APPENDIX J

CONSOLIDATION AND SETTLEMENT CALCULATIONS

APPENDIX J-1

CONSOLIDATION SETTLEMENT CALCULATIONS

2004-049 Newby Island Landfill
12/23/2007 RMW

OBA Consolidation Calc.

p = 14850 = 165' x 90 psf (MSW)
a = 600
b = 600
X = 200

Landfill Base Elevation = -40
Pre-Development Eff. Strss. @ Base = 2828.2

P_p Calc		
Elev	m	b
17	-129.17	489
35	-34.3	3810
55	-103.53	2

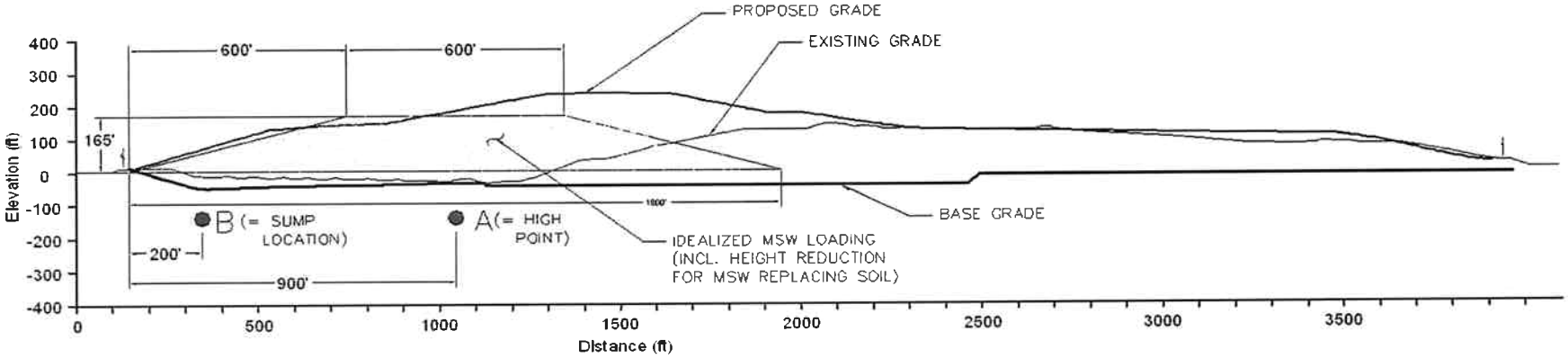
Unit Weights

OBA	127 pcf

POINT B: At Sump Beneath Edge of Load

Consol. Indices

Sublayer #	Sublayer Thickness (ft)	Mid-Point Elev. (ft)	Depth Below Landfill Base (ft)	Pre-Development σ'_{vo} (psf)	$\Delta\sigma_z$ Dike (psf)	σ_z Dike (% of p)	New Stress, $\sigma'_{vf} = \sigma'_{vo} + \Delta\sigma_z$ (psf)	C_c	C_r	Initial Void Ratio, e_o	Pre-consolidtion Pressure, P_p (psf)	Change in Void Ratio, Δe	Sublayer Settlement, ΔH (feet)	Inches of Settlement per Foot of Sublayer, $\Delta H/H$ (inches)
1	10	-45	5	3,151	4,950	33.3%	8,101	0.28	0.05	0.72	5,354	0.062	0.4	0.43
2	20	-60	20	4,120	4,950	33.3%	9,071	0.28	0.05	0.72	6,214	0.055	0.6	0.38
3	40	-90	50	6,058	4,956	33.4%	11,014	0.28	0.05	0.72	9,320	0.030	0.7	0.21
4	80	-150	110	9,934	5,001	33.7%	14,935	0.28	0.05	0.72	15,532	0.009	0.4	0.06
5	100	-240	200	15,748	5,161	34.8%	20,909	0.28	0.05	0.72	24,849	0.006	0.4	0.04
6	150	-365	325	23,823	5,444	36.7%	29,267	0.28	0.05	0.72	37,790	0.004	0.4	0.03
7	300	-590	550	38,358	5,781	38.9%	44,139	0.28	0.05	0.72	61,085	0.003	0.5	0.02
8	500	-990	950	64,198	5,728	38.6%	69,926	0.28	0.05	0.72	102,497	0.002	0.5	0.01
	1200											**Total Consolidation Settlement**	**3.9**	



CROSS SECTION 45+00

2004-049 Newby Island Landfill
12/23/2007 RMW

OBA Consolidation Calc.

p = 14850 = 165' x 90 psf (MSW)
a = 600
b = 600
X = 900

Landfill Base Elevation = -40
Pre-Development Eff. Strss. @ Base = 2828.2

P_p Calc		
Elev	m	b
17	-129.17	489
35	-34.3	3810
55	-103.53	2

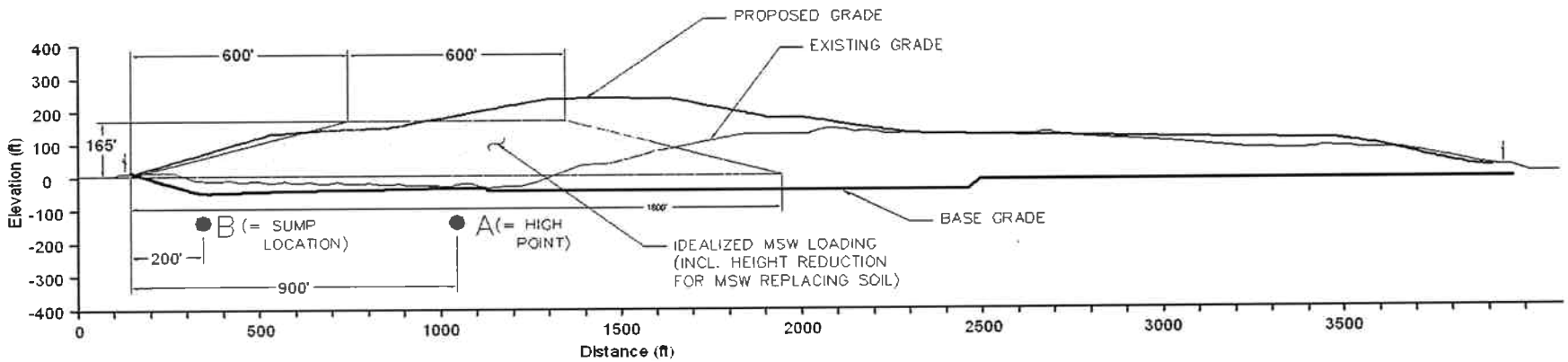
Unit Weights

OBA	127 pcf

POINT A: Beneath Center of Load

Consol. Indices

Sublayer #	Sublayer Thickness (ft)	Mid-Point Elev. (ft)	Depth Below Landfill Base (ft)	Pre-Development σ'_{vo} (psf)	$\Delta\sigma_z$ Dike (psf)	σ_z Dike (% of p)	New Stress, $\sigma'_{vf} = \sigma'_{vo} + \Delta\sigma_z$ (psf)	C_c	C_r	Initial Void Ratio, e_o	Pre-consolidtion Pressure, P_p (psf)	Change in Void Ratio, Δe	Sublayer Settlement, ΔH (feet)	Inches of Settlement per Foot of Sublayer, $\Delta H/H$ (inches)
1	10	-45	5	3,151	14,850	100.0%	18,001	0.28	0.05	0.72	5,354	0.159	0.9	1.11
2	20	-60	20	4,120	14,850	100.0%	18,970	0.28	0.05	0.72	6,214	0.145	1.7	1.01
3	40	-90	50	6,058	14,844	100.0%	20,902	0.28	0.05	0.72	9,320	0.108	2.5	0.75
4	80	-150	110	9,934	14,787	99.6%	24,721	0.28	0.05	0.72	15,532	0.066	3.1	0.46
5	100	-240	200	15,748	14,529	97.8%	30,277	0.28	0.05	0.72	24,849	0.034	2.0	0.24
6	150	-365	325	23,823	13,837	93.2%	37,661	0.28	0.05	0.72	37,790	0.010	0.9	0.07
7	300	-590	550	38,358	12,136	81.7%	50,494	0.28	0.05	0.72	61,085	0.006	1.0	0.04
8	500	-990	950	64,198	9,308	62.7%	73,507	0.28	0.05	0.72	102,497	0.003	0.9	0.02
	1200											**Total Consolidation Settlement**	**12.9**	



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