

**A14-4**

***Boring Log of Gwalior Bypass***



INTERCONTINENTAL CONSULTANTS AND TECHNOLOGISTS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 25.11.97 FINISH : 26.11.97		TERMINATION DEPTH : 7.95 M WATER TABLE : 6.0 M		TABLE NO. : 1 BORE HOLE NO. : PH-7							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	REMARKS
			Observed Value	Corrected Value				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
C.L.	D	DS1			10 20 30 40 50 60 70 80 90 100			1	69	20	0	N.	P.	12.9	2.61	1.55	
0.95	D	DS2	6	9		SILTY SAND (SM)  MEDIUM TO FINE SAND (SP-SM)		1	80	19	0	N.	P.	12.7	2.62	1.62	
1.15	D	SPT1	7	9													
2.15	D	SPT2	11	13													
3.15	D	SPT3	14	15													
4.15	D	SPT4	21	21													
5.15	D	SPT5	14	14													
6.15	D	SPT6	23	19													
7.15	D	SPT7	29	21													
7.65	D	SPT8															
7.95																	

D - DISTURBED SAMPLE

N.P. - NOT PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHINOCRATS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 24.11.97 FINISH : 24.11.97		TERMINATION DEPTH : 7.95 M WATER TABLE : 6.05M				TABLE NO. : 2 BORE HOLE NO. : MU-2			
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS	LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gc/cc)	REMARKS	
			OBSERVED VALUE	CORRECTED VALUE									GRAVEL (%)
G.L.	D	DS1											
0.65	D	SPT1	9	9	SILTY SAND (SM) 0.50	0	64	26	0	0	13.4	2.62	1.58
1.65	D	SPT2	12	12	SANDY SILT OF LOW PLASTICITY (ML-CL) 3.50	0	42	50	0	0	15.9	2.65	1.67
2.65	D	SPT3	9	9			0	64	26	0	0		
3.65	D	SPT4	14	16		12	64	24	0	0	13.1	2.60	1.76
4.65	D	SPT5	16	17	SILTY SAND (SM) 7.50	31	59	10	0	0	16.4	2.58	1.84
5.65	D	SPT6	14	14			31	59	10	0	0		
6.65	D	SPT7	19	17									
7.65	D	SPT8	25	20	GRAVELLY SAND (SP-SM) 7.95								
7.95													

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 D		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALTOR (M.P.).		BORING DATES : START : 28.11.97 FINISH : 28.11.97		TERMINATION DEPTH : 7.95 M WATER TABLE : 3.15 M		TABLE NO. : 3 BORE HOLE NO. : BM-3							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
G.L.		DS1			10 20 30 40 50 60 70 80 90 100	CLAY OF LOW PLASTICITY (CL)		2	30	61	7	29	20	21.2	2.66	1.71	
0.65	D	SPT1	7	7				5	42	50	3	22	18	16.9	2.64	1.72	
1.65	D	SPT2	8	8				2	67	30	1	N.	P.	14.1	2.52	1.64	
2.65	D	SPT3	12	15				6	80	14	0	N.	P.	15.8	2.61	1.67	
3.65	D	SPT4	14	16													
4.65	D	SPT5	16	16													
5.65	D	SPT6	19	17													
6.65	D	SPT7	19	17													
7.65	D	SPT8	22	18													
7.95																	

N.P. - NON PLASTIC

D - DISTURBED SAMPLE

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 29.11.97 FINISH : 29.11.97		TERMINATION DEPTH : 7.95 M WATER TABLE : 5.80 M		TABLE NO. : 4 BORE HOLE NO. : MH-4							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS
			PERCEIVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
C.L.	D	DS1			10 20 30 40 50 60 70 80 90 100	SANDY SILT OF LOW PLASTICITY (ML-CL)		0	40	54	6	25	19	13.0	2.65	1.64	
0.65	D	SPT1	29	48		SILTY SAND (SM-SC)		0	54	42	4	22	18	14.2	2.63	1.64	
1.65	D	SPT2	48	48		SANDY SILT OF LOW PLASTICITY (ML-CL)		0	48	48	4	23	18	14.9	2.64	1.81	
2.65	D	SPT3	38	38		SANDY SILT OF LOW PLASTICITY (ML-CL)		4	44	49	3	N.	P.	12.7	2.63	1.74	
3.65	D	SPT4	23	26													
4.65	D	SPT5	15	16		SANDY SILT (ML)											
5.65	D	SPT6	22	22													
6.65	D	SPT7	22	18													
7.65 7.95	D	SPT8	30	30		CLAY OF LOW PLASTICITY (CL)		3	17	76	4	31	21	21.1	2.67	1.79	

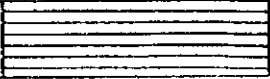
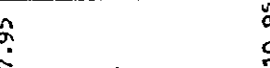
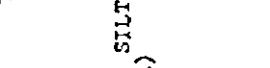
D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOLOGISTS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 13.12.97 FINISH : 23.10.98		TERMINATION DEPTH : 10.95 M WATER TABLE : 6.20 M		TABLE NO. : 5 BORE HOLE NO. : BH-5				
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		GRAIN SIZE ANALYSIS	FLUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS	
			CEASED VALUE	CORRECTED VALUE								GRAVEL (%)
0.65	D	SPT1	23	23	0	10	80	10	20.6	2.69	1.02	
1.65	D	SPT2	15	15	0	15	73	12	23	2.70	1.70	
2.65	D	SPT3	14	14	0	0	0	0	35			
3.65	D	SPT4	16	16					37			
4.65	D	SPT5	17	17					21			
5.65	D	SPT6	14	14					31			
6.65	D	SPT7	14	14					25.4	2.67	1.77	
7.65 7.95	D	SPT8	15	15								

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHINOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT CWALIOR (M.P.).		BORING DATES : START : 13.12.97 FINISH : 23.01.98		TERMINATION DEPTH : 10.95M WATER TABLE : 6.20 M BORE HOLE NO. : BH-5		TABLE NO. : 6								
DEPTH OF SAMPLE BECK	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS	
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)							
7.95					10 20 30 40 50 60 70 80 90 100													
8.65	D	SPT9	73	41					0	49	51	0	N.	P.	21.7	2.62	1.83	
9.65	D	SPT10	65	36		SANDY SILT (ML)			0	46	54	0	N.	P.	23.8	2.63	1.85	
10.65	D	SPT11	67	36					0	46	54	0	N.	P.	23.8	2.63	1.85	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC



INTERCONTINENTAL, CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 12.12.97 FINISH : 12.12.97		TERMINATION DEPTH : 7.95 M WATER TABLE : Not Met		TABLE NO. : 17 BORE HOLE NO. : PH-6								
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		SYMBOLIC REPRESENTATION	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)	LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gn/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE												
0.65	D	SPT1	15	15		CLAY OF MEDIUM PLASTICITY (CI)	0	12	74	14	38	23	15.0	2.68	1.72	
1.65	D	SPT2	18	18			0	10	75	15	41	24	15.7	2.70	1.75	
2.65	D	SPT3	26	26			0	10	75	15	41	24	15.7	2.70	1.75	
3.65	D	SPT4	27	27			0	10	75	15	41	24	15.7	2.70	1.75	
4.65	D	SPT5	11	11			1	17	65	17	36	23	18.4	2.69	1.70	
5.65	D	SPT6	14	14			1	17	65	17	36	23	18.4	2.69	1.70	
6.65	D	SPT7	17	17			1	17	65	17	36	23	18.4	2.69	1.70	
7.65	D	SPT8	17	17			1	17	65	17	36	23	18.4	2.69	1.70	
7.95	D	SPT8	17	17			1	17	65	17	36	23	18.4	2.69	1.70	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNICIANS PVT. LTD, NEW DELHI - 110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY IV-PASS AT CHALLOR (M.P.).		BORING DATES : START : 11.12.97 FINISH : 20.01.98		TERMINATION DEPTH : 13.95 M WATER TABLE : 6.55 M		TABLE NO. : 8 BORE HOLE NO. : NI-7						
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM	STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS	LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gc/cc)	REMARKS	
			CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)				
0.65	D	SPT1	33	33	CLAY OF MEDIUM PLASTICITY (CI)		0	10	77	13	15.5	2.69		1.77
1.65	D	SPT2	31	31	CLAY OF MEDIUM PLASTICITY (CI)		3	9	81	7	14.7	2.67		1.80
2.65	D	SPT3	11	11	CLAY OF LOW PLASTICITY (CL)		0	18	74	8	18.1	2.67		1.79
3.65	D	SPT4	12	12										
4.65	D	SPT5	14	14										
5.65	D	SPT6	15	15										
6.65	D	SPT7	19	19										
7.65 7.95	D	SPT8	21	21										

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.).		BORING DATES : START : 11.12.97 FINISH : 20.01.98		TERMINATION DEPTH : 13.95 M WATER TABLE : 6.55 M		TABLE NO. 19 BORE HOLE NO. : RH-7							
DEPTH OF SAMPLE BACK REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
7.95					10 20 30 40 50 60 70 80 90 100												
8.65	D	SPT9	16	16		7-9.5 CLAY OF LOW PLASTICITY (CL)		0	14	79	7	33	21	22.3	2.68	1.94	
9.65	D	SPT10	19	19		10-5 SANDY SILT OF LOW PLASTICITY (ML-CL)		5	20	69	6	27	20	20.1	2.66	1.91	
10.65	D	SPT11	39	39		12-5 CLAY OF LOW PLASTICITY (CL)		12	17	61	10	31	21	18.7	2.67	1.96	
11.65	D	SPT12	41	41		13.95											
12.65	D	SPT13	34	34													
13.65	D	SPT14	42	42													
13.95																	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT CHALIOR (M.P.).		BORING DATES : START : 24.01.98 FINISH : 25.01.98		TERMINATION DEPTH : 9.95 M WATER TABLE : 7.55 M				TABLE NO. : 10 BORE HOLE NO. : TH-8								
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		SYMBOLIC REPRESENTATION	USUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (ka/cc)	REMARKS		
			OBSERVED VALUE	CORRECTED VALUE			GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)								
0.65	D	DS1	13	13		CLAY OF LOW PLASTICITY (CL)	7	19	60	6	28	20	14.3	2.66	1.62			
0.95	D	SPT DS2	15	15														
1.65	D	SPT2	15	15														
2.65	D	SPT3	15	15														
3.65	D	SPT4	17	17														
4.65	D	SPT5	19	19														
5.65	D	SPT6 DS7	23	23														
5.95	D	SPT6 DS7	23	23														
6.65	D	SPT7	32	32														
7.65	D	SPT8	35	35														
7.95	D	SPT8	35	35														

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOLOGISTS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.).		BORING DATES : START : 24.01.98 FINISH : 25.01.98		TERMINATION DEPTH : 9.95 M WATER TABLE : 7.55 M		TABLE NO. : 11 BORE HOLE NO. : BH-B							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
7.95					10 20 30 40 50 60 70 80 90 100			8	32	53	7	25	19	21.1	2.65	1.95	
8.65	D	SPT9 DS10	37	37		SANDY SILT OF LOW PLASTICITY (ML-CL)											
8.95	D																
9.65	D	SPT10	43	43													
9.95																	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOLOGISTS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : CECTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GVALIOR (M.P.).		BORING DATES : START : 07.12.97 FINISH : 26.07.98		TERMINATION DEPTH : 13.75 M WATER TABLE : 2.30 M		TABLE NO. : 12 BORE HOLE NO. : MH-9								
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS		
			OBSERVED VALUE	CORRECTED VALUE			GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)								
G.L.		DS1																
0.65	D	SPT1	5	5	<p>STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)</p> <p>G.W.T. - 2.30m</p>		4	36	55	5	27	20	18.2	2.65	1.72			
1.65	D	SPT2	7	7					4	32	62	2	24	19.7	2.64	1.72		
2.65	D	SPT3	6	6					20	18	60	2	26	21.9	2.65	1.70		
3.65	D	SPT4	8	8														
4.65	D	SPT5	20	20														
5.65	D	SPT6	23	23														
6.65	D	SPT7	26	26														
7.65	D	SPT8	27	27														
7.95																		

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (kN/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
7.95					10 20 30 40 50 60 70 80 90 100												
8.65	D	SPT9	23	19		SANDY SILT (ML)		2	30	68	0	N.	P.	18.7	2.62	1.93	
8.95	D	DS10															
9.65	D	SPT10	17	16													
10.65	D	SPT11	20	17													
11.65	D	SPT12	102	-		CRAVELLY SAND (SM)		21	28	47	4	N.	P.	19.6	2.64	1.95	
12.65	D	SPT13	101	-													
12.84	D	DS14															
13.65	D	SPT14	103	-		SANDY GRAVEL (GP)		28	59	3	0	N.	P.	15.4	2.60	1.88	
13.75																	

PROJECT NO. : 2075 D  
 NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT WALIOR (M.P.).  
 INTERCONTINENTAL CONSULTANTS AND TECHNICIANS PVT. LTD. NEW DELHI-110016

BORING DATES :  
 START : 03.12.97  
 FINISH : 26.01.98

TERMINATION DEPTH : 13.75 M  
 WATER TABLE : 2.30 M

TABLE NO. : 13  
 BORE HOLE NO. : BH-9

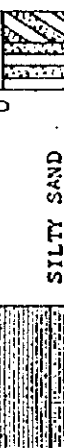


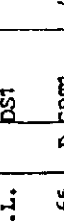
N.P. - NON PLASTIC

D - DISTURBED SAMPLE

INTERCONTINENTAL CONSULTANTS AND TECHNICIANS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR(M.P.).		BORING DATES : START : 27.01.98 FINISH : 28.01.98		TERMINATION DEPTH : 8.05 M WATER TABLE : 2.40 M		TABLE NO. : 14 BORE HOLE NO. : 2R-10							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	REMARKS	
			OBSERVED VALUE	CORRECTED VALUE			GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)							
					10 20 30 40 50 60 70 80 90 100												
G.L.	D	DC1				SANDY SILT OF LOW PLASTICITY (ML-CL)											
0.65	D	SPT1	7	7		0.95 GRAVELLY SAND (SM)	0	47	47	6	23	18	10.2	2.64	1.53		
1.65	D	SPT2	12	15			20	49	31	0	N.	P.	12.7	2.61	1.86		
2.65	D	SPT3	9	9			1	33	61	5	24	18	22.7	2.65	1.93		
3.65	D	SPT4	11	11													
4.65	D	SPT5	16	16													
5.65	D	SPT6	17	17													
6.50	D	SPT7	100	-													
6.55			(5cm)														
8.05																	

D - DISTURBED SAMPLE  
N.P. - NON PLASTIC



DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOMS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
C.L.		DS1			10 20 30 40 50 60 70 80 90 100												
0.65	D	D SPT1	4	7		SILTY SAND (SM-SC)		0	51	45	4	22	18	10.7	2.63	1.79	
1.65	D	D SPT2	11	15		SANDY SILT OF LOW PLASTICITY (ML-CL)		0	43	54	3	23	18	14.5	2.64	1.82	
2.65	D	D SPT3	5	5		SILTY SAND (SP-SM)		2	88	10	0	N.	P.	16.9	2.61	1.74	
3.30 3.50		D SPT4	133 (20cm)	-		ROCKY STRATA (SAND STONE)											
7.50																	

PROJECT NO. : 2075 B  
 NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.)

TERMINATION DEPTH : 7.50 M  
 WATER TABLE : 3.30 M

BORING DATES :  
 START : 04.12.97  
 FINISH : 07.12.97

TABLE NO. : 15  
 BORE HOLE NO. : BH-11

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD.  
 NEW DELHI-110016

D - DISTURBED SAMPLE

N.P. - NGI PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNICIANS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 18.12.97 FINISH : 18.12.97		TERMINATION DEPTH : 7.95 M WATER TABLE : Not Met		TABLE NO. : 16 BORE HOLE NO. : BH-12							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
G.L.	D	DS1			10 20 30 40 50 60 70 80 90 100												
0.65	D	SPT1	38	63		SILTY SAND (SM-SC)		12	65	16	7	23	18	12.1	2.63	1.84	
1.65	D	SPT2	42	57				0	22	60	18	36	23	15.7	2.69	1.06	
2.65	D	SPT3	35	43				0	22	60	18	36	23	15.7	2.69	1.06	
3.65	D	SPT4	15	15				0	0	0	0	100	0	0	0	0	
4.65	D	SPT5	16	16				0	0	0	0	100	0	0	0	0	
5.65	D	SPT6	16	16				0	0	0	0	100	0	0	0	0	
6.65	D	SPT7	22	22				0	0	0	0	100	0	0	0	0	
7.65	D	SPT8	26	26				0	0	0	0	100	0	0	0	0	
7.95	D	SPT8	26	26				0	0	0	0	100	0	0	0	0	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNICIANS PVT. LTD. NEW DELHI - 110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 19.12.97 FINISH : 20.12.97		TERMINATION DEPTH : 7.95 M WATER TABLE : 5.20 M		TABLE NO. : 17 HOLE NO. : HW-13							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (g/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
0.65	D	SPT1	40	40	10	CLAY OF MEDIUM PLASTICITY (CI)		0	15	69	16	36	23	9.8	2.68	1.75	
1.65	D	SPT2	52	52	20	CLAY OF MEDIUM PLASTICITY (CI)		1	24	59	16	35	21	13.4	2.67	1.69	
2.65	D	SPT3	32	32	30	CLAY OF MEDIUM PLASTICITY (CI)		17	12	52	19	38	24	16.1	2.69	1.79	
3.65	D	SPT4	18	18	40	CLAY OF MEDIUM PLASTICITY (CI)											
4.65	D	SPT5	16	16	50	CLAY OF MEDIUM PLASTICITY (CI)											
5.65	D	SPT6	19	19	60	CLAY OF MEDIUM PLASTICITY (CI)											
6.65	D	SPT7	20	20	70	CLAY OF MEDIUM PLASTICITY (CI)											
7.65	D	SPT8	23	23	80	CLAY OF MEDIUM PLASTICITY (CI)											
7.95					90												

D - DISTURBED SAMPLE      N.P. - NON PLASTIC

INTERCONTINENTAL, CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY DV-PASS AT GWALIOR (M.P.).		BORING DATES : START : 16.12.97 FINISH : 26.01.98				TERMINATION DEPTH : 11.95 M WATER TABLE : 7.85 M				TABLE NO. : 18 BORE HOLE NO. : RH-14					
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 20 CM		SYMBOLIC REPRESENTATION	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	GRAVEL SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gp/cc)	REMARKS	
			OBSERVED VALUE	CORRECTED VALUE			GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)							
G.L.	D	DS1				CLAY OF MEDIUM PLASTICITY (CI)											
0.65	D	SPT1	7	7		CLAY OF MEDIUM PLASTICITY (CI)	2	17	66	15	35	23	16.9	2.68	1.74		
1.65	D	SPT2	13	13		CLAY OF LOW PLASTICITY (CL)	9	26	57	8	28	20	13.7	2.66	1.79		
2.65	D	SPT3	25	25		CLAY OF MEDIUM PLASTICITY (CI)	6	30	47	17	32	21	18.1	2.67	1.81		
3.65	D	SPT4	20	20		CLAY OF MEDIUM PLASTICITY (CI)	5	8	69	18	38	24	18.9	2.70	1.84		
4.65	D	SPT5	18	18													
5.65	D	SPT6	17	17													
6.65	D	SPT7	21	21													
7.65	D	SPT8	24	24													
7.95																	

N.P. - NON PLASTIC

D - DISTURBED SAMPLE

DEPTH OF SAMPLE FROM REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (ks/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
7.95					10 20 30 40 50 60 70 80 90 100	CLAY OF MEDIUM PLASTICITY (CI)		0	14	72	14	35	22	21.3	2.69	1.97	
8.65	D	SPT9	31	31		CLAY OF MEDIUM PLASTICITY (CI)		0	14	72	14	35	22	21.3	2.69	1.97	
8.95	D	DS10	33	33				0	14	72	14	35	22	21.3	2.69	1.97	
9.65	D	SPT10	33	33				8	47	36	7	20	14.9	2.65	1.85		
10.65	D	SPT11	30	23				8	47	36	7	20	14.9	2.65	1.85		
11.65	D	SPT12	42	25				8	47	36	7	20	14.9	2.65	1.85		
11.95																	

PROJECT NO. : 2075 B  
NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.).

TABLE NO. : 19  
CORE HOLE NO. : MH-14

BORING DATES :  
START : 16.12.97  
FINISH : 26.01.98

TERMINATION DEPTH : 11.95 M  
WATER TABLE : 7.65 M

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI-110016		PROJECT NO. : 2075 B		NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BY-PASS AT GWALIOR (M.P.).		BORING DATES : START : 15.12.97 FINISH : 24.01.98		TERMINATION DEPTH : 11.95 M WATER TABLE : 8.15 M.		TABLE NO. : 20 BORE HOLE NO. : PH-75							
DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gp/cc)	REMARKS :
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
G.L.	D	D51			10 20 30 40 50 60 70 80 90 100												
0.65	D	SPT1	7	7		CLAY OF LOW PLASTICITY (CL)		7	28	55	10	32	21	23.1	2.66	1.81	
1.65	D	SPT2	9	9													
2.65	D	SPT3	10	10													
3.65	D	SPT4	22	22													
4.65	D	SPT5	23	23													
5.65	D	SPT6	26	26													
6.65	D	SPT7	13	13		CLAY OF MEDIUM PLASTICITY (CI)		4	15	66	15	38	24	19.2	2.69	1.88	
7.65	D	SPT8	15	15													
7.95																	

N.P. - NON PLASTIC

D - DISTURBED SAMPLE

DEPTH OF SAMPLE BELOW REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 cm		TERMINATION DEPTH : 11.95 M WATER TABLE : 0.15 M	TABLE NO. : 21 BORE HOLE NO. : BH-24 16
			OBSERVED VALUE	CORRECTED VALUE		
7.95	D	DS9				
8.65	D	SPT9	32	32		
9.65	D	SPT10	36	36		
10.65	D	SPT11	36	36		
11.65 11.95	D	SPT12	39	39		
PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.). BORING DATES : START : 15.12.97 FINISH : 24.01.98			GRAIN SIZE ANALYSIS GRAVEL (%) : 0 SAND (%) : 12 SILT (%) : 72 CLAY (%) : 16		LIQUID LIMIT : 23 PLASTIC LIMIT : 19.4 NATURAL MOISTURE CONTENT (%) : 2.69 SPECIFIC GRAVITY : 2.69 UNIT WEIGHT (g/cc) : 1.95	
STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE) 10 20 30 40 50 60 70 80 90-100			VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION 7.95 CLAY OF MEDIUM PLASTICITY (CI) 10.5 CLAY OF LOW PLASTICITY (CL) 11.95		REMARKS	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

DEPTH OF SAMPLE BECM REFERENCE LEVEL	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	SPT BLOWS PER 30 CM		STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAIN SIZE ANALYSIS				LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	REMARKS
			OBSERVED VALUE	CORRECTED VALUE				GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)						
0.15	D	DS1			10 20 30 40 50 60 70 80 90 100	SANDY GRAVEL (GW-GC) 0.15 POORLY GRADED GRAVEL (GP) 1.0	HEX	73	9	12	6	25	18	11.7	2.65	2.08	
1.00	D	DS2						86	11	3	0	N.	P.	7.9	2.77	2.12	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016

PROJECT NO. : 2075 B

NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.).

BORING DATES : START : 03.12.97 FINISH : 06.12.97


TERMINATION DEPTH : 1.0 M

WATER TABLE : Not Met

TABLE NO. : 22


TRIAL PIT NO. : TP-1



INTERCONTINENTAL, CONSULTANTS AND TECHNICIANS PVT. LTD. NEW DELHI - 110016	PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT CHALLOR (M.P.).		BORING DATES : START : 02.12.97 FINISH : 05.12.97		TERMINATION DEPTH : 1.0 M WATER TABLE : Not Met		TABLE NO. : 23 TRIAL PIT NO. : TP-2					
	DEPTH OF SAMPLE BELOW REFERENCE LEVEL C.L. : 1.00	NATURE OF SAMPLING : D	SAMPLE REFERENCE NO. : DS1	SPT BLOWS PER 30 CM OBSERVED VALUE CORRECTED VALUE	STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE) 10 20 30 40 50 60 70 80 90 100	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION POORLY GRADED GRAVEL (GP) 1.0	SYMBOLIC REPRESENTATION 	GRAIN SIZE ANALYSIS GRAVEL (%) : 79 SAND (%) : 19 SILT (%) : 2 CLAY (%) : 0	LIQUID LIMIT : N. PLASTIC LIMIT : P.	NATURAL MOISTURE CONTENT (%) : 8.1	SPECIFIC GRAVITY : 2.68	UNIT WEIGHT (Kc/cc) : 2.04

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

INTERCONTINENTAL, CONSULTANTS AND TECHNOCRATS PVT. LTD. NEW DELHI - 110016	PROJECT NO. : 2075 B NAME OF THE PROJECT : GEOTECHNICAL INVESTIGATION WORK FOR NATIONAL HIGHWAY BYPASS AT GWALIOR (M.P.).	BORING DATES : START : 17.12.97 FINISH : 18.12.97	TERMINATION DEPTH : 1.0 M WATER TABLE : Not Met	TABLE NO. : 24 TRIAL PIT NO. : TP-3	R E M A R K S		DEPTH OF SAMPLE PALCH REFERENCE LEVEL	D D S1	NATURE OF SAMPLING	SAMPLE REFERENCE NO.	OBSERVED VALUE CORRECTED VALUE	SPT BLOWS PER 30 cm	STANDARD PENETRATION RESISTANCE CURVE (OBSERVED VALUE)	VISUAL DESCRIPTION OF SOIL WITH I.S. CLASSIFICATION	SYMBOLIC REPRESENTATION	GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)	LIQUID LIMIT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT (%)	SPECIFIC GRAVITY	UNIT WEIGHT (gm/cc)	
																									GRAVEL (%)
							1.00						10 20 30 40 50 60 70 80 90 100	POORLY GRADED GRAVEL (GP)		65	14	3	0	N.	P.	7.2	2.72	2.09	

D - DISTURBED SAMPLE

N.P. - NON PLASTIC

**A14-5**

***Environmental Impact Assessment (Natural Aspects)  
Questionnaire for Environment Appraisal  
(Bareilly Bypass)***



## Environmental Impact Assessment (Natural Aspects)

### QUESTIONNAIRE FOR ENVIRONMENT APPRAISAL

#### 1.0 GENERAL

- 1.1 Name of the Project : The Feasibility Study on National Highway Bypasses in India (Bareilly Bypass)
- a) Objective of the proposal : To ease traffic congestion on NH-24 in Bareilly city and to provide for smooth, efficient and safe movement of through traffic.
- b) Brief description of Project Proposal : The project envisages:
- Construction of bypass
  - Construction of bridges & culverts as per latest IRC Standards
  - Construction of junctions, service roads, ROB etc., to ensure smooth and safe movement of traffic.
- c) Project justification/need : According to the Regional Plan 2001, National Capital Region, December 1988, Bareilly was nominated as one of the five Counter-magnets which were proposed to provide a pull to migrants from the less developed areas, and to form a regional growth centre in the region to achieve a balanced pattern of urbanisation. NH-24 is one of the corridors from Delhi to Calcutta via Lucknow and Kanpur also covers Bareilly which shows its importance as a commercial/ industrial centre of the region. Due to rapid increase in population and other business and industrial activities, the traffic flow pattern in and around Bareilly had changed significantly. Along with phenomenal increase in the through traffic, there has been a steady growth of slow moving traffic. The mixed traffic condition of increased fast and slow moving intra-city traffic causes chaotic traffic conditions in the

city. Therefore, to ease the traffic congestion and chaotic traffic conditions in the city, the State Government has planned a bypass far away from the city area.

- d) Present Status of the Project : Alignment has been proposed, Pre-feasibility study is in progress.
- e) Operational Plan (The schedule of major activities or project steps) : To be detailed in Feasibility Report.

## 1.2 Location of Project

- a) Place : Bareilly
- b) District : Bareilly
- c) State : Uttar Pradesh

1.3 Approximate area/population to be served : Uttar Pradesh, West Bengal and Delhi

1.4 Overall project cost : Rs. 43 crores (approximately)

1.5 No. of tracks, broad gauge/metre gauge : N. A.

1.6 Type of traction electric, diesel, steam etc. : N. A.

## 1.7 Size and magnitude of project

- a) Length of road : 24 km (Approximately)
- b) Width of the road/highway : 4-lanes (80 m R.O.W.)
- c) Total land required : 192 hectares (Approximately)

1.8 Alternative alignment/site examined : None

## 2.0 ENVIRONMENTAL SETTING/PROJECT LOCATION

### 2.1 Environmental characteristics

- i) National park : Nil
- ii) Recreational areas : Nil
- iii) Non-hunting areas : Nil
- iv) Wildlife sanctuary : Nil
- v) Natural reserves : Nil
- vi) Mangrove forests : Nil
- vii) Bio-sphere reserves : Nil

- viii) Primary (virgin) rain forests : Nil
- ix) Declared watershed areas to be used for community potable water supply : Nil
- x) Swamp/wet lands : Nil
- xi) Agricultural land : Entirely agricultural land
- xii) Land occupied by ethnic minorities : Nil
- xiii) Industrial : Nil
- xiv) Residential : Nil
- xv) Commercial : Nil
- xvi) Irrigated areas : Covered under item (xi)
- xvii) Non-irrigated crop land : Nil
- xviii) Others (specify), description of these identified critical areas should focus on the following
  - Ecosystems (i), (iii-x) as above : Insignificant
  - Total size of the ecosystem
  - Major ecological functions (e.g. habitat, breeding area, soil stabilisation, hydrologic regulation) : None
  - Major social functions (recreation etc.) : None
  - Number of people depending on functions of the ecosystem (visitors serving potable water etc.) : To be included in detailed project report
  - Impact of rail/road/highway construction/operation on the functions of critical eco-systems (pollution's destruction's etc.) : Insignificant
  - Significance of critical land use/environmental items : Mainly agricultural land
  - Brief description of ethnic community, impacts of rail/road/ highway projects on ethnic minority, reaction within : Nil

the community on the project

2.2 Details of forest land involved

- i) Legal status of forests (namely reserved, including unclassified etc.) : No forest land is involved
- ii) Details of flora existing in the area including density of vegetation : Mainly agricultural fields, no endangered species of flora are involved. Generally found species are Dalbergia sissoo, Azadirachta indica, Mangifera indica, Ficus religioza etc.
- iii) Topography of the area indicating gradient aspect, altitude etc. : Plain agricultural land
- iv) Its vulnerability to erosion, whether it forms a part of seriously eroded area or not. : No
- v) Whether it forms a part of National Park, wild-life sanctuary, natural reserve, biosphere reserve etc. if so, details of area involved. : No
- vi) Rare/endangered species of flora and fauna found in area : Nil
- Vii) Whether it is habitat of migrating fauna or a breeding ground for them : No
- Viii) Any other feature of the area relevant to the proposal : None

2.3 If the project (for which forest land is required) involves displacement of people or requires raw material from any forest area, the details of proposal for rehabilitation and procurement of raw material be furnished : N.A.

2.4 Proposed steps taken to compensate for loss of forest area, the vegetation and wildlife : Although no forest land is involved, even then a comprehensive afforestation plan along the bypass has to be designed, which will definitely improve the ecology of the area.



- 2.5 Stripping and site clearing
- Size and area to be stripped : To be detailed in the Feasibility Report.
  - Location : - Do -
  - Soil type : - Do -
  - Volume and quantity of earth to be removed : 4.4 mil. m<sup>3</sup> will be brought to the site from sides of the proposed bypass.
  - Location of dump sites, if any (to be shown on map) : Nil
- 2.6 Details of bridges/tunnels/cutting etc., size and area to be cut : To be provided in the detailed Feasibility Report
- Soil type : - Do -
  - Volume and quantity of earth removed : - Do -
  - Location of eventual dump site : Nil
- 2.7 Details of embankments/land fills etc. : Same as in item 2.6
- Location : - Do -
  - Soil type : - Do -
  - Volume and quantity required for filling : - Do -
- 2.8 Data for last 2-3 decades regarding soil erosion, floods, silting, earthquakes/landslides and cyclones etc. : N.A.
- 2.9 Measures being adopted against such calamities : N.A.
- 2.10 Likely modification of hydrology in the area leading to canalisation/ alteration of water flow, alteration of surface and underground drainage : Insignificant
- 2.11 Likely hazards to safety of workers and nearby residents due to quarrying including use of explosives : All necessary precautions will be contemplated while preparing the detailed operation plan
- 2.12 a) Has an air quality impact : Yes

assessment been carried out as per guidelines and report enclosed

- b) Has a noise impact assessment : Yes  
been carried out as per  
guidelines and report enclosed
- 2.13 Hazards of aquatic : None  
ecology/flooding due to run-off  
contamination
- 2.14 Likely hazards to passengers : None  
and nearby residents due to  
escape of sanitary water, spills  
of hazardous materials etc.
- 2.15 Pollution of ground water from : None  
fills
- 2.16 Fuel supply arrangement to the : Necessary clause to take care of this  
labour force during construction problem is to be included in the  
period tender documents.
- 3.0 **PROPOSED SAFEGUARDS**
- 3.1 Measures proposed for : N.A.; even then an adequate  
protection and renewal of greenbelt (afforestation) on both sides  
of bypass is to be proposed and the  
forests, agricultural land, cost estimate shall be made  
grazing land, top soil, natural accordingly.  
resources and water resources  
etc.
- 3.2 Measures adopted during : All relevant measures suggested by  
construction for balancing cut concerned authorities from time to  
and fill, rehabilitation of dump time are to be detailed out in the final  
sites, reclaiming borrow pits, Environment Management Plan.  
securing embankment soil and  
slope stabilisation, preventing  
soil erosion and siltation,  
containing blasting and  
bulldozing
- 3.3 Measures proposed for off- : N.A.  
setting adverse effect on fragile  
ecosystem
- 3.4 Measures to ensure that : Proper safeguard to this effect will be  
uncontrolled development will suggested in the EMP, but  
not occur enforcement of these measures will  
solely depend on the controlling  
authority.

- 3.5 Measures taken to ensure
- a) Prevention of pollution to : N.A.  
irrigation, water supply system  
of the area
  - b) Prevention of pollution of : N.A.  
sources of potable water supply  
system
- 3.6 Measures proposed to off-set : No adverse social impact is  
adverse social impacts anticipated
- 4.0 Having completed this : N.A.  
questionnaire please refer to  
sections 3 and 4 of these  
guidelines and based on the  
information herein and above  
data, prepare a comprehensive  
Environmental Impact  
Statement (EIS) and  
Environmental Management  
Plan (EMP) and submit it along  
with the filled in questionnaire.



**A14-6**

***Environmental Impact Assessment (Natural Aspects)  
Questionnaire for Environment Appraisal  
(Gwalior Bypass)***



## Environmental Impact Assessment (Natural Aspects)

### QUESTIONNAIRE FOR ENVIRONMENT APPRAISAL

#### 1.0 GENERAL

- 1.1 Name of the Project : The Feasibility Study on National Highway Bypasses in India (Gwalior Bypass)
- a) Objective of the proposal : Traffic on the existing NH-3 in Gwalior has increased tremendously which is beyond the capacity of existing 2-lane highway. The object of the proposal is to ease congestion in Gwalior city and to provide for smooth, efficient and safe movement of through traffic.
- b) Brief description of Project Proposal : The project envisages:  
- Construction of bypass  
- Construction of bridges and culverts as per latest IRC Standards  
- Construction of junctions, service roads, ROBs etc., as required to ensure smooth and safe travel of traffic.
- c) Project justification/need : The existing two lane national highway in city area is over crowded. It results in frequent traffic jams, delay and accidents. The average daily traffic on this section of NH was 42921 PCUs per day as per Dec. 1996 Traffic Census carried out by the department. Thus to relieve the congestion in city portion of NH-3, construction of a bypass to Gwalior town is necessary.
- d) Present Status of the Project : Land acquisition plan is being prepared, alignment proposed by MOST. Pre-feasibility Study is in progress.
- e) Operational Plan (The schedule of major activities or project steps) : To be provided in Feasibility Report.
- 1.2 Location of Project

- a) Place : Gwalior
- b) District : Gwalior
- c) State : M.P.
- 1.3 Approximate area/population to be served : M.P. and some part of U.P. and Maharashtra
- 1.4 Overall project cost : Approximately 60 crores (95-96)
- 1.5 No. of tracks, broad gauge/metre gauge : N.A.
- 1.6 Type of traction electric, diesel, steam etc. : N.A.
- 1.7 Size and magnitude of project
- a) Length of road : 28 km (Approximately)
- b) Width of the road/highway : 4 – lane (80m R.O.W.)
- c) Total land required : 224 hectares approximately
- 1.8 Alternative alignment/site examined : None
- 2.0 ENVIRONMENTAL SETTING/PROJECT LOCATION**
- 2.1 Environmental characteristics
- i) National park : Nil
- ii) Recreational areas : Nil
- iii) Non-hunting areas : Nil
- iv) Wildlife sanctuary : Nil
- v) Natural reserves : Nil
- vi) Mangrove forests : Nil
- vii) Bio-sphere reserves : Nil
- viii) Primary (virgin) rain forests : About 12 km stretch of Bypass passes through reserve forest.
- ix) Declared watershed areas to be used for community potable water supply : Nil
- x) Swamp/wet lands : Nil
- xi) Agricultural land : About 9 km stretch
- xii) Land occupied by ethnic minorities : Nil
- xiii) Industrial : Nil



- xiv) Residential : Nil
  - xv) Commercial : Nil
  - xvi) Irrigated areas : Covered under item (xi)
  - xvii) Non-irrigated crop land : Nil
  - xviii) Others (specify), description of these identified critical areas should focus on the following
    - Ecosystems (i), (iii-x) as above : N.A.
    - Total size of the ecosystem
    - Major ecological functions (e.g. habitat, breeding area, soil stabilisation, hydrologic regulation) : None
    - Major social functions (recreation etc.) : None
    - Number of people depending on functions of the ecosystem (visitors serving potable water etc.) : To be detailed during detailed project report.
    - Impact of rail/road/highway construction/operation on the functions of critical eco-systems (pollution's destruction's etc.) : Insignificant
    - Significance of critical land use/environmental items : Agricultural/barren land
    - Brief description of ethnic community, impacts of rail/road/ highway projects on ethnic minority, reaction within the community on the project. : Insignificant
- 2.2** Details of forest land involved
- i) Legal status of forests (namely reserved, including unclassified etc.) : Reserved forest
  - ii) Details of flora existing in the area including density of vegetation : Mainly some shrubs such as Lantana camera, Prosopis juliflora and Khair, Zizyphus nummularia, here and there, no endangered species of flora in the project area. The density is less than 0.2.

- iii) Topography of the area : Plain and rolling with some hills indicating gradient aspect, altitude etc. (Mostly plain fields, in some areas alignment passes through hilly region but still the gradients and geometrical requirements are feasible as per specifications of MOST.
  - iv) Its vulnerability to erosion, whether it forms a part of seriously eroded area or not. : No
  - v) Whether it forms a part of National Park, wild-life sanctuary, natural reserve, biosphere reserve etc. if so, details of area involved. : No
  - vi) Rare/endangered species of flora and fauna found in area : None
  - vii) Whether it is habitat of migrating fauna or a breeding ground for them : No
  - viii) Any other feature of the area relevant to the proposal : Animals found in forest are generally Rabbits, Deer, Wild dogs, Jackals, Wild cats, Foxes, Mongooses, Lizards, Owls, Sparrows and Son birds. But their number is very small.
- 2.3 If the project (for which forest land is required) involves displacement of people or requires raw material from any forest area, the details of proposal for rehabilitation and procurement of raw material be furnished : No displacement of people is involved, raw material will be procured from other areas.
- 2.4 Proposed steps taken to compensate for loss of forest area, the vegetation and wildlife : The State Government should provide equal area of land for afforestation.
- 2.5 Stripping and site clearing
- Size and area to be stripped : To be detailed in feasibility report.
  - Location : - Do -
  - Soil type : - Do -
  - Volume and quantity of earth to be removed : Total 5.8 mil. m<sup>3</sup>, out of which 5.3 mil. m<sup>3</sup> will be imported from nearby

- quarries in barren area.
- Location of dump sites, if any (to be shown on map) : N.A.
  - 2.6 Details of bridges/tunnels/cutting etc., size and area to be cut : To be detailed in feasibility report.
  - Size and area to be cut : To be detailed in feasibility report
  - Soil type : - Do -
  - Volume and quantity of earth removed : Total 5.8 mil. m<sup>3</sup>, out of which 5.3 mil. m<sup>3</sup> will be imported from nearby quarries and 0.5 mil. m<sup>3</sup> will be generated from stripping the local elevated area.
  - Location of eventual dump site : N.A.
  - 2.7 Details of embankments/land fills etc. : Same as in item 2.6
  - Location : - Do -
  - Soil type : - Do -
  - Volume and quantity required for filling : - Do -
  - 2.8 Data for last 2-3 decades regarding soil erosion, floods, silting, earthquakes/landslides and cyclones etc. : N.A.
  - 2.9 Measures being adopted against such calamities : N.A.
  - 2.10 Likely modification of hydrology in the area leading to canalisation/ alteration of water flow, alteration of surface and underground drainage : Insignificant
  - 2.11 Likely hazards to safety of workers and nearby residents due to quarrying including use of explosives : All necessary precautions will be contemplated while preparing the detailed operational plan.
  - 2.12 a) Has an air quality impact assessment been carried out as per guidelines and report enclosed : Yes
  - b) Has a noise impact assessment : Yes

been carried out as per guidelines and report enclosed

- 2.13 Hazards of aquatic ecology/flooding due to run-off contamination : None
- 2.14 Likely hazards to passengers and nearby residents due to escape of sanitary water, spills of hazardous materials etc. : None
- 2.15 Pollution of ground water from fills : None
- 2.16 Fuel supply arrangement to the labour force during construction period : Necessary clause to take care of this problem is to be included in the tender documents.
- 3.0 **PROPOSED SAFEGUARDS**
- 3.1 Measures proposed for protection and renewal of forests, agricultural land, grazing land, top soil, natural resources and water resources etc. : No clear felling is involved, anyhow adequate provision of roadside plantation shall be provided.
- 3.2 Measures adopted during construction for balancing cut and fill, rehabilitation of dump sites, reclaiming borrow pits, securing embankment soil and slope stabilisation, preventing soil erosion and siltation, containing blasting and bulldozing : All relevant measures suggested by concerned authorities from time to time are to be detailed out in the final Environment Management Plan.
- 3.3 Measures proposed for off-setting adverse effect on fragile ecosystem : N.A.
- 3.4 Measures to ensure that uncontrolled development will not occur : Proper safe guards to this effect will be suggested in the EMP, but enforcement of these measures will solely depend on the Controlling Authority.
- 3.5 Measures taken to ensure
- a) Prevention of pollution to irrigation, water supply system of the area : N.A.

- b) Prevention of pollution of sources of potable water supply system : N.A.
- 3.6 Measures proposed to off-set adverse social impacts : N.A.; no adverse social impact is anticipated.
- 4.0 Having completed this questionnaire please refer to sections 3 and 4 these guidelines and based on the information herein and above data, prepare a comprehensive Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) and submit it along with the filled in questionnaire. : N.A.



**A14-7**

***Environmental Impact Assessment (Natural Aspects)  
Number of Trees (Bareilly) and Number of Species (Gwalior)***





**TOTAL NUMBER OF TREES TO BE CUT DOWN (ABOVE 60 CM GIRTH)  
ALONG THE ALIGNMENT AREA (about 300 Ha.)**

Sl. No	Name of trees	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0	5.1 - 6.0	Above 6.0
<b>From Parsakhera (starting point) to Belwa (about 9 km)</b>						
1	Dalbergia sisoo	7	8	-	-	-
2	Eucalyptus citriodora	18	44	-	-	-
3	Acacia arabica	6	2	-	-	-
4	Azadirachta indica	-	1	-	-	-
5	Mangifera indica	3	4	-	-	-
<b>From Belwa to Nawadia (about 5 km)</b>						
1	Ficus religiosa	-	-	1	-	-
2	Dalbergia sisoo	5	16	7	-	-
3	Eucalyptus citriodora	4	8	1	-	-
4	Albizia lebbeck	-	-	4	-	-
5	Azadirachta indica	-	2	3	-	-
6	Acacia arabica	2	-	-	-	-
7	Mangifera indica	-	4	1	-	-
8	Ficus lucescens	1	30	17	2	-
<b>From Nawdia to Kantharia</b>						
1.	Dalbergia sisoo	10	14	3	-	-
2.	Eucalyptus Citriodora	-	-	1	-	-
3.	Azadirachta indica	-	4	-	-	-
4.	Mangifera indica	-	-	2	-	1
5	Albizia lebbeck	-	-	-	-	-
6.	Acacia arabica	2	4	-	-	-
<b>From Kantharia up to Pitampura (National Highway 24) - final point</b>						
1.	Dalbergia Sisoo	3	-	-	2	-
2.	Eucalyptus Citriodora	2	15	-	-	7
3	Mangifera indica	2	-	3	1	-
4.	Acacia arabica	4	-	-	-	-

**NUMBER OF SPECIES (WITH MORE THAN 60CM GIRTH) LYING IN THE ALIGNMENT OF GWALIOR BYPASS THAT WILL BE FELLED**

**A. Total no. of plants to be cut down within alignment area between Nirawali and Tighra dam (Gwalior road crossing)**

Name of plants	Between 2 to 3 ft.	Between 3 to 4 ft.	Between 4 to 5 ft.	Above 5 ft.	Total
Dalbergia sisoo	4	2	-	1	7
Acacia arabica	21	5	1	1	28
Azadirachta indica	4	11	1	1	17
Prosopis juliflora	2	-	-	-	2
Albizia Procera	-	2	-	-	2
Zizyphus mauratiana	1	-	-	-	1
Eucalyptus tereticornis	9	3	-	-	12
Mangifera indica	3	-	-	-	3
Holoptelea integrifolia	2	-	-	-	2
Melia azadirachta	-	-	1	-	1
<b>Total</b>	<b>46</b>	<b>23</b>	<b>3</b>	<b>3</b>	<b>75</b>

**B. Between Tighra dam (Gwalior road crossing) and Raipur Kalan (upto National Highway)**

Name of Plants	Between 2 to 3 ft.	Between 3 to 4 ft.	Between 4 to 5 ft.	Above 5 ft.	Total
Holoptelea integrifolia	-	1	-	-	1
Azadirachta indica	6	-	-	1	7
Zizyphus mauratiana	-	-	-	1	1
Acacia arabica	2	-	-	-	2
<b>Total</b>	<b>8</b>	<b>1</b>	<b>-</b>	<b>2</b>	<b>11</b>

*Appendix 16*

*Design for the Feasibility Study*

**A16-1**

***IP Data of Bareilly and Gwalior Bypass***

## IP Data of Bareilly Bypass

Horizontal Alignment PI Station Report.

Alignment: fs\_b\_01 Desc: F/S Alignment No.1 in Bareilly Bypass 980303

PI Station	Northing	Easting	Distance	Direction
0+000	3146807.6807	337892.8102	4152.3289	N 76-56-26 E
4+152.3289	3147745.9402	341937.7458	1110.1302	N 76-33-32 E
5+262.4591	3148003.9864	343017.4686	2007.2094	S 62-49-40 E
7+175.9167	3147087.3628	344803.1592	2107.9326	N 83-52-34 E
9+233.0709	3147312.2364	346899.0627	1676.1215	S 62-26-26 E
10+839.0396	3146536.7441	348384.9951	4716.8078	N 88-34-27 E
15+535.9164	3146654.1169	353100.3423	7022.4759	S 02-03-58 W
20+582.2946	3139636.2068	352847.1489	631.8586	S 19-15-18 W
21+209.6123	3139039.6942	352638.7793	7996.4286	S 00-32-21 W
29+200.1692	3131043.6196	352563.5318	787.5209	S 23-50-31 W
29+976.2890	3130323.3026	352245.2040		

## IP Data of Gwalior Bypass

Horizontal Alignment PI Station Report.

Alignment: fs\_g\_01 Desc: F/S Alignment in Gwalior Bypass 980305

PI Station	Northing	Easting	Distance	Direction
0+000	2914441.5650	211934.2368	985.8465	S 17-41-42 W
0+985.8465	2913502.3603	211634.5909	1426.7647	S 56-04-59 W
2+382.5421	2912706.2389	210450.5942	2914.0793	S 07-37-06 W
5+211.7339	2909817.8807	210064.2713	2320.9264	S 70-10-24 W
7+368.3490	2909030.6778	207880.9228	2604.2420	S 06-00-25 W
9+785.1890	2906440.7356	207608.3872	1276.0131	S 84-08-53 W
10+902.8476	2906310.6338	206339.0240	2557.8454	S 44-55-17 W
13+404.5774	2904499.4840	204532.8375	5080.6788	S 03-07-53 W
18+382.7979	2899426.3910	204255.3052	2196.5291	S 48-00-00 E
20+450.6146	2897956.6261	205887.6445	4571.5116	S 15-35-17 W
24+762.2409	2893553.2600	204659.1965	1353.9470	S 00-58-27 E
26+112.1285	2892199.5086	204682.2127	428.6088	S 55-14-35 W
26+497.1821	2891955.1600	204330.0774		

**A16-2**

***Station and Curve Data of Bareilly Bypass***





## Station and Curve Data of Bareilly Bypass

Horizontal Alignment Station and Curve Report.

Alignment: fs\_b\_01 Desc: F/S Alignment No.1 in Bareilly Bypass 980303

Desc.	Station	Spiral/Curve Data	Northing	Easting
PI	0+000		3146807.6807	337892.8102
	Length:	4152.3289	Course: N 76-56-26 E	
PI	4+152.3289		3147745.9402	341937.7458
	Length:	1110.1302	Course: N 76-33-32 E	
	Delta:	0-22-55		
Tangent Data				
	0+000		3146807.6807	337892.8102
	4+152.3289		3147745.9402	341937.7458
	Length:	4152.3289	Course: N 76-56-26 E	
PI	5+262.4591		3148003.9864	343017.4686
	Length:	2007.2094	Course: S 62-49-40 E	
	Delta:	40-36-48		
Circular Curve Data				
PC	4+152.3289		3147745.9402	341937.7458
RP			3144828.1128	342635.0861
PT	6+278.8374		3147497.0280	344005.0831
	Delta:	40-36-48	Type: RIGHT	
	Radius:	3000.0000	DOC: 01-54-35	
	Length:	2126.5086	Tangent: 1110.1302	
	Mid-Ord:	186.4542	External: 198.8106	
	Chord:	2082.2691	Course: S 83-08-04 E	
	Es:	198.8106		
PI	7+175.9167		3147087.3628	344803.1592
	Length:	2107.9326	Course: N 83-52-34 E	
	Delta:	33-17-46		
Circular Curve Data				
PC	6+278.8374		3147497.0280	344005.0831
RP			3150165.9432	345375.0800
PT	8+022.2176		3147183.0629	345695.1192
	Delta:	33-17-46	Type: LEFT	
	Radius:	3000.0000	DOC: 01-54-35	
	Length:	1743.3801	Tangent: 897.0792	
	Mid-Ord:	125.7521	External: 131.2539	
	Chord:	1718.9520	Course: S 79-28-33 E	
	Es:	131.2539		
PI	9+233.0709		3147312.2364	346899.0627
	Length:	1676.1215	Course: S 62-26-26 E	
	Delta:	33-41-01		
Circular Curve Data				
PC	8+022.2176		3147183.0629	345695.1192
RP			3143205.8892	346121.8380
PT	10+373.7715		3146752.0100	347972.5208
	Delta:	33-41-01	Type: RIGHT	
	Radius:	4000.0000	DOC: 01-25-57	
	Length:	2351.5539	Tangent: 1210.8534	
	Mid-Ord:	171.5658	External: 179.2542	
	Chord:	2317.8363	Course: S 79-16-56 E	
	Es:	179.2542		
PI	10+839.0396		3146536.7441	348384.9951
	Length:	4716.8078	Course: N 88-34-27 E	
	Delta:	28-59-08		

Desc.	Station	Spiral/Curve Data	Northing	Easting
Circular Curve Data				
PC	10+373.7715		3146752.0100	347972.5208
RP			3148347.7644	348805.3281
PT	11+284.3768		3146548.3218	348850.1192
	Delta:	28-59-08	Type:	LEFT
	Radius:	1800.0000	DOC:	03-10-59
	Length:	910.6054	Tangent:	465.2681
	Mid-Ord:	57.2771	External:	59.1596
	Chord:	900.9261	Course:	S 76-55-59 E
	Es:	59.1596		
-----				
PI	15+535.9164		3146654.1169	353100.3423
	Length:	7022.4759	Course:	S 02-03-58 W
	Delta:	93-29-32		
-----				
Circular Curve Data				
PC	11+284.3768		3146548.3218	348850.1192
RP			3142549.5604	348949.6549
PT	17+811.3583		3142405.3415	352947.0542
	Delta:	93-29-32	Type:	RIGHT
	Radius:	4000.0000	DOC:	01-25-57
	Length:	6526.9815	Tangent:	4251.5396
	Mid-Ord:	1259.0678	External:	1837.4300
	Chord:	5826.5910	Course:	S 44-40-47 E
	Es:	1837.4300		
-----				
PI	20+582.2946		3139636.2068	352847.1489
	Length:	631.8586	Course:	S 19-15-18 W
	Delta:	17-11-19		
-----				
Tangent Data				
	17+811.3583		3142405.3415	352947.0542
	20+280.0242		3139938.2807	352858.0471
	Length:	2468.6659	Course:	S 02-03-58 W
-----				
Circular Curve Data				
PC	20+280.0242		3139938.2807	352858.0471
RP			3140010.3902	350859.3475
PT	20+880.0242		3139350.8453	352747.4684
	Delta:	17-11-19	Type:	RIGHT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	600.0000	Tangent:	302.2704
	Mid-Ord:	22.4578	External:	22.7129
	Chord:	597.7525	Course:	S 10-39-38 W
	Es:	22.7129		
-----				
PI	21+209.6123		3139039.6942	352638.7793
	Length:	7996.4286	Course:	S 00-32-21 W
	Delta:	18-42-57		
-----				
Circular Curve Data				
PC	20+880.0242		3139350.8453	352747.4684
RP			3138691.3004	354635.5893
PT	21+533.3287		3138710.1206	352635.6778
	Delta:	18-42-57	Type:	LEFT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	653.3045	Tangent:	329.5881
	Mid-Ord:	26.6162	External:	26.9752
	Chord:	650.4039	Course:	S 09-53-49 W
	Es:	26.9752		
-----				
PI	29+200.1692		3131043.6196	352563.5318
	Length:	787.5209	Course:	S 23-50-31 W
	Delta:	23-18-10		
-----				
Tangent Data				
	21+533.3287		3138710.1206	352635.6778
	28+787.7584		3131456.0122	352567.4127

Desc.	Station	Spiral/Curve Data	Northing	Easting
	Length:	7254.4297	Course:	S 00-32-21 W
Circular Curve Data				
PC	28+787.7584		3131456.0122	352567.4127
RP			3131474.8324	350567.5012
PT	29+601.1789		3130666.4022	352396.8291
	Delta:	23-18-10	Type:	RIGHT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	813.4206	Tangent:	412.4109
	Mid-Ord:	41.2110	External:	42.0780
	Chord:	807.8259	Course:	S 12-11-26 W
	Es:	42.0780		
PI	29+976.2890		3130323.3026	352245.2040
Tangent Data				
	29+601.1789		3130666.4022	352396.8291
	29+976.2890		3130323.3026	352245.2040
	Length:	375.1100	Course:	S 23-59-31 W



**A16-3**

***Station and Curve Data of Gwalior Bypass***



## Station and Curve Data of Gwalior Bypass

Horizontal Alignment Station and Curve Report.  
 Alignment: fs\_g\_01 Desc: Alignment in Gwalior 980305

Desc.	Station	Spiral/Curve Data	Northing	Easting
PI	0+000	Length: 985.8465	2914441.5650 Course: S 17-41-42 W	211934.2368
PI	0+985.8465	Length: 1426.7647 Delta: 38-23-17	2913502.3603 Course: S 56-04-59 W	211634.5909
Tangent Data				
	0+000		2914441.5650	211934.2368
	0+500	Length: 500.0000	2913965.2207 Course: S 17-41-42 W	211782.2629
Spiral Curve Data: CLOTHOID				
TS	0+500		2913965.2207	211782.2629
SPI			2913806.3091	211731.5634
SC	0+750		2913730.5830	211696.4818
		Length: 250.0000	L Tan: 166.8033	
		Radius: 1000.0000	S Tan: 83.4575	
		Theta: 7-09-43	P: 2.6027	
		X: 249.6097	K: 124.9349	
		Y: 10.4050	A: 500.0000	
		Chord: 249.8264	Course: S 20-04-55 W	
		Ts: 485.8465		
Circular Curve Data				
SC	0+750		2913730.5830	211696.4818
RP			2914150.9356	210789.1209
CS	1+050		2913481.2140	211531.7332
		Delta: 17-11-19	Type: RIGHT	
		Radius: 1000.0000	DOC: 05-43-46	
		Length: 300.0000	Tangent: 151.1352	
		Mid-Ord: 11.2289	External: 11.3564	
		Chord: 298.8763	Course: S 33-27-04 W	
		Es: 65.5840		
Spiral Curve Data: CLOTHOID				
SC	1+050		2913481.2140	211531.7332
SPI			2913359.2229	211421.7161
ST	1+540.0000		2913176.3695	211149.7754
		Length: 490.0000	L Tan: 327.6997	
		Radius: 1000.0000	S Tan: 164.2729	
		Theta: 14-02-15	P: 9.9827	
		X: 487.0669	K: 244.5106	
		Y: 39.8454	A: 700.0000	
		Chord: 488.6940	Course: S 51-24-23 W	
		Ts: 584.2226		
PI	2+382.5421		2912706.2389	210450.5942
		Length: 2914.0793	Course: S 07-37-06 W	
		Delta: 48-27-53		
Spiral Curve Data: CLOTHOID				
TS	1+540.0000		2913176.3695	211149.7754
SPI			2913054.7760	210968.9408
SC	1+866.6667		2912984.4776	210885.6236
		Length: 326.6667	L Tan: 217.9132	
		Radius: 1500.0000	S Tan: 109.0120	
		Theta: 6-14-20	P: 2.9629	
		X: 326.2796	K: 163.2688	
		Y: 11.8468	A: 700.0000	
		Chord: 326.4946	Course: S 54-00-13 W	
		Ts: 842.5421		

Desc.	Station	Spiral/Curve Data	Northing	Easting
Circular Curve Data				
SC	1+866.6667		2912984.4776	210885.6236
RP			2911838.0374	211852.9265
CS	2+758.8069		2912245.6246	210409.3640
	Delta:	34-04-38	Type:	LEFT
	Radius:	1500.0000	DOC:	03-49-11
	Length:	892.1402	Tangent:	459.7019
	Mid-Ord:	65.8388	External:	68.8613
	Chord:	879.0489	Course:	S 32-48-20 W
	Es:	149.3362		
Spiral Curve Data: CLOTHOID				
SC	2+758.8069		2912245.6246	210409.3640
SPI			2912108.4893	210370.6441
ST	3+185.4736		2911826.2562	210332.8950
	Length:	426.6667	L Tan:	284.7464
	Radius:	1500.0000	S Tan:	142.4968
	Theta:	8-08-55	P:	5.0531
	X:	425.8044	K:	213.1896
	Y:	20.1980	A:	800.0000
	Chord:	426.2832	Course:	S 10-20-02 W
	Ts:	887.8190		
Tangent Data				
PI	5+211.7339		2909817.8807	210064.2713
	Length:	2320.9264	Course:	S 70-10-24 W
	Delta:	62-33-18		
	3+185.4736		2911826.2562	210332.8950
	4+245.8825		2910775.2070	210192.3153
	Length:	1060.4089	Course:	S 07-37-06 W
Spiral Curve Data: CLOTHOID				
TS	4+245.8825		2910775.2070	210192.3153
SPI			2910492.8051	210154.5436
SC	4+672.5492		2910356.9853	210110.9259
	Length:	426.6667	L Tan:	284.9168
	Radius:	1200.0000	S Tan:	142.6517
	Theta:	10-11-09	P:	6.3139
	X:	425.3202	K:	213.1088
	Y:	25.2269	A:	715.5418
	Chord:	426.0676	Course:	S 11-00-45 W
	Ts:	965.8514		
Circular Curve Data				
SC	4+672.5492		2910356.9853	210110.9259
RP			2910723.9017	208968.3969
CS	5+352.7004		2909800.9040	209735.2576
	Delta:	32-28-29	Type:	RIGHT
	Radius:	1200.0000	DOC:	04-46-29
	Length:	680.1512	Tangent:	349.4821
	Mid-Ord:	47.8664	External:	49.8551
	Chord:	671.0835	Course:	S 34-02-29 W
	Es:	221.9052		
Spiral Curve Data: CLOTHOID				
SC	5+352.7004		2909800.9040	209735.2576
SPI			2909621.3261	209519.1166
ST	6+186.0337		2909431.6910	208993.1538
	Length:	833.3333	L Tan:	559.1050
	Radius:	1200.0000	S Tan:	281.0074
	Theta:	19-53-40	P:	24.0091
	X:	823.3423	K:	414.9978
	Y:	95.6232	A:	1000.0000
	Chord:	828.8766	Course:	S 63-32-55 W
	Ts:	1138.6111		
Tangent Data				
PI	7+368.3490		2909030.6778	207880.9228
	Length:	2604.2420	Course:	S 06-00-25 W
	Delta:	64-09-59		



Desc.	Station	Spiral/Curve Data	Northing	Easting
Spiral Curve Data: CLOTHOID				
TS	6+186.0337		2909431.6910	208993.1538
SPI			2909242.0559	208467.1909
SC	7+019.3670		2909062.4779	208251.0499
	Length:	833.3333	L Tan:	559.1050
	Radius:	1200.0000	S Tan:	281.0074
	Theta:	19-53-40	P:	24.0091
	X:	823.3423	K:	414.9978
	Y:	95.6232	A:	1000.0000
	Chord:	828.8766	Course:	S 63-32-55 W
	Ts:	1182.3152		
Circular Curve Data				
SC	7+019.3670		2909062.4779	208251.0499
RP			2908139.4803	209017.9106
CS	7+529.9289		2908663.6689	207938.4542
	Delta:	24-22-39	Type:	LEFT
	Radius:	1200.0000	DOC:	04-46-29
	Length:	510.5619	Tangent:	259.2029
	Mid-Ord:	27.0512	External:	27.6751
	Chord:	506.7196	Course:	S 38-05-25 W
	Es:	244.6364		
Spiral Curve Data: CLOTHOID				
SC	7+529.9289		2908663.6689	207938.4542
SPI			2908410.8895	207815.7034
ST	8+363.2622		2907854.8546	207757.1927
	Length:	833.3333	L Tan:	559.1050
	Radius:	1200.0000	S Tan:	281.0074
	Theta:	19-53-40	P:	24.0091
	X:	823.3423	K:	414.9978
	Y:	95.6232	A:	1000.0000
	Chord:	828.8766	Course:	S 12-37-54 W
	Ts:	1182.3152		
Tangent Data				
PI	9+785.1890		2906440.7356	207608.3872
	Length:	1276.0131	Course:	S 84-08-53 W
	Delta:	78-08-27		
	8+363.2622		2907854.8546	207757.1927
	9+221.8668		2907000.9646	207667.3392
	Length:	858.6045	Course:	S 06-00-25 W
Spiral Curve Data: CLOTHOID				
TS	9+221.8668		2907000.9646	207667.3392
SPI			2906901.4322	207656.8655
SC	9+371.8668		2906852.6745	207645.4574
	Length:	150.0000	L Tan:	100.0820
	Radius:	600.0000	S Tan:	50.0745
	Theta:	7-09-43	P:	1.5616
	X:	149.7658	K:	74.9610
	Y:	6.2430	A:	300.0000
	Chord:	149.8959	Course:	S 08-23-39 W
	Ts:	563.3222		
Circular Curve Data				
SC	9+371.8668		2906852.6745	207645.4574
RP			2906989.3691	207061.2360
CS	10+040.1567		2906404.7800	207196.3495
	Delta:	63-49-01	Type:	RIGHT
	Radius:	600.0000	DOC:	09-32-57
	Length:	668.2899	Tangent:	373.5905
	Mid-Ord:	90.6640	External:	106.8026
	Chord:	634.2770	Course:	S 45-04-39 W
	Es:	174.8375		
Spiral Curve Data: CLOTHOID				
SC	10+040.1567		2906404.7800	207196.3495
SPI			2906393.5038	207147.5611

Desc.	Station	Spiral/Curve Data	Northing	Easting
ST	10+190.1567		2906383.2995	207048.0007
	Length:	150.0000	L Tan:	100.0820
	Radius:	600.0000	S Tan:	50.0745
	Theta:	7-09-43	P:	1.5616
	X:	149.7658	K:	74.9610
	Y:	6.2430	A:	300.0000
	Chord:	149.8959	Course:	S 81-45-39 W
	Ts:	563.3222		
PI	10+902.8476		2906310.6338	206339.0240
	Length:	2557.8454	Course:	S 44-55-17 W
	Delta:	39-13-36		
Circular Curve Data				
PC	10+190.1567		2906383.2995	207048.0007
RP			2904393.7224	207251.9200
PT	11+559.4229		2905805.9942	205835.7674
	Delta:	39-13-36	Type:	LEFT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	1369.2662	Tangent:	712.6909
	Mid-Ord:	116.0408	External:	123.1882
	Chord:	1342.6805	Course:	S 64-32-05 W
	Es:	123.1882		
PI	13+404.5774		2904499.4840	204532.8375
	Length:	5080.6788	Course:	S 03-07-53 W
	Delta:	41-47-24		
Tangent Data				
	11+559.4229		2905805.9942	205835.7674
	12+259.2875		2905310.4367	205341.5678
	Length:	699.8646	Course:	S 44-55-17 W
Circular Curve Data				
PC	12+259.2875		2905310.4367	205341.5678
RP			2903192.0289	207465.7968
PT	14+447.4091		2903355.9041	204470.2760
	Delta:	41-47-24	Type:	LEFT
	Radius:	3000.0000	DOC:	01-54-35
	Length:	2188.1216	Tangent:	1145.2900
	Mid-Ord:	197.2936	External:	211.1819
	Chord:	2139.9410	Course:	S 24-01-35 W
	Es:	211.1819		
PI	18+382.7979		2899426.3910	204255.3052
	Length:	2196.5291	Course:	S 48-00-00 E
	Delta:	51-07-53		
Tangent Data				
	14+447.4091		2903355.9041	204470.2760
	17+426.0314		2900381.7290	204307.5686
	Length:	2978.6223	Course:	S 03-07-53 W
Circular Curve Data				
PC	17+426.0314		2900381.7290	204307.5686
RP			2900272.4789	206304.5825
PT	19+210.8520		2898786.1893	204966.3213
	Delta:	51-07-53	Type:	LEFT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	1784.8206	Tangent:	956.7665
	Mid-Ord:	195.8175	External:	217.0706
	Chord:	1726.1814	Course:	S 22-26-04 E
	Es:	217.0706		
PI	20+450.6146		2897956.6261	205887.6445
	Length:	4571.5116	Course:	S 15-35-17 W
	Delta:	63-35-17		

Desc.	Station	Spiral/Curve Data	Northing	Easting
Circular Curve Data				
PC	19+210.8520		2898786.1893	204966.3213
RP			2897299.8996	203628.0601
PT	21+430.4920		2896762.4634	205554.4978
	Delta:	63-35-17	Type:	RIGHT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	2219.6400	Tangent:	1239.7626
	Mid-Ord:	300.1043	External:	353.0855
	Chord:	2107.4672	Course:	S 16-12-22 E
	Es:	353.0855		
-----				
PI	24+762.2409		2893553.2600	204659.1965
	Length:	1353.9470	Course:	S 00-58-27 E
	Delta:	16-33-43		
-----				
Tangent Data				
	21+430.4920		2896762.4634	205554.4978
	24+471.1490		2893833.6451	204737.4181
	Length:	3040.6571	Course:	S 15-35-17 W
-----				
Circular Curve Data				
PC	24+471.1490		2893833.6451	204737.4181
RP			2893296.2089	206663.8558
PT	25+049.2733		2893262.2102	204664.1448
	Delta:	16-33-43	Type:	LEFT
	Radius:	2000.0000	DOC:	02-51-53
	Length:	578.1243	Tangent:	291.0919
	Mid-Ord:	20.8529	External:	21.0726
	Chord:	576.1136	Course:	S 07-18-25 W
	Es:	21.0726		
-----				
PI	26+112.1285		2892199.5086	204682.2127
	Length:	428.6088	Course:	S 55-14-35 W
	Delta:	56-13-01		
-----				
Tangent Data				
	25+049.2733		2893262.2102	204664.1448
	25+845.0577		2892466.5407	204677.6727
	Length:	795.7844	Course:	S 00-58-27 E
-----				
Circular Curve Data				
PC	25+845.0577		2892466.5407	204677.6727
RP			2892458.0411	204177.7449
PT	26+335.6440		2892047.2524	204462.7934
	Delta:	56-13-01	Type:	RIGHT
	Radius:	500.0000	DOC:	11-27-33
	Length:	490.5863	Tangent:	267.0707
	Mid-Ord:	58.9716	External:	66.8569
	Chord:	471.1431	Course:	S 27-08-04 W
	Es:	66.8569		
-----				
PI	26+497.1821		2891955.1600	204330.0774
-----				
Tangent Data				
	26+335.6440		2892047.2524	204462.7934
	26+497.1821		2891955.1600	204330.0774
	Length:	161.5381	Course:	S 55-14-35 W



**A16-4**

***Project Profile Data of Bareilly Bypass***



## Project Profile Data of Bareilly Bypass

Vertical alignment station report.

Alignment: fs\_b\_01

Vertical Alignment: FGC

Surface: eg00

Station	Elevation	Curve Length	Grade
0+000	168.000		0.0000
0+850	168.000	300.0000	2.0000
1+200	175.000	400.0000	-1.5000
1+650	168.250	300.0000	1.5000
2+000	173.500	400.0000	-1.5000
2+300	169.000	200.0000	0.0000
2+900	169.000	300.0000	2.0000
3+200	175.000	300.0000	-2.0000
3+500	169.000	300.0000	2.5000
3+850	177.750	400.0000	-2.0000
4+200	170.750	300.0000	0.1000
4+800	171.350	300.0000	2.0000
5+150	178.350	400.0000	-2.0000
5+450	172.350	200.0000	2.0000
5+750	178.350	400.0000	-2.0000
6+100	171.350	300.0000	1.7000
6+450	177.300	400.0000	-1.3000
6+800	172.750	300.0000	0.0000
7+600	172.750	200.0000	-0.3000
7+900	171.850	400.0000	0.3000
8+200	172.750	200.0000	2.1000
8+450	178.000	300.0000	0.7000
9+100	182.550	400.0000	-2.0000
9+550	173.550	300.0000	-0.2000
10+100	172.450	300.0000	2.0000
10+400	178.450	300.0000	0.5000
10+700	179.950	300.0000	-2.0000
10+950	174.950	200.0000	-0.3000
11+300	173.900	300.0000	2.0000
11+600	179.900	300.0000	-2.0000
11+900	173.900	300.0000	0.2000
12+900	175.900	300.0000	0.7000
13+600	180.800	300.0000	-2.0000
14+000	172.800	300.0000	

Station	Elevation	Curve Length	Grade
			0.3000
14+600	174.600	200.0000	-0.2200
14+950	173.830	200.0000	2.0000
15+200	178.830	300.0000	-1.2000
15+500	175.230	300.0000	0.0000
16+000	175.230	200.0000	1.5000
16+200	178.230	200.0000	-1.5000
16+500	173.730	200.0000	-0.2000
16+900	172.930	300.0000	1.5000
17+250	178.180	400.0000	-1.8000
17+650	170.980	400.0000	1.2000
18+100	176.380	400.0000	-1.2000
18+400	172.780	200.0000	1.2000
18+600	175.180	200.0000	-1.0000
18+900	172.180	400.0000	1.3000
19+200	176.080	200.0000	-1.4000
19+600	170.480	300.0000	0.0000
19+950	170.480	400.0000	1.5000
20+250	174.980	200.0000	-1.0000
20+600	171.480	200.0000	1.5000
20+800	174.480	200.0000	-1.2000
21+050	171.480	300.0000	1.5000
21+300	175.230	200.0000	-1.1000
21+500	173.030	200.0000	1.6000
21+700	176.230	200.0000	-1.4000
22+100	170.630	200.0000	1.5000
22+300	173.630	200.0000	-1.5000
22+500	170.630	200.0000	2.0000
22+900	178.630	400.0000	-2.0000
23+350	169.630	200.0000	0.3000
23+650	170.530	200.0000	1.2400
23+900	173.630	200.0000	-1.5000
24+200	169.130	400.0000	1.6000
24+500	173.930	200.0000	-1.4000
24+850	169.030	300.0000	1.7000
25+300	176.680	400.0000	-2.0000
25+600	170.680	200.0000	1.4000



Station	Elevation	Curve Length	Grade
25+900	174.880	300.0000	-1.1000
26+150	172.130	200.0000	0.0000
26+400	172.130	300.0000	-1.1000
26+650	169.380	200.0000	0.0000
27+050	169.380	200.0000	1.7000
27+300	173.630	300.0000	-1.3000
27+750	167.780	200.0000	1.5000
28+000	171.530	300.0000	-1.0000
28+400	167.530	400.0000	1.3000
28+700	171.430	200.0000	-1.0000
29+050	167.930	400.0000	1.0000
29+400	171.430	300.0000	-1.2000
29+700	167.830	300.0000	0.0000



**A16-5**

***Project Profile Data of Gwalior Bypass***



## Project Profile Data of Gwalior Bypass

Vertical alignment station report.

Station	Elevation	Curve Length	Grade
0+000	192.000		
0+250	191.000	300.0000	-0.4000
0+550	198.800	300.0000	2.6000
0+850	192.800	300.0000	-2.0000
1+150	199.400	300.0000	2.2000
1+525	191.525	450.0000	-2.1000
1+900	199.025	300.0000	2.0000
2+200	193.625	300.0000	-1.8000
2+500	201.125	300.0000	2.5000
2+800	195.875	300.0000	-1.7500
3+300	197.375	300.0000	0.3000
3+600	203.225	300.0000	1.9500
4+000	197.225	500.0000	-1.5000
4+400	204.825	300.0000	1.9000
4+750	204.825	400.0000	0.0000
5+100	201.325	300.0000	-1.0000
6+000	201.325	300.0000	0.0000
6+300	206.725	300.0000	1.8000
6+600	203.125	300.0000	-1.2000
7+200	203.125	300.0000	0.0000
7+500	206.725	300.0000	1.2000
7+750	202.975	200.0000	-1.5000
7+950	207.575	200.0000	2.3000
8+250	208.475	300.0000	0.3000
8+500	206.425	200.0000	-0.8200
9+100	206.425	300.0000	0.0000
9+400	213.925	300.0000	2.5000
9+700	210.025	300.0000	-1.3000
10+025	216.525	350.0000	2.0000
10+350	206.775	300.0000	-3.0000
10+850	216.775	300.0000	2.0000
11+400	215.125	300.0000	-0.3000
11+800	226.325	300.0000	2.8000
12+750	210.175	300.0000	-1.7000

Station	Elevation	Curve Length	Grade
			3.3000
13+400	231.625	500.0000	0.3000
13+900	233.125	300.0000	-0.3750
14+300	231.625	300.0000	1.2000
15+400	244.825	300.0000	0.0000
15+700	244.825	300.0000	1.5000
16+550	257.575	300.0000	3.0000
16+900	268.075	400.0000	2.0000
18+100	292.075	300.0000	0.0000
18+400	292.075	300.0000	1.7000
19+800	315.875	400.0000	-1.5000
20+500	305.375	500.0000	0.7000
21+900	315.175	500.0000	-3.0000
22+400	300.175	500.0000	-1.1000
23+600	286.975	300.0000	1.0000
24+000	290.975	300.0000	-0.5000
24+900	286.475	300.0000	1.5000
25+200	290.975	300.0000	-0.5000
25+650	288.725	300.0000	1.4000
26+100	295.025	300.0000	-1.2000
26+497.1821	290.259		

**A16-6**

***Earthwork Volume Data of Bareilly Bypass***





## Earthwork Volume Data of Bareilly Bypass

Volume Output report

Station (m)	Cut Area (m <sup>2</sup> )	Fill Area (m <sup>2</sup> )	Cut Volume (m <sup>3</sup> )	Fill Volume (m <sup>3</sup> )	Total Cut Volume (m <sup>3</sup> )	Total Fill Volume (m <sup>3</sup> )	Mass Ordinate (m <sup>3</sup> )	Remark
+0 000	0.000	0.707						
+100 000	0.000	0.819	0.000	76.300	0.000	76.300	-76.300	
+200 000	0.000	4.246	0.000	253.255	0.000	329.555	-329.555	
+300 000	0.000	18.041	0.000	1114.320	0.000	1443.875	-1443.875	
+400 000	0.000	21.668	0.000	1985.420	0.000	3429.295	-3429.295	
+500 000	0.000	17.839	0.000	1975.350	0.000	5404.645	-5404.645	
+600 000	0.000	16.181	0.000	1701.010	0.000	7105.655	-7105.655	
+700 000	0.000	24.436	0.000	2030.860	0.000	9136.515	-9136.515	
+800 000	0.000	22.256	0.000	2334.620	0.000	11471.135	-11471.135	
+900 000	0.000	100.158	0.000	6120.710	0.000	17591.845	-17591.845	
1+000 000	0.000	156.274	0.000	12821.585	0.000	30413.430	-30413.430	
1+100 000	0.000	162.762	0.000	15951.795	0.000	46365.225	-46365.225	
1+200 000	0.000	207.289	0.000	18502.570	0.000	64867.795	-64867.795	
1+300 000	0.000	171.076	0.000	18918.250	0.000	83786.045	-83786.045	
1+400 000	0.000	129.433	0.000	15025.420	0.000	98811.465	-98811.465	
1+500 000	0.000	65.798	0.000	9761.530	0.000	108572.995	-108572.995	
1+600 000	0.000	28.856	0.000	4732.670	0.000	113305.665	-113305.665	
1+700 000	0.000	22.220	0.000	2553.760	0.000	115859.425	-115859.425	
1+800 000	0.000	50.510	0.000	3636.470	0.000	119495.895	-119495.895	
1+900 000	0.000	84.382	0.000	6744.595	0.000	126240.490	-126240.490	
2+000 000	0.000	84.095	0.000	8423.845	0.000	134664.335	-134664.335	
2+100 000	0.000	80.174	0.000	8213.450	0.000	142877.785	-142877.785	
2+200 000	0.000	35.081	0.000	5762.765	0.000	148640.550	-148640.550	
2+300 000	0.000	15.887	0.000	2548.375	0.000	151188.925	-151188.925	
2+400 000	0.000	0.000	0.000	794.325	0.000	151983.250	-151983.250	
2+500 000	0.000	0.000	0.000	0.000	0.000	151983.250	-151983.250	
2+600 000	0.000	4.040	0.000	202.020	0.000	152185.270	-152185.270	
2+700 000	0.000	2.112	0.000	307.635	0.000	152492.905	-152492.905	
2+800 000	0.000	1.161	0.000	163.685	0.000	152656.590	-152656.590	
2+900 000	0.000	16.227	0.000	869.400	0.000	153525.990	-153525.990	
3+000 000	0.000	71.572	0.000	4389.950	0.000	157915.940	-157915.940	
3+100 000	0.000	110.179	0.000	9087.590	0.000	167003.530	-167003.530	
3+200 000	0.000	144.826	0.000	12750.280	0.000	179753.810	-179753.810	
3+300 000	0.000	132.913	0.000	13886.955	0.000	193640.765	-193640.765	
3+400 000	0.000	77.982	0.000	10544.750	0.000	204185.515	-204185.515	
3+500 000	0.000	55.234	0.000	6660.820	0.000	210846.335	-210846.335	
3+600 000	0.000	94.999	0.000	7511.650	0.000	218357.985	-218357.985	
3+700 000	0.000	129.679	0.000	11233.860	0.000	229591.845	-229591.845	
3+800 000	0.000	189.600	0.000	15963.900	0.000	245555.745	-245555.745	
3+900 000	0.000	191.832	0.000	19071.595	0.000	264627.340	-264627.340	
4+000 000	0.000	148.878	0.000	17035.505	0.000	281662.845	-281662.845	
4+100 000	0.000	73.757	0.000	11131.715	0.000	292794.560	-292794.560	
4+152 329	0.000	44.880	0.000	3194.067	0.000	295898.627	-295898.627	
4+200 000	0.000	25.835	0.000	1685.540	0.000	297584.167	-297584.167	
4+300 000	0.000	3.871	0.000	1485.300	0.000	299069.467	-299069.467	
4+400 000	0.000	1.789	0.000	282.965	0.000	299352.432	-299352.432	
4+500 000	0.000	2.245	0.000	201.695	0.000	299554.127	-299554.127	
4+600 000	0.000	2.139	0.000	219.215	0.000	299773.342	-299773.342	
4+700 000	0.000	12.980	0.000	755.965	0.000	300529.307	-300529.307	
4+800 000	0.000	29.633	0.000	2130.645	0.000	302659.952	-302659.952	
4+900 000	0.000	73.116	0.000	5137.410	0.000	307797.362	-307797.362	
5+000 000	0.000	138.959	0.000	10603.730	0.000	318401.092	-318401.092	
5+100 000	0.000	173.648	0.000	15630.365	0.000	334031.457	-334031.457	
5+200 000	0.000	182.662	0.000	17815.525	0.000	351846.982	-351846.982	
5+300 000	0.000	135.367	0.000	15901.435	0.000	367748.417	-367748.417	
5+400 000	0.000	66.928	0.000	10114.715	0.000	377863.132	-377863.132	
5+500 000	0.000	73.830	0.000	7037.875	0.000	384901.007	-384901.007	
5+600 000	0.000	133.572	0.000	10370.075	0.000	395271.082	-395271.082	
5+700 000	0.000	153.860	0.000	14371.575	0.000	409642.657	-409642.657	
5+800 000	0.000	146.581	0.000	15022.035	0.000	424664.692	-424664.692	
5+900 000	0.000	110.225	0.000	12840.270	0.000	437504.962	-437504.962	
6+000 000	0.000	43.598	0.000	7691.125	0.000	445196.087	-445196.087	
6+100 000	0.000	18.312	0.000	3095.515	0.000	448291.602	-448291.602	
6+200 000	0.000	31.419	0.000	2486.545	0.000	450778.147	-450778.147	
6+278 837	0.000	31.419	0.000	2476.961	0.000	453255.108	-453255.108	
6+300 000	0.000	78.514	0.000	1163.225	0.000	454418.332	-454418.332	
6+400 000	0.000	101.257	0.000	8988.540	0.000	463406.872	-463406.872	

Station (m)	Cut Area (m2)	Fill Area (m2)	Cut Volume (m3)	Fill Volume (m3)	Total Cut Volume (m3)	Total Fill Volume (m3)	Mass Ordinate (m3)	Remain
6+500.000	0.000	121.143	0.000	11120.000	0.000	474526.872	-474526.872	
6+600.000	0.000	105.762	0.000	11345.220	0.000	485872.092	-485872.092	
6+700.000	0.000	63.503	0.000	8463.250	0.000	494335.342	-494335.342	
6+800.000	0.000	31.439	0.000	4747.105	0.000	499082.447	-499082.447	
6+900.000	0.000	12.402	0.000	2192.025	0.000	501274.472	-501274.472	
7+000.000	0.000	4.221	0.000	831.155	0.000	502105.627	-502105.627	
7+100.000	0.000	6.687	0.000	545.400	0.000	502651.027	-502651.027	
7+200.000	0.000	11.517	0.000	910.170	0.000	503561.197	-503561.197	
7+300.000	0.000	18.693	0.000	1510.480	0.000	505071.677	-505071.677	
7+400.000	0.000	18.833	0.000	1876.270	0.000	506947.947	-506947.947	
7+500.000	0.000	18.038	0.000	1843.510	0.000	508791.457	-508791.457	
7+600.000	0.000	33.869	0.000	2595.345	0.000	511386.802	-511386.802	
7+700.000	0.000	43.710	0.000	3878.970	0.000	515265.772	-515265.772	
7+800.000	0.000	57.823	0.000	5076.645	0.000	520342.417	-520342.417	
7+875.000	0.000	82.908	0.000	5277.390	0.000	525619.807	-525619.807	
7+925.000	0.000	82.908	0.000	5223.360	0.000	525619.807	-525619.807	Bridge
8+000.000	0.000	56.382	0.000	5223.360	0.000	530843.167	-530843.167	
8+022.218	0.000	56.382	0.000	1252.673	0.000	532095.840	-532095.840	
8+100.000	0.000	35.070	0.000	3556.682	0.000	535652.522	-535652.522	
8+200.000	0.000	18.116	0.000	2659.280	0.000	538311.802	-538311.802	
8+300.000	0.000	59.112	0.000	3861.360	0.000	542173.162	-542173.162	
8+400.000	0.000	132.305	0.000	9570.830	0.000	551743.992	-551743.992	
8+500.000	0.000	188.387	0.000	16034.600	0.000	567778.592	-567778.592	
8+600.000	0.000	223.750	0.000	20506.850	0.000	588385.442	-588385.442	
8+665.000	0.000	257.651	0.000	20459.534	0.000	608844.976	-608844.976	Bridge
8+715.000	0.000	257.651	0.000	23573.399	0.000	608844.976	-608844.976	
8+800.000	0.000	297.017	0.000	32472.950	0.000	632418.374	-632418.374	
8+900.000	0.000	352.442	0.000	37520.965	0.000	664891.324	-664891.324	
9+000.000	0.000	397.978	0.000	26979.664	0.000	702412.289	-702412.289	
9+065.000	0.000	432.166	0.000	26979.664	0.000	729391.953	-729391.953	Bridge
9+115.000	0.000	432.166	0.000	33310.289	0.000	729391.953	-729391.953	
9+200.000	0.000	351.606	0.000	30777.875	0.000	762702.242	-762702.242	
9+300.000	0.000	263.952	0.000	21410.735	0.000	793480.117	-793480.117	
9+400.000	0.000	164.263	0.000	12373.495	0.000	814890.852	-814890.852	
9+500.000	0.000	83.207	0.000	6302.270	0.000	827264.347	-827264.347	
9+600.000	0.000	42.838	0.000	3226.560	0.000	833566.617	-833566.617	
9+700.000	0.000	34.028	0.000	2918.940	0.000	837409.947	-837409.947	
9+800.000	0.000	30.503	0.000	2560.940	0.000	840636.507	-840636.507	
9+900.000	0.000	27.876	0.000	2074.200	0.000	843555.447	-843555.447	
10+000.000	0.000	13.608	0.000	1532.155	0.000	845629.647	-845629.647	
10+100.000	0.000	17.035	0.000	4139.285	0.000	847161.802	-847161.802	
10+200.000	0.000	65.751	0.000	9618.530	0.000	851301.087	-851301.087	
10+300.000	0.000	126.620	0.000	9340.940	0.000	860919.617	-860919.617	
10+373.772	0.000	126.620	0.000	3975.648	0.000	870260.557	-870260.557	
10+400.000	0.000	176.535	0.000	19096.560	0.000	874236.205	-874236.205	
10+500.000	0.000	205.396	0.000	21738.025	0.000	893332.765	-893332.765	
10+600.000	0.000	229.364	0.000	20310.660	0.000	915070.790	-915070.790	
10+700.000	0.000	176.849	0.000	15800.780	0.000	935381.450	-935381.450	
10+800.000	0.000	139.167	0.000	11630.855	0.000	951182.230	-951182.230	
10+900.000	0.000	93.451	0.000	7560.425	0.000	962813.085	-962813.085	
11+000.000	0.000	57.758	0.000	4832.985	0.000	970373.510	-970373.510	
11+100.000	0.000	38.902	0.000	3374.090	0.000	975206.495	-975206.495	
11+200.000	0.000	28.580	0.000	2411.497	0.000	978580.585	-978580.585	
11+284.377	0.000	28.580	0.000	576.391	0.000	980992.082	-980992.082	
11+300.000	0.000	45.207	0.000	6576.615	0.000	981568.474	-981568.474	
11+400.000	0.000	66.326	0.000	11836.985	0.000	988145.069	-988145.069	
11+500.000	0.000	150.414	0.000	16414.850	0.000	999982.074	-999982.074	
11+600.000	0.000	177.883	0.000	16258.850	0.000	1016396.924	-1016396.924	
11+700.000	0.000	147.294	0.000	11671.915	0.000	1032655.774	-1032655.774	
11+800.000	0.000	86.144	0.000	6397.130	0.000	1044327.689	-1044327.689	
11+900.000	0.000	41.798	0.000	3059.210	0.000	1050724.819	-1050724.819	
12+000.000	0.000	19.386	0.000	1222.745	0.000	1053784.029	-1053784.029	
12+100.000	0.000	5.069	0.000	667.260	0.000	1055006.774	-1055006.774	
12+200.000	0.000	8.276	0.000	1855.605	0.000	1055674.034	-1055674.034	
12+300.000	0.000	28.836	0.000	2130.705	0.000	1057529.639	-1057529.639	
12+400.000	0.000	13.778	0.000	2653.410	0.000	1059660.344	-1059660.344	
12+500.000	0.000	39.290	0.000	3711.065	0.000	1062313.754	-1062313.754	
12+600.000	0.000	34.931	0.000		0.000	1066024.819	-1066024.819	

Station (m)	Cut Area (m2)	Fill Area (m2)	Cut Volume (m3)	Fill Volume (m3)	Total Cut Volume (m3)	Total Fill Volume (m3)	Mass Orinate (m3)	Remark
12+700.000	0.000	40.015	0.000	3747.300	0.000	1069772.119	-1069772.119	
12+800.000	0.000	23.742	0.000	3187.835	0.000	1072959.954	-1072959.954	
12+900.000	0.000	19.933	0.000	2183.735	0.000	1075143.689	-1075143.689	
13+000.000	0.000	82.714	0.000	5132.320	0.000	1080276.009	-1080276.009	
13+100.000	0.000	162.370	0.000	12254.205	0.000	1092530.214	-1092530.214	
13+200.000	0.000	198.728	0.000	18054.895	0.000	1110585.109	-1110585.109	
13+285.000	0.000	244.602	0.000	18841.508	0.000	1129426.617	-1129426.617	
								Bridge
13+315.000	0.000	244.602			0.000	1129426.617	-1129426.617	
13+400.000	0.000	287.832	0.000	22628.441	0.000	1152055.057	-1152055.057	
13+500.000	0.000	295.577	0.000	29170.420	0.000	1181225.477	-1181225.477	
13+595.000	0.000	295.387	0.000	28070.766	0.000	1209296.244	-1209296.244	
								Bridge
13+625.000	0.000	295.387			0.000	1209296.244	-1209296.244	
13+700.000	0.000	240.247	0.000	20086.266	0.000	1229382.530	-1229382.530	
13+800.000	0.000	164.397	0.000	20232.190	0.000	1249614.720	-1249614.720	
13+900.000	0.000	131.918	0.000	14815.720	0.000	1264430.440	-1264430.440	
14+000.000	0.000	75.157	0.000	10353.725	0.000	1274784.165	-1274784.165	
14+100.000	0.000	38.276	0.000	5671.620	0.000	1280455.785	-1280455.785	
14+200.000	0.000	57.929	0.000	4810.235	0.000	1285266.020	-1285266.020	
14+245.000	0.000	57.929	0.000	2606.801	0.000	1287872.820	-1287872.820	
								Bridge
14+295.000	0.000	62.377			0.000	1287872.820	-1287872.820	
14+300.000	0.000	62.377	0.000	6015.310	0.000	1291281.330	-1291281.330	
14+400.000	0.000	2.619	0.000	3249.805	0.000	1294531.135	-1294531.135	
14+500.000	0.000	2.860	0.000	273.925	0.000	1294805.060	-1294805.060	
14+600.000	0.000	17.266	0.000	1006.280	0.000	1295811.340	-1295811.340	
14+700.000	0.000	17.163	0.000	1721.440	0.000	1297532.780	-1297532.780	
14+800.000	0.000	18.600	0.000	1788.165	0.000	1299320.945	-1299320.945	
14+900.000	0.000	19.255	0.000	1894.755	0.000	1301215.700	-1301215.700	
15+000.000	0.000	47.161	0.000	3322.770	0.000	1304538.470	-1304538.470	
15+100.000	0.000	102.831	0.000	7499.585	0.000	1312038.055	-1312038.055	
15+200.000	0.000	143.882	0.000	12335.625	0.000	1324373.680	-1324373.680	
15+300.000	0.000	111.244	0.000	12756.295	0.000	1337129.975	-1337129.975	
15+400.000	0.000	62.334	0.000	8678.905	0.000	1345808.880	-1345808.880	
15+500.000	0.000	26.306	0.000	4431.985	0.000	1350240.865	-1350240.865	
15+600.000	0.000	4.042	0.000	1517.405	0.000	1351758.270	-1351758.270	
15+700.000	0.000	4.273	0.000	415.735	0.000	1352174.005	-1352174.005	
15+800.000	0.000	6.092	0.000	518.245	0.000	1352692.250	-1352692.250	
15+900.000	0.000	11.206	0.000	864.925	0.000	1353557.175	-1353557.175	
16+000.000	0.000	20.865	0.000	1603.575	0.000	1355160.750	-1355160.750	
16+100.000	0.000	72.735	0.000	4680.005	0.000	1359840.755	-1359840.755	
16+200.000	0.000	113.759	0.000	9324.665	0.000	1369165.420	-1369165.420	
16+300.000	0.000	102.961	0.000	10835.965	0.000	1380001.385	-1380001.385	
16+400.000	0.000	59.088	0.000	6102.415	0.000	1388103.800	-1388103.800	
16+500.000	0.000	28.963	0.000	4402.500	0.000	1392506.300	-1392506.300	
16+600.000	0.000	21.087	0.000	2502.450	0.000	1395008.750	-1395008.750	
16+700.000	0.000	21.334	0.000	2121.005	0.000	1397129.755	-1397129.755	
16+800.000	0.000	22.265	0.000	2179.915	0.000	1399309.670	-1399309.670	
16+900.000	0.000	36.278	0.000	2927.110	0.000	1402236.780	-1402236.780	
17+000.000	0.000	70.209	0.000	5324.320	0.000	1407561.100	-1407561.100	
17+100.000	0.000	122.096	0.000	9615.225	0.000	1417176.325	-1417176.325	
17+200.000	0.000	152.774	0.000	13743.465	0.000	1430919.790	-1430919.790	
17+300.000	0.000	145.126	0.000	14894.965	0.000	1445814.755	-1445814.755	
17+400.000	0.000	106.454	0.000	12579.000	0.000	1458393.755	-1458393.755	
17+500.000	0.000	50.001	0.000	7822.785	0.000	1466216.540	-1466216.540	
17+600.000	0.000	16.572	0.000	3328.640	0.000	1469545.180	-1469545.180	
17+700.000	0.000	10.925	0.000	1374.815	0.000	1470919.995	-1470919.995	
17+800.000	0.000	24.525	0.000	1772.505	0.000	1472692.500	-1472692.500	
17+811.358	0.000	24.525	0.000	278.566	0.000	1472971.066	-1472971.066	
17+900.000	0.000	66.371	0.000	4028.592	0.000	1476999.658	-1476999.658	
18+000.000	0.000	96.312	0.000	8134.150	0.000	1485133.808	-1485133.808	
18+100.000	0.000	110.641	0.000	10347.650	0.000	1495481.458	-1495481.458	
18+200.000	0.000	105.722	0.000	10818.125	0.000	1506299.583	-1506299.583	
18+300.000	0.000	71.669	0.000	8869.525	0.000	1515169.108	-1515169.108	
18+400.000	0.000	53.477	0.000	6257.290	0.000	1521426.398	-1521426.398	
18+500.000	0.000	80.077	0.000	6677.695	0.000	1528104.093	-1528104.093	
18+600.000	0.000	110.000	0.000	9503.840	0.000	1537607.933	-1537607.933	
18+700.000	0.000	101.029	0.000	10551.430	0.000	1548159.363	-1548159.363	
18+800.000	0.000	70.743	0.000	8588.560	0.000	1556747.923	-1556747.923	
18+900.000	0.000	50.421	0.000	6058.165	0.000	1562806.088	-1562806.088	

Station (m)	Cut Area (m2)	Fill Area (m2)	Cut Volume (m3)	Fill Volume (m3)	Total Cut Volume (m3)	Total Fill Volume (m3)	Mass Ordinate (m3)	Remark
19+000.000	0.000	82.131	0.000	6627.575	0.000	1569433.663	-1569433.663	
19+100.000	0.000	121.468	0.000	10179.920	0.000	1579613.583	-1579613.583	
19+200.000	0.000	157.122	0.000	13929.485	0.000	1593543.068	-1593543.068	
19+300.000	0.000	130.182	0.000	14365.215	0.000	1607908.283	-1607908.283	
19+400.000	0.000	81.460	0.000	10582.120	0.000	1618490.403	-1618490.403	
19+500.000	0.000	36.791	0.000	5912.530	0.000	1624402.933	-1624402.933	
19+600.000	0.000	13.250	0.000	2502.025	0.000	1626904.958	-1626904.958	
19+700.000	0.000	1.314	0.000	728.175	0.000	1627633.133	-1627633.133	
19+800.000	0.000	4.219	0.000	276.600	0.000	1627909.733	-1627909.733	
19+900.000	0.000	18.527	0.000	1137.290	0.000	1629047.023	-1629047.023	
20+000.000	0.000	45.070	0.000	3229.840	0.000	1632276.863	-1632276.863	
20+100.000	0.000	89.999	0.000	6803.425	0.000	1639080.288	-1639080.288	
20+200.000	0.000	130.184	0.000	11009.150	0.000	1650089.438	-1650089.438	
20+260.024	0.000	130.184	0.000	10417.870	0.000	1660507.308	-1660507.308	
20+300.000	0.000	135.250	0.000	2651.123	0.000	1663158.432	-1663158.432	
20+400.000	0.000	109.848	0.000	12254.895	0.000	1675413.327	-1675413.327	
20+500.000	0.000	68.479	0.000	8916.345	0.000	1684329.672	-1684329.672	
20+600.000	0.000	52.416	0.000	6044.710	0.000	1690374.382	-1690374.382	
20+700.000	0.000	88.960	0.000	7068.805	0.000	1697443.187	-1697443.187	
20+800.000	0.000	123.652	0.000	10630.595	0.000	1708073.782	-1708073.782	
20+860.024	0.000	123.652	0.000	9895.112	0.000	1717968.894	-1717968.894	
20+900.000	0.000	103.098	0.000	2264.747	0.000	1720233.641	-1720233.641	
21+000.000	0.000	67.329	0.000	8521.320	0.000	1728754.961	-1728754.961	
21+100.000	0.000	77.618	0.000	7247.355	0.000	1736002.316	-1736002.316	
21+200.000	0.000	128.471	0.000	10304.470	0.000	1746306.786	-1746306.786	
21+300.000	0.000	171.367	0.000	14991.890	0.000	1761298.676	-1761298.676	
21+400.000	0.000	149.706	0.000	16053.625	0.000	1777352.301	-1777352.301	
21+500.000	0.000	130.263	0.000	13998.445	0.000	1791350.746	-1791350.746	
21+533.329	0.000	130.263	0.000	4341.500	0.000	1795692.246	-1795692.246	
21+600.000	0.000	161.653	0.000	9731.206	0.000	1805423.452	-1805423.452	
21+700.000	0.000	207.959	0.000	18480.600	0.000	1823904.052	-1823904.052	
21+800.000	0.000	176.801	0.000	19238.015	0.000	1843142.067	-1843142.067	
21+900.000	0.000	119.295	0.000	14804.820	0.000	1857946.887	-1857946.887	
22+000.000	0.000	66.760	0.000	9302.745	0.000	1867249.632	-1867249.632	
22+100.000	0.000	43.773	0.000	5626.625	0.000	1872776.257	-1872776.257	
22+200.000	0.000	75.288	0.000	5953.035	0.000	1878729.292	-1878729.292	
22+300.000	0.000	104.843	0.000	9006.540	0.000	1887735.832	-1887735.832	
22+400.000	0.000	76.085	0.000	9046.375	0.000	1896782.207	-1896782.207	
22+500.000	0.000	66.056	0.000	7107.035	0.000	1903889.242	-1903889.242	
22+600.000	0.000	92.043	0.000	7904.980	0.000	1911794.222	-1911794.222	
22+700.000	0.000	170.863	0.000	13145.305	0.000	1924339.527	-1924339.527	
22+800.000	0.000	248.465	0.000	20966.360	0.000	1945905.887	-1945905.887	
22+900.000	0.000	251.144	0.000	24980.400	0.000	1970886.287	-1970886.287	
23+000.000	0.000	259.505	0.000	25532.430	0.000	1996418.717	-1996418.717	
23+100.000	0.000	191.421	0.000	22546.290	0.000	2018965.007	-2018965.007	
23+200.000	0.000	135.449	0.000	16343.500	0.000	2035308.507	-2035308.507	
23+300.000	0.000	64.881	0.000	10016.500	0.000	2045325.007	-2045325.007	
23+400.000	0.000	31.553	0.000	4821.685	0.000	2050146.692	-2050146.692	
23+500.000	0.000	18.785	0.000	2516.895	0.000	2052663.587	-2052663.587	
23+600.000	0.000	21.001	0.000	1989.310	0.000	2054652.897	-2054652.897	
23+700.000	0.000	35.570	0.000	2828.540	0.000	2057481.437	-2057481.437	
23+800.000	0.000	79.878	0.000	5772.385	0.000	2063253.822	-2063253.822	
23+900.000	0.000	113.571	0.000	9672.460	0.000	2072926.282	-2072926.282	
24+000.000	0.000	111.736	0.000	11265.365	0.000	2084191.647	-2084191.647	
24+100.000	0.000	73.682	0.000	9270.910	0.000	2093462.557	-2093462.557	
24+200.000	0.000	62.472	0.000	6807.695	0.000	2100270.252	-2100270.252	
24+300.000	0.000	78.553	0.000	7051.270	0.000	2107321.522	-2107321.522	
24+400.000	0.000	121.172	0.000	9986.275	0.000	2117307.797	-2117307.797	
24+500.000	0.000	145.845	0.000	13350.875	0.000	2130658.672	-2130658.672	
24+600.000	0.000	117.505	0.000	13167.510	0.000	2143826.182	-2143826.182	
24+700.000	0.000	72.234	0.000	9486.920	0.000	2153313.102	-2153313.102	
24+800.000	0.000	29.182	0.000	5070.785	0.000	2158383.887	-2158383.887	
24+900.000	0.000	24.760	0.000	2697.115	0.000	2161081.002	-2161081.002	
25+000.000	0.000	62.776	0.000	4376.825	0.000	2165457.827	-2165457.827	
25+100.000	0.000	119.284	0.000	9102.995	0.000	2174560.822	-2174560.822	
25+200.000	0.000	142.167	0.000	13072.530	0.000	2187633.352	-2187633.352	
25+300.000	0.000	185.720	0.000	16394.325	0.000	2204027.677	-2204027.677	
25+400.000	0.000	150.444	0.000	16808.170	0.000	2220835.847	-2220835.847	
25+500.000	0.000	92.210	0.000	12132.670	0.000	2232968.517	-2232968.517	
25+600.000	0.000	63.994	0.000	7810.180	0.000	2240778.697	-2240778.697	
25+700.000	0.000	101.952	0.000	8297.310	0.000	2249076.007	-2249076.007	

Station (m)	Cut Area (m2)	Fill Area (m2)	Cut Volume (m3)	Fill Volume (m3)	Total Cut Volume (m3)	Total Fill Volume (m3)	Mass Ordinate (m3)	Remark
25+800.000	0.000	188.277	0.000	14511.450	0.000	2263587.457	-2263587.457	
25+900.000	0.000	163.067	0.000	17567.205	0.000	2281154.662	-2281154.662	
26+000.000	0.000	166.504	0.000	16478.535	0.000	2297633.197	-2297633.197	
26+100.000	0.000	118.747	0.000	14262.525	0.000	2311895.722	-2311895.722	
26+200.000	0.000	90.563	0.000	10465.480	0.000	2322361.202	-2322361.202	
26+300.000	0.000	99.428	0.000	9499.535	0.000	2331860.737	-2331860.737	
26+400.000	0.000	81.210	0.000	9031.925	0.000	2340892.662	-2340892.662	
26+500.000	0.000	52.626	0.000	6691.820	0.000	2347584.482	-2347584.482	
26+600.000	0.000	25.553	0.000	3928.935	0.000	2351513.417	-2351513.417	
26+700.000	0.000	14.584	0.000	2026.825	0.000	2353540.242	-2353540.242	
26+800.000	0.000	14.284	0.000	1443.365	0.000	2354983.607	-2354983.607	
26+900.000	0.000	21.679	0.000	1798.130	0.000	2356781.737	-2356781.737	
27+000.000	0.000	31.045	0.000	2636.205	0.000	2359417.942	-2359417.942	
27+100.000	0.000	64.680	0.000	4786.265	0.000	2364204.207	-2364204.207	
27+200.000	0.000	128.571	0.000	9662.555	0.000	2373866.762	-2373866.762	
27+300.000	0.000	157.984	0.000	14327.720	0.000	2388194.482	-2388194.482	
27+400.000	0.000	152.339	0.000	15516.125	0.000	2403710.607	-2403710.607	
27+500.000	0.000	109.185	0.000	13076.190	0.000	2416786.797	-2416786.797	
27+600.000	0.000	62.091	0.000	8563.805	0.000	2425350.602	-2425350.602	
27+700.000	0.000	27.593	0.000	4484.215	0.000	2429834.817	-2429834.817	
27+800.000	0.000	27.546	0.000	2756.935	0.000	2432591.752	-2432591.752	
27+900.000	0.000	74.200	0.000	5087.275	0.000	2437679.027	-2437679.027	
28+000.000	0.000	103.589	0.000	8889.440	0.000	2446568.467	-2446568.467	
28+100.000	0.000	103.939	0.000	10376.400	0.000	2456944.867	-2456944.867	
28+200.000	0.000	78.030	0.000	9098.475	0.000	2466043.342	-2466043.342	
28+300.000	0.000	45.038	0.000	6153.440	0.000	2472196.782	-2472196.782	
28+400.000	0.000	37.627	0.000	4133.265	0.000	2476330.047	-2476330.047	
28+500.000	0.000	52.533	0.000	4508.000	0.000	2480838.047	-2480838.047	
28+600.000	0.000	84.848	0.000	6869.050	0.000	2487707.097	-2487707.097	
28+700.000	0.000	112.780	0.000	9881.405	0.000	2497588.502	-2497588.502	
28+787.758	0.000	112.780	0.000	9897.410	0.000	2507485.912	-2507485.912	
28+800.000	0.000	95.437	0.000	1274.453	0.000	2508760.365	-2508760.365	
28+900.000	0.000	66.837	0.000	8113.655	0.000	2516874.030	-2516874.030	
29+000.000	0.000	55.774	0.000	6130.555	0.000	2523004.585	-2523004.585	
29+100.000	0.000	49.976	0.000	5287.500	0.000	2526292.085	-2526292.085	
29+200.000	0.000	68.653	0.000	5931.430	0.000	2534223.515	-2534223.515	
29+300.000	0.000	107.089	0.000	8787.110	0.000	2543010.625	-2543010.625	
29+400.000	0.000	116.303	0.000	11169.590	0.000	2554180.215	-2554180.215	
29+500.000	0.000	97.759	0.000	10703.080	0.000	2564883.295	-2564883.295	
29+600.000	0.000	58.806	0.000	7828.245	0.000	2572711.540	-2572711.540	
29+601.179	0.000	58.806	0.000	69.326	0.000	2572780.866	-2572780.866	
29+700.000	0.000	33.944	0.000	4582.799	0.000	2577363.665	-2577363.665	
29+800.000	0.000	21.689	0.000	2781.650	0.000	2580145.315	-2580145.315	
29+900.000	0.000	23.239	0.000	2246.435	0.000	2582391.750	-2582391.750	
29+976.289	0.000	27.827	0.000	1947.902	0.000	2584339.652	-2584339.652	

