1 17 17 tolerance = 0.009
1 18 18
1 19 19 xs dgn = p:\nnddot\13817\drawings\13817_xs1.dgn
/* file with x-sects */
1 20 20
1 21 21 proposed finish grade
1 22 22 soil type = SUIT_GRADING /* general fill
class */
1 23 23 type = line
1 24 24 lv = 7 /* proposed roadway, shoulder, top of
topsoil */
1 25 25
1 26 26 existing ground line
1 27 27 soil type = SUIT_GRADING /* excavation
class */
1 28 28 type = line
1 29 29 lv = 6 /* existing
ground line */
1 30 30
1 31 31
1 32 32 write earthwork shapes /* file with
x-sects */
1 33 33 plot param
1 34 34 lv = 62
1 35 35 lc = 4
1 36 36 stratify shape color
1 37 37
1 38 38
```

```

/*****
1  39  39 /* Uncomment and fill in the following three options as needed
*/
1  40  40
/*****
1  41  41
1  42  42 /* calculate only between excavation limits */
1  43  43
1  44  44
1  45  45 /* skip areas
1  46  46 from 1+00.0 r 1 to 2+00.0 r 1
1  47  47 from 4+00.0 r 1 to 5+00.0 r 1 */
1  48  48
1  49  49
1  50  50 /* volume adjustment
1  51  51 station = 1+00 r 1
1  52  52 soil type = SUIT_GRADING
1  53  53 common excavation volume = ? */
common excavation volume = ?, subgrade excavation volume = ?, or fill volume =
? */
1  54  54
1  55  55
/*****
1  56  56
1  57  57 process earthwork for baseline = ditch
1  58  58 job number = 001
1  59  59
1  60  60 /* BEG STA = ???
1  61  61 END STA = ??? */
1  62  62

```

MAPPING DGN FILE p:\nnddot\13817\drawings\13817_xs1.dgn INTO MEMORY
COMPUTING EARTHWORKS FOR BASELINE = DITCH
COMPUTING EARTHWORKS FOR JOB = 001
FORMING LIST OF XSCHELLS
BEGINNING EARTHWORKS COMPUTATION

Station	Material Name	End Areas (sq. ft.)	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	Mass Ordinate
0+07.160	SUIT_GRADING					
	Common Exc	97.24	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	0
0+50.000	SUIT_GRADING					
	Common Exc	686.87	622	622	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	622
1+00.000	SUIT_GRADING					
	Common Exc	1800.45	2303	2303	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	2925
1+50.000	SUIT_GRADING					
	Common Exc	3700.22	5093	5093	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	8018
2+00.000	SUIT_GRADING					
	Common Exc	4609.97	7695	7695	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	15713
2+50.000	SUIT_GRADING					
	Common Exc	4920.01	8824	8824	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	24537
3+00.000	SUIT_GRADING					
	Common Exc	5090.22	9269	9269	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	33806
3+50.000	SUIT_GRADING					
	Common Exc	5152.23	9484	9484	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	43290
4+00.000	SUIT_GRADING					
	Common Exc	5157.11	9546	9546	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	52836

4+50.000	SUIT_GRADING					
	Common Exc	5190.41	9581	9581	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	62417
5+00.000	SUIT_GRADING					
	Common Exc	5226.11	9645	9645	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	72062
5+50.000	SUIT_GRADING					
	Common Exc	5255.23	9705	9705	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	81767
6+00.000	SUIT_GRADING					
	Common Exc	5280.54	9755	9755	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	91522
6+50.000	SUIT_GRADING					
	Common Exc	5299.49	9796	9796	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	101318
7+00.000	SUIT_GRADING					
	Common Exc	5330.88	9843	9843	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	111161
7+50.000	SUIT_GRADING					
	Common Exc	5396.84	9933	9933	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	121094
8+00.000	SUIT_GRADING					
	Common Exc	5460.83	10053	10053	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	131147
8+50.000	SUIT_GRADING					
	Common Exc	5496.62	10146	10146	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	141293
9+00.000	SUIT_GRADING					
	Common Exc	5465.19	10150	10150	1.00	
	Subgrade Exc	0.00	0	0	1.00	

	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	151443
9+50.000	SUIT_GRADING					
	Common Exc	5465.42	10121	10121	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	161564
10+00.000	SUIT_GRADING					
	Common Exc	5500.02	10153	10153	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	171717
10+50.000	SUIT_GRADING					
	Common Exc	5541.21	10223	10223	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	181940
11+00.000	SUIT_GRADING					
	Common Exc	5619.20	10334	10334	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	192274
11+50.000	SUIT_GRADING					
	Common Exc	5694.40	10476	10476	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	202750
12+00.000	SUIT_GRADING					
	Common Exc	5742.84	10590	10590	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	213340
12+50.000	SUIT_GRADING					
	Common Exc	5726.38	10620	10620	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	223960
13+00.000	SUIT_GRADING					
	Common Exc	5702.58	10582	10582	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	234542
13+50.000	SUIT_GRADING					
	Common Exc	5669.16	10529	10529	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	245071
14+00.000	SUIT_GRADING					

	Common Exc	5551.42	10389	10389	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	255460
14+50.000	SUIT_GRADING					
	Common Exc	5501.54	10234	10234	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	265694
15+00.000	SUIT_GRADING					
	Common Exc	5643.85	10320	10320	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	276014
15+50.000	SUIT_GRADING					
	Common Exc	5632.45	10441	10441	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	286455
16+00.000	SUIT_GRADING					
	Common Exc	5756.49	10545	10545	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	297000
16+50.000	SUIT_GRADING					
	Common Exc	5843.27	10741	10741	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	307741
17+00.000	SUIT_GRADING					
	Common Exc	5885.20	10860	10860	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	318601
17+50.000	SUIT_GRADING					
	Common Exc	5877.71	10892	10892	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	329493
18+00.000	SUIT_GRADING					
	Common Exc	5857.74	10866	10866	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	340359
18+50.000	SUIT_GRADING					
	Common Exc	5841.05	10832	10832	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	351191

19+00.000	SUIT_GRADING					
	Common Exc	5781.92	10762	10762	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	361953
19+50.000	SUIT_GRADING					
	Common Exc	4173.94	9218	9218	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	371171
20+00.000	SUIT_GRADING					
	Common Exc	1307.33	5075	5075	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	376246
20+50.000	SUIT_GRADING					
	Common Exc	1062.67	2194	2194	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	378440
21+00.000	SUIT_GRADING					
	Common Exc	583.48	1524	1524	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	379964
21+50.000	SUIT_GRADING					
	Common Exc	104.32	637	637	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	3.98	4	4	1.00	380597
21+90.930	SUIT_GRADING					
	Common Exc	0.44	79	79	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	27.19	24	24	1.00	380652

G R A N D		S U M M A R Y		T O T A L S	
Material Name		Unadjusted	Adjusted	Mult	
		Volumes	Volumes	Factor	
		(cu. yd.)	(cu. yd.)		

SUIT_GRADING					
	Common Exc	380680	380680	1.00	
	Subgrade Exc	0	0	1.00	
	Subsoil Exc	0	0	1.00	
	Fill	28	28	1.00	

Project:	Computed:	Date:
Subject:	Checked:	Date:
Task:	Page:	of:
Job #:	No:	

APPENDIX

~~Roadway~~ Alternative 2
Diversion Channel

Earthwork

Input File: p:\nndot\13817\geopak\input\earth_ditch2.inp
 Output File: DITCH2

```

1      1      1
/*****/
1      2      2 /*
*/
1      3      3 /*                EARTH
*/
1      4      4 /*
*/
1      5      5 /* This input file computes earthwork for the preliminary
components of */
1      6      6 /* of a proposed cross section graphics file. This file does
cut and */
1      7      7 /* fill only. No grading grade or subcuts are needed.
*/
1      8      8 /*
*/
1      9      9 /*          Written by:  CAES office
*/
1     10     10 /*          Date of last modification:  12-13-99
*/
1     11     11 /*
*/
1     12     12
/*****/
1     13     13
1     14     14
1     15     15
1     16     16          earthwork
1     17     17          tolerance = 0.009
1     18     18
1     19     19          xs dgn = p:\nndot\13817\drawings\13817_xs2A.dgn
/* file with x-sects */
1     20     20
1     21     21          proposed finish grade
1     22     22          soil type = SUIT_GRADING          /* general fill
class */
1     23     23          type = line
1     24     24          lv   = 7 /* proposed roadway, shoulder, top of
topsoil */
1     25     25
1     26     26          existing ground line
1     27     27          soil type = SUIT_GRADING          /* excavation
class */
1     28     28          type = line
1     29     29          lv   = 2          /* existing
ground line */
1     30     30
1     31     31
1     32     32          write earthwork shapes          /* file with
x-sects */
1     33     33          plot param
1     34     34          lv = 62
1     35     35          lc = 4
1     36     36          stratify shape color
1     37     37
1     38     38
    
```

```

/*****
1   39   39 /* Uncomment and fill in the following three options as needed
*/
1   40   40
/*****
1   41   41
1   42   42 /* calculate only between excavation limits */
1   43   43
1   44   44
1   45   45 /* skip areas
1   46   46         from 1+00.0 r 1 to 2+00.0 r 1
1   47   47         from 4+00.0 r 1 to 5+00.0 r 1 */
1   48   48
1   49   49
1   50   50 /* volume adjustment
1   51   51         station = 1+00 r 1
1   52   52         soil type = SUIT_GRADING
1   53   53         common excavation volume = ? */ /*
common excavation volume = ?, subgrade excavation volume = ?, or fill volume =
? */
1   54   54
1   55   55
/*****
1   56   56
1   57   57         process earthwork for baseline = alt2a
1   58   58         job number = 001
1   59   59
1   60   60 /* BEG STA = ???
1   61   61         END STA = ??? */
1   62   62

```

```

MAPPING DGN FILE p:\nnddot\13817\drawings\13817_xs2A.dgn INTO MEMORY
COMPUTING EARTHWORKS FOR BASELINE = ALT2A
COMPUTING EARTHWORKS FOR JOB = 001
FORMING LIST OF XCELLS
BEGINNING EARTHWORKS COMPUTATION

```

Station	Material Name	End Areas (sq. ft.)	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	Mass Ordinate
22+50.00	SUIT_GRADING					
	Common Exc	65.43	0	0	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	99.67	0	0	1.00	0
23+00.00	SUIT_GRADING					
	Common Exc	350.97	386	386	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	92	92	1.00	294
23+50.00	SUIT_GRADING					
	Common Exc	694.82	968	968	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	1262
24+00.00	SUIT_GRADING					
	Common Exc	1156.22	1714	1714	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	2976
24+50.00	SUIT_GRADING					
	Common Exc	1814.44	2751	2751	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	5727
25+00.00	SUIT_GRADING					
	Common Exc	2651.70	4135	4135	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	9862
25+50.00	SUIT_GRADING					
	Common Exc	3232.37	5448	5448	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	15310
26+00.00	SUIT_GRADING					
	Common Exc	3322.12	6069	6069	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	21379
26+50.00	SUIT_GRADING					
	Common Exc	3432.42	6254	6254	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	27633

27+00.00	SUIT_GRADING					
	Common Exc	3828.93	6723	6723	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	34356
27+50.00	SUIT_GRADING					
	Common Exc	4219.84	7453	7453	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	41809
28+00.00	SUIT_GRADING					
	Common Exc	4804.60	8356	8356	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	50165
28+50.00	SUIT_GRADING					
	Common Exc	4938.96	9022	9022	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	59187
29+00.00	SUIT_GRADING					
	Common Exc	5038.03	9238	9238	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	68425
29+50.00	SUIT_GRADING					
	Common Exc	5066.91	9356	9356	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	77781
30+00.00	SUIT_GRADING					
	Common Exc	5060.35	9377	9377	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	87158
30+50.00	SUIT_GRADING					
	Common Exc	5039.22	9351	9351	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	96509
31+00.00	SUIT_GRADING					
	Common Exc	5016.29	9311	9311	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	105820
31+50.00	SUIT_GRADING					
	Common Exc	5031.82	9304	9304	1.00	
	Subgrade Exc	0.00	0	0	1.00	

Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	115124
32+00.00 SUIT_GRADING					
Common Exc	5084.06	9367	9367	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	124491
32+50.00 SUIT_GRADING					
Common Exc	5163.72	9489	9489	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	133980
33+00.00 SUIT_GRADING					
Common Exc	5222.23	9617	9617	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	143597
33+50.00 SUIT_GRADING					
Common Exc	5256.94	9703	9703	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	153300
34+00.00 SUIT_GRADING					
Common Exc	5271.99	9749	9749	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	163049
34+50.00 SUIT_GRADING					
Common Exc	5309.98	9798	9798	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	172847
35+00.00 SUIT_GRADING					
Common Exc	5361.38	9881	9881	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	182728
35+50.00 SUIT_GRADING					
Common Exc	5405.87	9970	9970	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	192698
36+00.00 SUIT_GRADING					
Common Exc	5450.34	10052	10052	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	202750
36+50.00 SUIT_GRADING					

Common Exc	5492.08	10132	10132	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	212882
37+00.00 SUIT_GRADING					
Common Exc	5530.91	10206	10206	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	223088
37+50.00 SUIT_GRADING					
Common Exc	5524.32	10236	10236	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	233324
38+00.00 SUIT_GRADING					
Common Exc	5480.11	10189	10189	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	243513
38+50.00 SUIT_GRADING					
Common Exc	5400.21	10074	10074	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	253587
39+00.00 SUIT_GRADING					
Common Exc	5992.15	10548	10548	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	264135
39+50.00 SUIT_GRADING					
Common Exc	5319.01	10473	10473	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	274608
40+00.00 SUIT_GRADING					
Common Exc	5495.11	10013	10013	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	284621
40+50.00 SUIT_GRADING					
Common Exc	5583.83	10258	10258	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	294879
41+00.00 SUIT_GRADING					
Common Exc	5628.94	10382	10382	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	305261

41+50.00	SUIT_GRADING					
	Common Exc	5626.96	10422	10422	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	315683
42+00.00	SUIT_GRADING					
	Common Exc	5605.00	10400	10400	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	326083
42+50.00	SUIT_GRADING					
	Common Exc	5579.65	10356	10356	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	336439
43+00.00	SUIT_GRADING					
	Common Exc	5553.89	10309	10309	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	346748
43+50.00	SUIT_GRADING					
	Common Exc	5541.40	10273	10273	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	357021
44+00.00	SUIT_GRADING					
	Common Exc	5550.93	10271	10271	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	367292
44+50.00	SUIT_GRADING					
	Common Exc	5534.67	10264	10264	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	377556
45+00.00	SUIT_GRADING					
	Common Exc	5521.39	10237	10237	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	387793
45+50.00	SUIT_GRADING					
	Common Exc	5509.77	10214	10214	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	398007
46+00.00	SUIT_GRADING					
	Common Exc	5552.12	10242	10242	1.00	
	Subgrade Exc	0.00	0	0	1.00	

	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	408249
46+50.00	SUIT_GRADING					
	Common Exc	5694.18	10413	10413	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	418662
47+00.00	SUIT_GRADING					
	Common Exc	5650.84	10505	10505	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	429167
47+50.00	SUIT_GRADING					
	Common Exc	5327.90	10166	10166	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	439333
48+00.00	SUIT_GRADING					
	Common Exc	4447.08	9051	9051	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	448384
48+50.00	SUIT_GRADING					
	Common Exc	3349.46	7219	7219	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	455603
49+00.00	SUIT_GRADING					
	Common Exc	2602.14	5511	5511	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	461114
49+50.00	SUIT_GRADING					
	Common Exc	1908.89	4177	4177	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	465291
50+00.00	SUIT_GRADING					
	Common Exc	1268.37	2942	2942	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	468233
50+50.00	SUIT_GRADING					
	Common Exc	790.24	1906	1906	1.00	
	Subgrade Exc	0.00	0	0	1.00	
	Subsoil Exc	0.00	0	0	1.00	
	Fill	0.00	0	0	1.00	470139
51+00.00	SUIT_GRADING					

Common Exc	583.55	1272	1272	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	0.00	0	0	1.00	471411
51+50.00 SUIT_GRADING					
Common Exc	256.39	778	778	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	17.73	16	16	1.00	472173
52+00.00 SUIT_GRADING					
Common Exc	55.23	289	289	1.00	
Subgrade Exc	0.00	0	0	1.00	
Subsoil Exc	0.00	0	0	1.00	
Fill	251.24	249	249	1.00	472213

G R A N D		S U M M A R Y		T O T A L S	
Material Name		Unadjusted	Adjusted	Mult	
		Volumes	Volumes	Factor	
		(cu. yd.)	(cu. yd.)		

SUIT_GRADING					
	Common Exc	472570	472570	1.00	
	Subgrade Exc	0	0	1.00	
	Subsoil Exc	0	0	1.00	
	Fill	357	357	1.00	