URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*						
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi				
β_1 =	*0.800*		f_{pe} =	*65%*								
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}=	*1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s=	*2.0*	N_s= *0.0*

Draped Tendon Bonded

		MOMENTS (t=1)										*Positive Bending Capacity*														
		Service Loads								Ultimate		As*bottom	fps	As*bottom	fps	As*mild steel	fy	Section			Area					
ELEM	Node	DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	M_u (LLmax)	M_u (LLmin)	Bottom		Draped/External		Mild Steel		Centroid	y_{na}	y_{cg}	Concrete	Equilibrium	ϕ	ϕ_w	$\phi M_n(+)$
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
1	1	0	0	0	0	-7	49	-62	2	82	-112	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	51379
1	2	-16	-2	0	0	-6	54	-238	2	2993	-714	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	20816
2	2	-16	-2	0	0	-13	103	-275	3	1124	-9241	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	20816
2	3	168	22	88	0	-14	178	-201	4	1485	-8558	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	21240
3	3	168	22	88	0	-21	208	-225	6	1532	-8617	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	21240
3	4	2205	297	1292	0	-26	2257	-699	14	8503	-3421	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	26507
4	4	2201	300	1300	0	-107	2217	-693	33	8405	-3476	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	26507
4	5	3194	434	2305	0	-109	3627	-1252	40	14135	-573	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	29721
5	5	3183	437	2329	0	-176	3602	-1248	52	14046	-647	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	29721
5	6	3535	484	3339	0	-175	4654	-1811	59	17710	1412	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	32002
6	6	3523	487	3364	0	-248	4635	-1807	68	17696	1309	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	32002
6	7	3227	446	4374	0	-245	5290	-2371	75	19857	2356	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33398
7	7	3215	447	4398	0	-323	5278	-2367	82	19760	2233	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33398
7	8	2270	317	5408	0	-321	5579	-2935	89	22900	2234	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33849
8	8	2258	318	5433	0	-403	5575	-2931	94	22799	2103	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33849
8	9	664	99	6443	0	-402	5559	-3504	101	22806	994	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33359
9	9	652	98	6467	0	-487	5564	-3976	106	22708	52	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	33359
9	10	-1590	-210	7477	0	-489	5262	-4636	113	21284	-4152	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	31954
10	10	-1602	-211	7500	0	-576	5280	-4631	117	21209	-4109	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	31954
10	11	-4493	-609	8510	0	-582	4790	-5300	124	18463	-9549	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	29622
11	11	-4503	-611	8530	0	-634	4810	-5302	126	18424	-9527	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	29622
11	12	-6735	-918	9188	0	-640	4338	-5744	130	15852	-13560	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	27619
12	12	-6746	-919	9208	0	-686	4352	-5741	132	14540	-12272	0.00	270	22.03	267	3.60	60	74.01	104.77	106.39	1436	0	0.95	1.00	27619
12	13	-10426	-1424	10150	0	-768	3672	-6366	147	10183	-18815	0.00	270	22.03	267	3.60	60	71.06	104.77	106.39	1436	0	0.95	1.00	23998
13	13	-10437	-1427	10170	0	-847	3678	-6364	149	10280	-18981	0.00	270	22.03	267	3.60	60	71.06	104.77	106.39	1436	0	0.95	1.00	23998
13	14	-14735	-2009	11112	0	-931	2893	-7016	163	426	-24175	0.00	270	33.05	266	3.60	60	68.45	103.24	105.62	2118	0	0.95	1.00	30620
14	14	-14745	-2012	11132	0	-1015	2909	-7011	165	592	-24024	0.00	270	33.05	266	3.60	60	68.45	103.24	105.62	2118	0	0.95	1.00	30620
14	15	-19773	-2670	12074	0	-1100	2285	-7799	178	-5517	-30862	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	21467
15	15	-19782	-2674	12093	0	-1198	2289	-7794	180	-4126	-32315	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	21467
15	16	-26069	-3465	13103	0	-1223	2201	-8827	187	-21440	-40740	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	12382
16	16	-26075	-3469	13117	0	-1240	2195	-8841	187	-21460	-40772	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	12382
16	17	-28277	-3770	13440	0	-1285	2232	-9265	190	-24299	-44417	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	11564
17	17	-28280	-3774	13447	0	-1301	2228	-9261	190	-24315	**-44421**	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	11564
17	18	-25721	-3419	13351	0	-1287	2114	-8554	181	-20874	-39543	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	11830
18	18	-25727	-3422	13365	0	-1305	2112	-8551	181	-20884	-39544	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	11830
18	19	-18228	-2455	13066	0	-1283	1828	-6597	153	-1420	-43437	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	15767
19	19	-18236	-2450	13085	0	-1382	1820	-6611	153	-2309	-42662	0.00	270	33.05	266	5.58	60	66.16	103.18	105.59	2146	0	0.95	1.00	15767
19	20	-11471	-1570	12787	0	-1315	2071	-4995	121	3069	-25202	0.00	270	33.05	266	3.60	60	67.48	103.24	105.62	2118	0	0.95	1.00	22666
20	20	-11479	-1564	12806	0	-1402	2058	-5016	121	2983	-25247	0.00	270	33.05	266	3.60	60	67.48	103.24	105.62	2118	0	0.95	1.00	22666
20	21	-5435	-772	12507	0	-1326	2613	-3617	88	11604	-13097	0.00	270	33.05	266	3.60	60	68.96	103.24	105.62	2118	0	0.95	1.00	31047
21	21	-5442	-767	12526	0	-1403	2587	-3637	88	11511	-13163	0.00	270	33.05	266	3.60	60	68.96	103.24	105.62	2118	0	0.95	1.00	31047
21	22	-101	-62	12228	0	-1318	3392	-2442	54	19396	-2292	0.00	270	33.05	266	3.60	60	70.49	103.24	105.62	2118	0	0.95	1.00	38365
22	22	-109	-58	12246	0	-1385	3365	-2464	54	19325	-2381	0.00	270	33.05	266	3.60	60	70.49	103.24	105.62	2118	0	0.95	1.00	38365
22	23	4548	559	11948	0	-1289	4130	-1739	20	26005	6801	0.00	270	33.05	266	3.60	60	72.22	103.24	105.62	2118	0	0.95	1.00	44753
23	23	4540	562	11965	0	-1348	4105	-1745	20	25958	6721	0.00	270	33.05	266	3.60	60	72.22	103.24	105.62	2118	0	0.95	1.00	44753
23	24	8530	1090	11667	0	-1239	4815	-1425	-15	31903	14149	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	50351
24	24	8521	1094	11685	0	-1290	4795	-1428	-15	32865	12806	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	50351
24	25	11858	1534	11386	0	-1256	5513	-1385	-44	37663	18648	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	55117
25	25	11850	1536	11403	0	-1304	5501	-1387	-45	37763	18460	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	55117
25	26	14538	1888	11104	0	-1265	6328	-1471	-75	43349	23083	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	58979
26	26	14529	1890	11120	0	-1311	6326	-1473	-75	43178	22882	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	58979
26	27	16568	2152	10822	0	-1269	7002	-1566	-105	48159	26403	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	61937
27	27	16558	2154	10837	0	-1312	7000	-1568	-106	47969	26187	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	61937
27	28	17949	2327	10539	0	-1267	7518	-1701	-135	49605	28723	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	64006
28	28	17939	2328	10554	0	-1309	7518	-1706	-136	49775	28490	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	64006
28	29	18681	2413	10255	0	-1261	7884	-1970	-166	52642	29954	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65200
29	29	18670	2414	10270	0	-1300	7878	-1968	-167	52415	29728	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65200
29	30	18763	2409	9971	0	-1250	8084	-2289	-197	55480	30443	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65523
30	30	18753	2409	9983	0	-1276	8085	-2288	-197	55288	30253	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65523
30	31	18402	2348	9761	0	-1237	8131	-2527	-220	**55511**	31082	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65200
31	31	18391	2348	9773	0	-1263	8131	-2525	-220	55320	31222	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	65200
31	32	17353	2188	9475	0	-1210	8068	-2851	-250	54481	28362	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	64008
32	32	17340	2188	9488	0	-1247	8063	-2850	-251	54254	28159	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	64008
32	33	15654	1939	9189	0	-1195	7836	-3178	-281	52035	25083	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	61936
33	33	15639	1938	9202	0	-1231	7835	-3175	-282	51827	25226	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	61936
33	34	13305	1600	8903	0	-1180	7450	-3511	-312	48358	19958	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	58977
34	34	13290	1599	8916	0	-1217	7446	-3508	-313	48157	20068	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	58977

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*					
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi			
β_1 =	*0.800*		f_{pe} =	*65%*							
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}= *1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s= *2.0*	N_s= *0.0*
									Draped Tendon Bonded		

		MOMENTS (t=1)										*Positive Bending Capacity*														
ELEM	Node	Service Loads								Ultimate		As^*_{bottom}	f_{ps}	As^*_{bottom}	f_{ps}	$As^*_{mild\ steel}$	fy	Section	y_{na}	y_{cg}	Area	Equilibrium	ϕ	ϕ_w	$\phi M_n(+)$
		DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	M_u (LLmax)	M_u (LLmin)	Bottom		Draped/External		Mild Steel		Centroid			Concrete				
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
34	35	10307	1171	8617	0	-1167	6908	-3853	-344	43660	13905	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	55118
35	35	10291	1169	8629	0	-1205	6905	-3847	-344	43475	13996	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	55118
35	36	6660	652	8331	0	-1158	6230	-4225	-375	37819	6831	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	50407
36	36	6643	649	8343	0	-1199	6228	-4220	-375	36172	8366	0.00	270	33.05	266	3.60	60	74.01	103.24	105.62	2118	0	0.95	1.00	50407
36	37	2357	44	8044	0	-1288	5458	-4657	-400	29430	10	0.00	270	33.05	266	3.60	60	71.85	103.24	105.62	2118	0	0.95	1.00	44758
37	37	2341	41	8055	0	-1335	5457	-5355	-401	29413	-1311	0.00	270	33.05	266	3.60	60	71.85	103.24	105.62	2118	0	0.95	1.00	44758
37	38	-2663	-654	7756	0	-1420	4657	-5907	-426	11670	-15818	0.00	270	61.51	262	3.60	60	69.88	99.35	103.68	3847	0	0.95	1.00	59620
38	38	-2680	-658	7767	0	-1471	4655	-5900	-427	11510	-15703	0.00	270	61.51	262	3.60	60	69.88	99.35	103.68	3847	0	0.95	1.00	59620
38	39	-8484	-1441	7468	0	-1552	3886	-6565	-453	5572	-20472	0.00	270	61.51	262	3.60	60	68.08	99.35	103.68	3847	0	0.95	1.00	39910
39	39	-8500	-1446	7479	0	-1601	3897	-6557	-454	5679	-20362	0.00	270	61.51	262	3.60	60	68.08	99.35	103.68	3847	0	0.95	1.00	39910
39	40	-15135	-2317	7180	0	-1678	3235	-7381	-480	2497	-33734	0.00	270	61.51	262	5.58	60	66.44	99.29	103.65	3875	0	0.95	1.00	29456
40	40	-15151	-2323	7190	0	-1725	3243	-7373	-481	2615	-33898	0.00	270	61.51	262	5.58	60	66.44	99.29	103.65	3875	0	0.95	1.00	29456
40	41	-22639	-3282	6891	0	-1798	2764	-8650	-508	-3327	-52612	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	21052
41	41	-22653	-3287	6900	0	-1844	2767	-8630	-509	-1498	-54441	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	21052
41	42	-31012	-4335	6601	0	-1819	2854	-10380	-540	-34580	-57739	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16695
42	42	-31021	-4335	6608	0	-1818	2855	-10373	-540	-34583	-57732	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16695
42	43	-33878	-4722	6512	0	-1845	2910	-11131	-548	-38748	-63319	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16402
43	43	-33882	-4721	6515	0	-1847	2913	-11132	-548	-38745	-63324	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16402
43	44	-31236	-4358	6628	0	-1799	2764	-10358	-516	-35017	-57980	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16549
44	44	-31245	-4356	6633	0	-1801	2767	-10366	-517	-35014	-57996	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	16549
44	45	-23546	-3384	6986	0	-1705	2391	-8237	-414	-11018	-65528	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	18865
45	45	-23557	-3378	6994	0	-1751	2383	-8254	-416	-12953	-63670	0.00	270	61.51	262	5.58	60	64.84	99.29	103.65	3875	0	0.95	1.00	18865
45	46	-16729	-2495	7347	0	-1550	2601	-6630	-317	-7532	-44282	0.00	270	61.51	262	5.58	60	66.38	99.29	103.65	3875	0	0.95	1.00	23952
46	46	-16739	-2488	7355	0	-1589	2588	-6635	-319	-7716	-44167	0.00	270	61.51	262	5.58	60	66.38	99.29	103.65	3875	0	0.95	1.00	23952
46	47	-10764	-1693	7708	0	-1375	3094	-5753	-220	-119	-23767	0.00	270	61.51	262	3.60	60	67.90	99.35	103.68	3847	0	0.95	1.00	32217
47	47	-10774	-1687	7715	0	-1404	3066	-5768	-222	-40	-23681	0.00	270	61.51	262	3.60	60	67.90	99.35	103.68	3847	0	0.95	1.00	32217
47	48	-5630	-981	8068	0	-1176	3851	-5053	-123	15049	-11322	0.00	270	61.51	262	3.60	60	69.81	99.35	103.68	3847	0	0.95	1.00	49981
48	48	-5640	-976	8075	0	-1197	3824	-5061	-125	15122	-11453	0.00	270	61.51	262	3.60	60	69.81	99.35	103.68	3847	0	0.95	1.00	49981
48	49	-1295	-359	8428	0	-952	4549	-4499	-27	14958	-10933	0.00	270	39.47	265	3.60	60	71.85	102.35	105.18	2513	0	0.95	1.00	40923
49	49	-1305	-355	8435	0	-970	4527	-4506	-29	14874	-10940	0.00	270	39.47	265	3.60	60	71.85	102.35	105.18	2513	0	0.95	1.00	40923
49	50	2321	173	8788	0	-707	5382	-4168	69	21080	-3082	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	46386
50	50	2310	176	8794	0	-725	5381	-3590	67	22585	-3776	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	46386
50	51	5282	616	9147	0	-617	6304	-3512	169	27788	2528	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	51122
51	51	5272	618	9153	0	-636	6297	-3515	168	27901	2354	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	51122
51	52	7595	969	9506	0	-523	7107	-3485	269	33284	7601	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	55120
52	52	7585	971	9511	0	-542	7105	-3488	268	33125	7413	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	55120
52	53	9259	1232	9864	0	-424	7764	-3464	368	38386	11690	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	58384
53	53	9248	1233	9868	0	-442	7762	-3467	367	38203	11491	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	58384
53	54	10274	1404	10221	0	-317	8266	-3477	467	40683	14746	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	60914
54	54	10263	1405	10225	0	-335	8266	-3480	466	40788	14493	0.00	270	39.47	265	3.60	60	74.01	102.35	105.18	2513	0	0.95	1.00	60914
54	55	10640	1486	10578	0	-208	8627	-3553	565	42427	16664	0.00	270	39.47	265	3.60	60	74.14	102.54	105.36	2513	0	0.95	1.00	62716
55	55	10629	1487	10582	0	-222	8623	-3559	564	42379	16333	0.00	270	39.47	265	3.60	60	74.14	102.54	105.36	2513	0	0.95	1.00	62716
55	56	10419	1484	10896	0	-116	8822	-3846	652	45229	17056	0.00	270	39.47	265	3.60	60	74.55	103.17	105.99	2513	0	0.95	1.00	63715
56	56	10408	1485	10899	0	-130	8821	-3846	651	45120	16788	0.00	270	39.47	265	3.60	60	74.55	103.17	105.99	2513	0	0.95	1.00	63715
56	57	9556	1397	11252	0	-14	8899	-4210	749	46759	17102	0.00	270	39.47	265	3.60	60	75.20	104.16	106.99	2514	0	0.95	1.00	64150
57	57	9544	1397	11255	0	-30	8899	-4209	747	46450	17014	0.00	270	39.47	265	3.60	60	75.20	104.16	106.99	2514	0	0.95	1.00	64150
57	58	8040	1221	11608	0	81	8841	-4576	845	46021	15210	0.00	270	39.47	265	3.60	60	76.10	105.54	108.36	2514	0	0.95	1.00	63863
58	58	8028	1220	11610	0	65	8835	-4575	843	45683	14897	0.00	270	39.47	265	3.60	60	76.10	105.54	108.36	2514	0	0.95	1.00	63863
58	59	5869	954	11963	0	168	8636	-4948	940	44118	11482	0.00	270	39.47	265	3.60	60	77.27	107.35	110.17	2515	0	0.95	1.00	62853
59	59	5856	954	11964	0	152	8635	-4946	938	43803	11732	0.00	270	39.47	265	3.60	60	77.27	107.35	110.17	2515	0	0.95	1.00	62853
59	60	3038	599	12317	0	248	8284	-5327	1034	41092	6104	0.00	270	39.47	265	3.60	60	78.69	109.53	112.36	2516	0	0.95	1.00	61118
60	60	3025	598	12318	0	231	8286	-5324	1032	40782	6346	0.00	270	39.47	265	3.60	60	78.69	109.53	112.36	2516	0	0.95	1.00	61118
60	61	-455	154	12671	0	317	7806	-5719	1126	36968	-309	0.00	270	39.47	265	3.60	60	80.35	112.09	114.92	2517	0	0.95	1.00	58656
61	61	-469	152	12672	0	299	7803	-6655	1125	36637	-1708	0.00	270	39.47	265	3.60	60	80.35	112.09	114.92	2517	0	0.95	1.00	58656
61	62	-4617	-381	13025	0	371	7250	-7247	1218	31832	-9703	0.00	270	39.47	266	3.60	60	82.28	115.09	117.92	2518	0	0.95	1.00	55463
62	62	-4630	-383	13025	0	350	7246	-7241	1216	31521	-9493	0.00	270	39.47	266	3.60	60	82.28	115.09	117.92	2518	0	0.95	1.00	55463
62	63	-9452	-1005	13377	0	409	6643	-7882	1308	25779	-18539	0.00	270	39.47	266	3.60	60	84.49	118.53	121.36	2519	0	0.95	1.00	51554
63	63	-9465	-1009	13377	0	384	6641	-7873	1306	25455	-18319	0.00	270	39.47	266	3.60	60	84.49	118.53	121.36	2519	0	0.95	1.00	51554
63	64	-14968	-1719	13730	0	425	5988	-8584	1397	18779	-28560	0.00	270	39.47	266	3.60	60	86.88	122.27	125.11	2520	0	0.95	1.00	46908
64	64	-14981	-1724	13728	0	395	5986	-8575	1395	15941	-25889	0.00	270	39.47	266	3.60	60	86.88	122.27	125.11	2520	0	0.95	1.00	46908
64	65	-21178	-2521	14081	0	179	5289	-9359	1488	8183	-37429	0.00	270	39.47	266	3.60	60	86.72	126.46	129.29	2521	0	0.95	1.00	41493
65	65	-21190	-2527	14079	0	137	5286	-9350	1486	7983	-37348	0.00	270	39.47	266	3.60	60	86.72	126.46	129.29	2521	0	0.95	1.00	41493
65	66	-28182	-3412	14432	0	-92	4669	-10276	1577	-16392	-53316	0.00	270	67.93	263	3.60	60	86.90	126.70	131.89	4259	0	0.95	1.00	54959
66	66	-28192	-3420	14430	0	-141	4680	-10264	1574	-16551	-53448	0.00	270	67.93	263	3.60	60	86.90	126.70	131.89	4259	0	0.95	1.00	54959
66	67	-36103	-4393	14783	0	-382	4136	-11315	1665	-20770	-59409	0.00	270	67.93	264	5.58	60	87.44	131.57	136.85	4291	0	0.95	1.00	36981
67	67	-36112	-4402	14780	0	-430	4148	-11307	1661	-21035	-59660	0.00	270	67.93	264	5.58	60	87.44	131.57	136.85	4291	0	0.95	1.00	36981
67	68	-44995	-5463	15133	0	-690	3668	-12523	1751	-19541	-81860	0.00	270	67.93	264	5.58	60	88.28	136.93	142.22	4295	0	0.95	1.00	26992

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*						
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi				
β_1 =	*0.800*		f_{pe} =	*65%*								
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}=	*1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s=	*2.0*	N_s= *0.0*
									Draped Tendon Bonded			

ELEM	Node	MOMENTS (t=1)										*Positive Bending Capacity*														
		Service Loads								Ultimate		As^*_{bottom}	f_{ps}	As^*_{bottom}	f_{ps}	$As^*_{mild\ steel}$	fy	Section	y_{na}	y_{cg}	Area					
		DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	$M_{u\ (LLmax)}$	$M_{u\ (LLmin)}$	Bottom		Draped/External		Mild Steel		Centroid			Concrete	Equilibrium	ϕ	ϕ_w	$\phi M_n(+)$
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
68	68	-45003	-5473	15129	0	-734	3677	-12516	1746	-19862	-81625	0.00	270	67.93	264	5.58	60	88.28	136.93	142.22	4295	0	0.95	1.00	26992
68	69	-54893	-6621	15482	0	-1014	3405	-13830	1834	-23415	-106809	0.00	270	67.93	264	5.58	60	89.41	142.73	148.03	4299	0	0.95	1.00	21292
69	69	-54898	-6630	15478	0	-1058	3406	-13869	1827	-19528	-110795	0.00	270	67.93	264	5.58	60	89.41	142.73	148.03	4299	0	0.95	1.00	21292
69	70	-65825	-7867	15831	0	-1166	3576	-16108	1913	-72574	-107022	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18797
70	70	-65827	-7870	15828	0	-1183	3575	-16076	1912	-72596	-106986	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18797
70	71	-69541	-8308	15941	0	-1155	3653	-16704	1927	-77632	-113256	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18622
71	71	-74635	-8648	25246	0	-1333	4960	-18517	-277	-73005	-114090	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18622
71	72	-70519	-8174	25137	0	-1408	4823	-17630	-282	-67537	-106830	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18799
72	72	-70532	-8176	25151	0	-1429	4825	-17662	-283	-67548	-106902	0.00	270	67.93	264	5.58	60	92.87	148.90	154.21	4302	0	0.95	1.00	18799
72	73	-58384	-6814	24878	0	-1233	4444	-14941	-324	-25838	-125999	0.00	270	67.93	264	5.58	60	89.41	142.73	148.03	4299	0	0.95	1.00	21954
73	73	-58402	-6807	24898	0	-1268	4449	-14967	-335	-28448	-123381	0.00	270	67.93	264	5.58	60	89.41	142.73	148.03	4299	0	0.95	1.00	21954
73	74	-47308	-5533	24658	0	-948	4239	-12538	-386	-23003	-91659	0.00	270	67.93	264	5.58	60	87.73	136.93	142.22	4295	0	0.95	1.00	28790
74	74	-47324	-5524	24678	0	-971	4231	-12566	-396	-22616	-92090	0.00	270	67.93	264	5.58	60	87.73	136.93	142.22	4295	0	0.95	1.00	28790
74	75	-37242	-4337	24433	0	-665	4392	-10333	-444	-19252	-61124	0.00	270	67.93	264	5.58	60	86.15	131.57	136.85	4291	0	0.95	1.00	39790
75	75	-37257	-4329	24452	0	-678	4379	-10363	-454	-18910	-61495	0.00	270	67.93	264	5.58	60	86.15	131.57	136.85	4291	0	0.95	1.00	39790
75	76	-28158	-3228	24203	0	-383	4675	-8631	-500	-5589	-40248	0.00	270	67.93	263	3.60	60	84.86	126.70	131.89	4259	0	0.95	1.00	54415
76	76	-28171	-3221	24221	0	-389	4662	-8641	-509	-5866	-40476	0.00	270	67.93	263	3.60	60	84.86	126.70	131.89	4259	0	0.95	1.00	54415
76	77	-20011	-2208	23968	0	-99	4951	-7610	-552	8445	-32665	0.00	270	56.92	264	3.60	60	83.84	124.06	128.09	3589	0	0.95	1.00	56557
77	77	-20022	-2202	23985	0	-103	4942	-7620	-560	8730	-32899	0.00	270	56.92	264	3.60	60	83.84	124.06	128.09	3589	0	0.95	1.00	56557
77	78	-12683	-1276	23729	0	181	5325	-6692	-602	18219	-18692	0.00	270	56.92	264	3.60	60	82.98	119.88	123.91	3586	0	0.95	1.00	65071
78	78	-12694	-1271	23745	0	180	5325	-6701	-609	18486	-18881	0.00	270	56.92	264	3.60	60	82.98	119.88	123.91	3586	0	0.95	1.00	65071
78	79	-6077	-432	23486	0	462	5852	-5919	-649	27220	-6063	0.00	270	56.92	264	3.60	60	82.51	116.13	120.16	3584	0	0.95	1.00	72784
79	79	-6088	-429	23500	0	465	5855	-5933	-655	27510	-6263	0.00	270	56.92	264	3.60	60	82.51	116.13	120.16	3584	0	0.95	1.00	72784
79	80	-168	323	23239	0	746	6421	-5263	-694	35472	5134	0.00	270	56.92	264	3.60	60	82.28	112.70	116.73	3582	0	0.95	1.00	79681
80	80	-179	326	23253	0	753	6421	-4583	-699	38078	3792	0.00	270	56.92	264	3.60	60	82.28	112.70	116.73	3582	0	0.95	1.00	79681
80	81	5088	993	22939	0	849	6979	-4014	-724	45036	13768	0.00	270	56.92	263	3.60	60	80.35	109.71	113.73	3579	0	0.95	1.00	85940
81	81	5078	995	22951	0	857	6977	-4020	-728	45386	13535	0.00	270	56.92	263	3.60	60	80.35	109.71	113.73	3579	0	0.95	1.00	85940
81	82	9679	1574	22633	0	948	7533	-3567	-752	51480	22172	0.00	270	56.92	263	3.60	60	78.69	107.15	111.17	3577	0	0.95	1.00	91435
82	82	9668	1575	22645	0	958	7531	-3571	-756	51806	21966	0.00	270	56.92	263	3.60	60	78.69	107.15	111.17	3577	0	0.95	1.00	91435
82	83	13608	2066	22323	0	1046	8166	-3318	-778	57361	29184	0.00	270	56.92	263	3.60	60	77.27	104.96	108.98	3576	0	0.95	1.00	96142
83	83	13597	2067	22334	0	1057	8163	-3321	-781	57452	28981	0.00	270	56.92	263	3.60	60	77.27	104.96	108.98	3576	0	0.95	1.00	96142
83	84	16880	2470	22009	0	1143	8834	-3223	-803	63783	34890	0.00	270	56.92	263	3.60	60	76.10	103.16	107.17	3574	0	0.95	1.00	100069
84	84	16868	2470	22018	0	1156	8831	-3224	-805	63424	34667	0.00	270	56.92	263	3.60	60	76.10	103.16	107.17	3574	0	0.95	1.00	100069
84	85	19498	2785	21689	0	1237	9421	-3165	-825	69131	39364	0.00	270	56.92	263	3.60	60	75.20	101.78	105.80	3573	0	0.95	1.00	103229
85	85	19485	2785	21698	0	1252	9413	-3165	-827	68747	39106	0.00	270	56.92	263	3.60	60	75.20	101.78	105.80	3573	0	0.95	1.00	103229
85	86	21464	3012	21366	0	1330	9888	-3112	-846	73120	42824	0.00	270	56.92	263	3.60	60	74.55	100.79	104.80	3572	0	0.95	1.00	105632
86	86	21450	3012	21373	0	1346	9880	-3112	-847	72993	42495	0.00	270	56.92	263	3.60	60	74.55	100.79	104.80	3572	0	0.95	1.00	105632
86	87	22780	3150	21038	0	1422	10230	-3072	-864	73202	45361	0.00	270	56.92	263	3.60	60	74.14	100.16	104.17	3572	0	0.95	1.00	107283
87	87	22770	3149	21043	0	1432	10229	-3074	-865	73106	45118	0.00	270	56.92	263	3.60	60	74.14	100.16	104.17	3572	0	0.95	1.00	107283
87	88	23136	3181	20901	0	1464	10341	-3089	-872	74907	46000	0.00	270	56.92	263	3.60	60	74.01	99.97	103.99	3571	0	0.95	1.00	107751
88	88	23125	3181	20905	0	1472	10338	-3090	-872	75021	45564	0.00	270	56.92	263	3.60	60	74.01	99.97	103.99	3571	0	0.95	1.00	107751
88	89	23536	3194	20563	0	1534	10515	-3349	-887	78491	46610	0.00	270	56.92	263	3.60	60	74.14	100.16	104.17	3572	0	0.95	1.00	108357
89	89	23520	3194	20568	0	1553	10512	-3348	-888	78360	46270	0.00	270	56.92	263	3.60	60	74.14	100.16	104.17	3572	0	0.95	1.00	108357
89	90	23284	3118	20222	0	1608	10559	-3653	-901	79017	47934	0.00	270	56.92	263	3.60	60	74.55	100.79	104.80	3572	0	0.95	1.00	108226
90	90	23267	3117	20226	0	1629	10557	-3652	-901	78606	47873	0.00	270	56.92	263	3.60	60	74.55	100.79	104.80	3572	0	0.95	1.00	108226
90	91	22383	2953	19877	0	1679	10487	-3959	-913	78062	44887	0.00	270	56.92	263	3.60	60	75.20	101.78	105.80	3573	0	0.95	1.00	107355
91	91	22364	2953	19880	0	1701	10484	-3958	-913	77651	44499	0.00	270	56.92	263	3.60	60	75.20	101.78	105.80	3573	0	0.95	1.00	107355
91	92	20829	2700	19527	0	1745	10292	-4269	-924	75872	42571	0.00	270	56.92	263	3.60	60	76.10	103.16	107.17	3574	0	0.95	1.00	105737
92	92	20810	2699	19530	0	1768	10287	-4267	-922	75438	42166	0.00	270	56.92	263	3.60	60	76.10	103.16	107.17	3574	0	0.95	1.00	105737
92	93	18621	2358	19173	0	1803	9981	-4578	-932	72480	38519	0.00	270	56.92	263	3.60	60	77.27	104.96	108.98	3576	0	0.95	1.00	103369
93	93	18601	2357	19175	0	1826	9976	-4578	-930	72083	38863	0.00	270	56.92	263	3.60	60	77.27	104.96	108.98	3576	0	0.95	1.00	103369
93	94	15755	1928	18815	0	1853	9549	-4905	-939	68223	32555	0.00	270	56.92	263	3.60	60	78.69	107.15	111.17	3577	0	0.95	1.00	100238
94	94	15734	1927	18815	0	1877	9548	-4903	-936	67838	32899	0.00	270	56.92	263	3.60	60	78.69	107.15	111.17	3577	0	0.95	1.00	100238
94	95	12228	1409	18452	0	1895	9080	-5318	-943	63002	25445	0.00	270	56.92	263	3.60	60	80.35	109.71	113.73	3579	0	0.95	1.00	96335
95	95	12206	1408	18452	0	1918	9079	-5313	-940	62623	25814	0.00	270	56.92	263	3.60	60	80.35	109.71	113.73	3579	0	0.95	1.00	96335
95	96	8033	802	18085	0	1923	8567	-5815	-946	56788	17217	0.00	270	56.92	264	3.60	60	82.28	112.70	116.73	3582	0	0.95	1.00	91646
96	96	8011	801	18083	0	1946	8566	-5811	-942	56463	17532	0.00	270	56.92	264	3.60	60	82.28	112.70	116.73	3582	0	0.95	1.00	91646
96	97	3166	107	17713	0	1938	8027	-6401	-946	49701	7783	0.00	270	56.92	264	3.60	60	84.49	116.13	120.16	3584	0	0.95	1.00	86193
97	97	3143	104	17711	0	1960	8026	-7557	-942	49363	6082	0.00	270	56.92	264	3.60	60	84.49	116.13	120.16	3584	0	0.95	1.00	86193
97	98	-2380	-677	17336	0	1937	7462	-8315	-944	41715	-5039	0.00	270	56.92	264	3.60	60	86.88	119.88	123.91	3586	0	0.95	1.00	79916
98	98	-2403	-681	17333	0	1956	7461	-8308	-940	41408	-4740	0.00	270	56.92	264	3.60	60	86.88	119.88	123.91	3586	0	0.95	1.00	79916
98	99	-8612	-1550	16955	0	1918	6900	-9135	-941	32964	-17103	0.00	270	56.92	264	3.60	60	89.54	124.06	128.09	3589	0	0.95	1.00	73016
99	99	-8636	-1555	16951	0	1933	6898	-9127	-935	28231	-12447	0.00	270	56.92	264	3.60	60	89.54	124.06	128.09	3589	0	0.95	1.00	73016
99	100	-15510	-2507	16491	0	1608	6373	-10042	-916	18712	-26144	0.00	270	56.92	264	3.60	60	89.71	128.62	132.65	3591	0	0.95	1.00	64789
100	100	-15532	-2513	16486	0	1619	6372	-10033	-909	18657	-26102	0.00	270	56.92	264	3.60	60	89.71	128.62	132.65	3591	0	0.95	1.00	64789
100	101	-23138	-3552	16027	0	1293	5903	-11093	-889	8324	-41127	0.00	270	82.62	262	3.60	60	87.97	127.20	135.64	5147	0	0.95	1.00	79844
101	101	-23159	-3560	16022	0	1296	5916	-11091	-881	8133	-40992	0.00	270	82.62	262	3.60	60	87.97	127.20	135.64	5147	0	0.95	1.00	79844

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*					
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi			
β_1 =	*0.800*		f_{pe} =	*65%*							
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}= *1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s= *2.0*	N_s= *0.0*

Draped Tendon Bonded

		MOMENTS (t=1)										*Positive Bending Capacity*														
ELEM	Node	Service Loads								Ultimate		As^*_{bottom}	f_{ps}	As^*_{bottom}	f_{ps}	$As^*_{mild\ steel}$	fy	Section	y_{na}	y_{cg}	Area		ϕ	ϕ_w	$\phi M_n(+)$
		DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	$M_{u\ (LLmax)}$	$M_{u\ (LLmin)}$	Bottom		Draped/External		Mild Steel		Centroid			Concrete	Equilibrium			
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
101	102	-31613	-4686	15561	0	961	5466	-12253	-859	-20856	-64130	0.00	270	82.62	262	5.58	60	88.91	132.35	140.96	5180	0	0.95	1.00	66444
102	102	-31633	-4695	15555	0	962	5481	-12243	-849	-20723	-64433	0.00	270	82.62	262	5.58	60	88.91	132.35	140.96	5180	0	0.95	1.00	66444
102	103	-41067	-5909	15092	0	616	5019	-13553	-826	-28064	-73874	0.00	270	82.62	263	5.58	60	90.14	138.12	146.76	5186	0	0.95	1.00	44166
103	103	-41086	-5919	15086	0	627	5035	-13544	-815	-28386	-74182	0.00	270	82.62	263	5.58	60	90.14	138.12	146.76	5186	0	0.95	1.00	44166
103	104	-51559	-7220	14620	0	270	4638	-14943	-790	-25833	-97892	0.00	270	82.62	263	5.58	60	91.68	144.27	152.94	5191	0	0.95	1.00	31151
104	104	-51575	-7231	14613	0	297	4650	-14937	-779	-26224	-97550	0.00	270	82.62	263	5.58	60	91.68	144.27	152.94	5191	0	0.95	1.00	31151
104	105	-63127	-8618	14145	0	-70	4609	-16872	-751	-30193	-129417	0.00	270	82.62	263	5.58	60	93.36	150.79	159.49	5197	0	0.95	1.00	23417
105	105	-63140	-8627	14138	0	-28	4610	-16822	-739	-24461	-135001	0.00	270	82.62	263	5.58	60	93.36	150.79	159.49	5197	0	0.95	1.00	23417
105	106	-75827	-10103	13718	0	-224	4818	-19199	-725	-87901	-129931	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	20088
106	106	-75834	-10103	13713	0	-220	4820	-19108	-724	-87910	-129783	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	20088
106	107	-80140	-10607	13604	0	-203	4898	-19837	-727	-94012	-137299	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	19719
107	107	-80634	-10284	10450	0	-357	5121	-19901	1695	-96987	-140776	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	19719
107	108	-76545	-9797	10588	0	-281	4983	-19056	1689	-91208	-133277	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	22465
108	108	-76580	-9795	10606	0	-276	4986	-19098	1690	-91224	-133370	0.00	270	82.62	264	5.58	60	97.15	157.76	166.48	5202	0	0.95	1.00	22465
108	109	-64514	-8387	11037	0	79	4579	-16315	1632	-49920	-152285	0.00	270	82.62	263	5.58	60	93.36	150.79	159.49	5197	0	0.95	1.00	26873
109	109	-64562	-8377	11063	0	140	4579	-16336	1639	-49282	-152966	0.00	270	82.62	263	5.58	60	93.36	150.79	159.49	5197	0	0.95	1.00	26873
109	110	-53576	-7056	11490	0	475	4333	-13892	1580	-42689	-121224	0.00	270	82.62	263	5.58	60	91.68	144.27	152.94	5191	0	0.95	1.00	30515
110	110	-53621	-7045	11515	0	542	4322	-13904	1585	-42185	-121766	0.00	270	82.62	263	5.58	60	91.68	144.27	152.94	5191	0	0.95	1.00	30515
110	111	-43684	-5811	11939	0	860	4473	-12367	1525	-37869	-81166	0.00	270	82.62	263	5.58	60	90.14	138.12	146.76	5186	0	0.95	1.00	38902
111	111	-43728	-5800	11964	0	934	4457	-12359	1529	-38335	-81544	0.00	270	82.62	263	5.58	60	90.14	138.12	146.76	5186	0	0.95	1.00	38902
111	112	-34811	-4654	12385	0	1236	4750	-11149	1469	-14680	-58923	0.00	270	82.62	262	5.58	60	88.91	132.35	140.96	5180	0	0.95	1.00	59764
112	112	-34852	-4644	12410	0	1317	4734	-11157	1472	-15157	-58502	0.00	270	82.62	262	5.58	60	88.91	132.35	140.96	5180	0	0.95	1.00	59764
112	113	-26906	-3585	12828	0	1602	5028	-10056	1411	-10250	-61146	0.00	270	54.16	265	3.60	60	87.97	133.99	137.84	3426	0	0.95	1.00	46481
113	113	-26946	-3578	12852	0	1674	5016	-10066	1413	-9925	-61392	0.00	270	54.16	265	3.60	60	87.97	133.99	137.84	3426	0	0.95	1.00	46481
113	114	-19845	-2607	13267	0	1946	5440	-9082	1351	-313	-46168	0.00	270	54.16	265	3.60	60	87.22	128.99	132.84	3424	0	0.95	1.00	52735
114	114	-19884	-2601	13290	0	2006	5444	-9100	1353	-44	-46343	0.00	270	54.16	265	3.60	60	87.22	128.99	132.84	3424	0	0.95	1.00	52735
114	115	-13523	-1718	13704	0	2272	6042	-8240	1289	8980	-32642	0.00	270	54.16	264	3.60	60	86.88	124.44	128.28	3421	0	0.95	1.00	58290
115	115	-13562	-1714	13727	0	2323	6046	-8250	1291	9301	-32858	0.00	270	54.16	264	3.60	60	86.88	124.44	128.28	3421	0	0.95	1.00	58290
115	116	-7913	-918	14138	0	2582	6652	-7485	1227	17485	-20587	0.00	270	54.16	264	3.60	60	86.88	120.25	124.10	3419	0	0.95	1.00	63110
116	116	-7954	-914	14162	0	2630	6656	-7494	1228	20473	-23479	0.00	270	54.16	264	3.60	60	86.88	120.25	124.10	3419	0	0.95	1.00	63110
116	117	-2968	-205	14533	0	2725	7262	-6873	1164	27644	-12674	0.00	270	54.16	264	3.60	60	84.49	116.51	120.35	3417	0	0.95	1.00	68037
117	117	-3006	-203	14555	0	2769	7260	-6880	1166	28014	-12936	0.00	270	54.16	264	3.60	60	84.49	116.51	120.35	3417	0	0.95	1.00	68037
117	118	1301	418	14924	0	2859	7912	-6402	1101	34382	-3515	0.00	270	54.16	264	3.60	60	82.28	113.08	116.91	3415	0	0.95	1.00	72306
118	118	1263	419	14945	0	2902	7911	-5370	1102	34724	-1928	0.00	270	54.16	264	3.60	60	82.28	113.08	116.91	3415	0	0.95	1.00	72306
118	119	4899	952	15312	0	2991	8594	-5099	1036	40259	6011	0.00	270	54.16	264	3.60	60	80.35	110.08	113.92	3413	0	0.95	1.00	75992
119	119	4860	953	15332	0	3033	8592	-5103	1038	40623	5761	0.00	270	54.16	264	3.60	60	80.35	110.08	113.92	3413	0	0.95	1.00	75992
119	120	7830	1398	15695	0	3122	9258	-4941	970	45457	12424	0.00	270	54.16	264	3.60	60	78.69	107.52	111.36	3411	0	0.95	1.00	79075
120	120	7791	1398	15715	0	3164	9257	-4944	972	45554	12187	0.00	270	54.16	264	3.60	60	78.69	107.52	111.36	3411	0	0.95	1.00	79075
120	121	10100	1754	16076	0	3255	9824	-4802	903	51218	17769	0.00	270	54.16	264	3.60	60	77.27	105.34	109.17	3409	0	0.95	1.00	81556
121	121	10061	1754	16095	0	3297	9822	-4804	905	50880	17487	0.00	270	54.16	264	3.60	60	77.27	105.34	109.17	3409	0	0.95	1.00	81556
121	122	11713	2022	16454	0	3392	10269	-4668	835	55822	22070	0.00	270	54.16	263	3.60	60	76.10	103.53	107.36	3408	0	0.95	1.00	83440
122	122	11673	2022	16472	0	3435	10263	-4669	837	55414	21717	0.00	270	54.16	263	3.60	60	76.10	103.53	107.36	3408	0	0.95	1.00	83440
122	123	12672	2201	16828	0	3532	10595	-4534	767	56682	25318	0.00	270	54.16	263	3.60	60	75.20	102.16	105.98	3407	0	0.95	1.00	84732
123	123	12632	2200	16846	0	3577	10591	-4535	768	56727	24943	0.00	270	54.16	263	3.60	60	75.20	102.16	105.98	3407	0	0.95	1.00	84732
123	124	12980	2291	17199	0	3679	10790	-4426	697	59709	27492	0.00	270	54.16	263	3.60	60	74.55	101.16	104.99	3406	0	0.95	1.00	85430
124	124	12939	2291	17216	0	3726	10788	-4429	698	59628	27117	0.00	270	54.16	263	3.60	60	74.55	101.16	104.99	3406	0	0.95	1.00	85430
124	125	12639	2293	17567	0	3832	10861	-4590	626	62364	28201	0.00	270	54.16	263	3.60	60	74.14	100.53	104.36	3406	0	0.95	1.00	85534
125	125	12610	2292	17579	0	3857	10863	-4590	627	62263	27976	0.00	270	54.16	263	3.60	60	74.14	100.53	104.36	3406	0	0.95	1.00	85534
125	126	12290	2267	17726	0	3904	10856	-4699	596	62528	28607	0.00	270	54.16	263	3.60	60	74.01	100.35	104.17	3405	0	0.95	1.00	85400
126	126	12260	2267	17737	0	3927	10853	-4699	597	61860	28986	0.00	270	54.16	263	3.60	60	74.01	100.35	104.17	3405	0	0.95	1.00	85400
126	127	11044	2143	18079	0	4018	10750	-4956	524	61721	27065	0.00	270	54.16	263	3.60	60	74.55	101.16	104.99	3406	0	0.95	1.00	84697
127	127	11002	2143	18094	0	4068	10747	-4955	526	61399	27174	0.00	270	54.16	263	3.60	60	74.55	101.16	104.99	3406	0	0.95	1.00	84697
127	128	9137	1930	18435	0	4168	10521	-5215	452	60142	25196	0.00	270	54.16	263	3.60	60	75.20	102.16	105.98	3407	0	0.95	1.00	83393
128	128	9095	1930	18449	0	4219	10515	-5214	454	59740	24835	0.00	270	54.16	263	3.60	60	75.20	102.16	105.98	3407	0	0.95	1.00	83393
128	129	6579	1629	18787	0	4322	10167	-5477	380	57377	21602	0.00	270	54.16	263	3.60	60	76.10	103.53	107.36	3408	0	0.95	1.00	81494
129	129	6536	1628	18801	0	4374	10163	-5476	382	56952	21961	0.00	270	54.16	263	3.60	60	76.10	103.53	107.36	3408	0	0.95	1.00	81494
129	130	3367	1239	19136	0	4479	9678	-5740	308	53474	16029	0.00	270	54.16	264	3.60	60	77.27	105.34	109.17	3409	0	0.95	1.00	79000
130	130	3324	1239	19149	0	4531	9677	-5738	310	53078	16358	0.00	270	54.16	264	3.60	60	77.27	105.34	109.17	3409	0	0.95	1.00	79000
130	131	-501	761	19482	0	4638	9074	-6008	235	48519	9434	0.00	270	54.16	264	3.60	60	78.69	107.52	111.36	3411	0	0.95	1.00	75908
131	131	-544	760	19493	0	4690	9073	-7024	237	48124	7972	0.00	270	54.16	264	3.60	60	78.69	107.52	111.36	3411	0	0.95	1.00	75908
131	132	-5031	194	19824	0	4798	8387	-7443	161	42554	-165	0.00	270	54.16	264	3.60	60	80.35	110.08	113.92	3413	0	0.95	1.00	72214
132	132	-5074	193	19835	0	4849	8384	-7438	164	42128	162	0.00	270	54.16	264	3.60	60	80.35	110.08	113.92	3413	0	0.95	1.00	72214
132	133	-10226	-461	20163	0	4956	7696	-7979	88	35700	-9177	0.00	270	54.16	264	3.60	60	82.28	113.08	116.91	3415	0	0.95	1.00	67915
133	133	-10268	-463	20172	0	5005	7694	-7973	91	35304	-8885	0.00	270	54.16	264	3.60	60	82.28	113.08	116.91	3415	0	0.95	1.00	67915
133	134	-16092	-1204	20498	0	5111	6993	-8616	15	28021	-19432	0.00	270	54.16	264	3.60	60	84.49	116.51	120.35	3417	0	0.95	1.00	63072
134	134	-16137	-1208	20507	0	5158	6991	-8609	17	24477	-16030	0.00	270	54.16	264	3.60	60	84.49	116.51	120.35	3417	0	0.95	1.00	63072
134	135	-22613	-2036	20788	0	5123	6290	-9337	-53	16198	-27786	0.00	270	54.16	264	3.60	60	84.61	120.25	124.10	3419	0	0.95	1.00	57493

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*					
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi			
β_1 =	*0.800*		f_{pe} =	*65%*							
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}= *1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s= *2.0*	N_s= *0.0*

Draped Tendon Bonded

		MOMENTS (t=1)										*Positive Bending Capacity*													
		Service Loads								Ultimate		As^*_{bottom}	f_{ps}	As^*_{bottom}	f_{ps}	$As^*_{mild\ steel}$	fy	Section	y_{na}	y_{cg}	Area				
ELEM	Node	DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	$M_{u\ (LLmax)}$	$M_{u\ (LLmin)}$	Bottom		Draped/External		Mild Steel		Centroid			Concrete	Equilibrium	ϕ	ϕ_w	$\phi M_n(+)$
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
135	135	-22653	-2041	20795	0	5168	6288	-9329	-51	15902	-27603	0.00	270	54.16	264	3.60	60	84.61	120.25	124.10	3419	0	0.95	1.00	57493
135	136	-29837	-2956	21075	0	5136	5588	-10211	-121	6833	-40795	0.00	270	54.16	264	3.60	60	85.08	124.44	128.28	3421	0	0.95	1.00	51336
136	136	-29876	-2962	21081	0	5175	5587	-10201	-118	6482	-40554	0.00	270	54.16	264	3.60	60	85.08	124.44	128.28	3421	0	0.95	1.00	51336
136	137	-37796	-3964	21359	0	5141	4888	-11145	-189	-3437	-55039	0.00	270	54.16	265	3.60	60	85.82	128.99	132.84	3424	0	0.95	1.00	44540
137	137	-37834	-3972	21364	0	5170	4877	-11133	-185	-3748	-54854	0.00	270	54.16	265	3.60	60	85.82	128.99	132.84	3424	0	0.95	1.00	44540
137	138	-46593	-5062	21640	0	5134	4186	-12184	-255	-33872	-74306	0.00	270	79.87	262	5.58	60	86.79	128.07	135.86	5010	0	0.95	1.00	54448
138	138	-46629	-5072	21645	0	5158	4169	-12169	-252	-34349	-74741	0.00	270	79.87	262	5.58	60	86.79	128.07	135.86	5010	0	0.95	1.00	54448
138	139	-56352	-6248	21918	0	5116	3501	-13339	-321	-39466	-82131	0.00	270	79.87	263	5.58	60	88.07	133.41	141.22	5015	0	0.95	1.00	34802
139	139	-56386	-6260	21921	0	5148	3485	-13324	-318	-40046	-82630	0.00	270	79.87	263	5.58	60	88.07	133.41	141.22	5015	0	0.95	1.00	34802
139	140	-67122	-7524	22191	0	5099	2960	-14711	-387	-34802	-111706	0.00	270	79.87	263	5.58	60	89.61	139.20	147.03	5020	0	0.95	1.00	25920
140	140	-67153	-7537	22193	0	5140	2941	-14666	-383	-35381	-111171	0.00	270	79.87	263	5.58	60	89.61	139.20	147.03	5020	0	0.95	1.00	25920
140	141	-78935	-8888	22460	0	5085	2809	-16755	-451	-40833	-140855	0.00	270	79.87	263	5.58	60	91.29	145.35	153.21	5025	0	0.95	1.00	21599
141	141	-78962	-8899	22462	0	5130	2792	-16655	-448	-36392	-145169	0.00	270	79.87	263	5.58	60	91.29	145.35	153.21	5025	0	0.95	1.00	21599
141	142	-91840	-10336	22755	0	5162	3036	-19047	-520	-99654	-138299	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19740
142	142	-91855	-10337	22756	0	5239	2921	-18393	-517	-99837	-137136	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19740
142	143	-96215	-10770	22867	0	5571	3007	-18987	-539	-105509	-144000	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19605
143	143	-96210	-10778	22867	0	5603	2956	-18623	-536	-105587	-143352	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19605
143	144	-91594	-10307	22698	0	5264	2938	-18026	-532	-99481	-136168	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19732
144	144	-91555	-10322	22697	0	5242	2926	-18884	-528	-99488	-137656	0.00	270	79.87	263	5.58	60	94.90	151.88	159.76	5030	0	0.95	1.00	19732
144	145	-77879	-8763	22221	0	5098	2900	-16497	-512	-51090	-159582	0.00	270	79.87	263	5.58	60	91.29	145.35	153.21	5025	0	0.95	1.00	22407
145	145	-77818	-8755	22219	0	5066	2906	-16591	-512	-55481	-155153	0.00	270	79.87	263	5.58	60	91.29	145.35	153.21	5025	0	0.95	1.00	22407
145	146	-65238	-7282	21771	0	5006	3174	-14483	-499	-49016	-120857	0.00	270	79.87	263	5.58	60	89.67	139.20	147.03	5020	0	0.95	1.00	28522
146	146	-65171	-7272	21768	0	4978	3168	-14555	-499	-48428	-121418	0.00	270	79.87	263	5.58	60	89.67	139.20	147.03	5020	0	0.95	1.00	28522
146	147	-53637	-5886	21317	0	4908	3659	-12791	-486	-40849	-81473	0.00	270	79.87	263	5.58	60	88.14	133.41	141.22	5015	0	0.95	1.00	39927
147	147	-53568	-5876	21313	0	4891	3654	-12832	-487	-41271	-81970	0.00	270	79.87	263	5.58	60	88.14	133.41	141.22	5015	0	0.95	1.00	39927
147	148	-43047	-4577	20859	0	4809	4314	-11691	-473	-16278	-60641	0.00	270	79.87	262	5.58	60	86.86	128.07	135.86	5010	0	0.95	1.00	61974
148	148	-42976	-4568	20854	0	4800	4319	-11686	-474	-16623	-60073	0.00	270	79.87	262	5.58	60	86.86	128.07	135.86	5010	0	0.95	1.00	61974
148	149	-33419	-3357	20397	0	4705	5122	-10709	-460	-8448	-59554	0.00	270	51.41	265	3.60	60	85.82	129.37	133.03	3255	0	0.95	1.00	51150
149	149	-33345	-3349	20391	0	4689	5138	-10720	-461	-8116	-59696	0.00	270	51.41	265	3.60	60	85.82	129.37	133.03	3255	0	0.95	1.00	51150
149	150	-24629	-2225	19932	0	4585	5991	-9874	-446	3626	-43798	0.00	270	51.41	265	3.60	60	85.08	124.81	128.47	3253	0	0.95	1.00	58947
150	150	-24554	-2219	19925	0	4559	6001	-9883	-447	3993	-43953	0.00	270	51.41	265	3.60	60	85.08	124.81	128.47	3253	0	0.95	1.00	58947
150	151	-16573	-1182	19464	0	4444	6882	-9194	-432	14914	-29676	0.00	270	51.41	265	3.60	60	84.61	120.63	124.28	3251	0	0.95	1.00	66027
151	151	-16498	-1178	19457	0	4412	6885	-9202	-433	15215	-29751	0.00	270	51.41	265	3.60	60	84.61	120.63	124.28	3251	0	0.95	1.00	66027
151	152	-9225	-228	18995	0	4289	7781	-8562	-418	25317	-16835	0.00	270	51.41	264	3.60	60	84.49	116.89	120.54	3249	0	0.95	1.00	72365
152	152	-9144	-225	18985	0	4252	7779	-8568	-419	28906	-20206	0.00	270	51.41	264	3.60	60	84.49	116.89	120.54	3249	0	0.95	1.00	72365
152	153	-2522	638	18479	0	3996	8650	-8005	-398	37944	-8556	0.00	270	51.41	264	3.60	60	82.28	113.45	117.10	3247	0	0.95	1.00	77963
153	153	-2446	641	18469	0	3960	8647	-6683	-399	38357	-6427	0.00	270	51.41	264	3.60	60	82.28	113.45	117.10	3247	0	0.95	1.00	77963
153	154	3504	1416	17960	0	3693	9484	-6255	-377	46389	3935	0.00	270	51.41	264	3.60	60	80.35	110.46	114.10	3245	0	0.95	1.00	82903
154	154	3581	1417	17950	0	3657	9480	-6258	-378	46836	3689	0.00	270	51.41	264	3.60	60	80.35	110.46	114.10	3245	0	0.95	1.00	82903
154	155	8865	2105	17437	0	3377	10249	-5886	-356	53795	12939	0.00	270	51.41	264	3.60	60	78.69	107.90	111.54	3244	0	0.95	1.00	87207
155	155	8941	2106	17426	0	3343	10243	-5888	-357	54217	12686	0.00	270	51.41	264	3.60	60	78.69	107.90	111.54	3244	0	0.95	1.00	87207
155	156	13564	2705	16912	0	3051	10915	-5538	-335	60092	20880	0.00	270	51.41	264	3.60	60	77.27	105.71	109.36	3243	0	0.95	1.00	90909
156	156	13640	2705	16900	0	3020	10913	-5539	-336	60526	20578	0.00	270	51.41	264	3.60	60	77.27	105.71	109.36	3243	0	0.95	1.00	90909
156	157	17607	3216	16382	0	2717	11459	-5194	-314	65390	27549	0.00	270	51.41	264	3.60	60	76.10	103.90	107.55	3241	0	0.95	1.00	93956
157	157	17682	3216	16370	0	2689	11458	-5196	-314	65863	27208	0.00	270	51.41	264	3.60	60	76.10	103.90	107.55	3241	0	0.95	1.00	93956
157	158	20995	3639	15850	0	2374	11882	-4850	-292	69712	32805	0.00	270	51.41	264	3.60	60	75.20	102.53	106.17	3240	0	0.95	1.00	96250
158	158	21069	3638	15836	0	2350	11872	-4851	-293	70161	32478	0.00	270	51.41	264	3.60	60	75.20	102.53	106.17	3240	0	0.95	1.00	96250
158	159	23732	3973	15314	0	2023	12173	-4508	-270	73789	37287	0.00	270	51.41	264	3.60	60	74.55	101.53	105.17	3240	0	0.95	1.00	97744
159	159	23805	3972	15300	0	2004	12169	-4509	-271	73431	36951	0.00	270	51.41	264	3.60	60	74.55	101.53	105.17	3240	0	0.95	1.00	97744
159	160	25820	4218	14775	0	1666	12323	-4167	-248	76650	41237	0.00	270	51.41	264	3.60	60	74.14	100.91	104.55	3239	0	0.95	1.00	98654
160	160	25871	4217	14764	0	1646	12323	-4167	-248	76566	40829	0.00	270	51.41	264	3.60	60	74.14	100.91	104.55	3239	0	0.95	1.00	98654
160	161	26528	4294	14541	0	1498	12352	-4024	-238	76781	42476	0.00	270	51.41	264	3.60	60	74.14	100.91	104.55	3239	0	0.95	1.00	98940
161	161	26578	4294	14530	0	1480	12349	-4024	-239	76946	42062	0.00	270	51.41	264	3.60	60	74.14	100.91	104.55	3239	0	0.95	1.00	98940
161	162	27676	4415	13998	0	1114	12310	-3684	-215	79747	45720	0.00	270	51.41	264	3.60	60	74.55	101.53	105.17	3240	0	0.95	1.00	99272
162	162	27746	4413	13982	0	1111	12306	-3685	-215	79360	45753	0.00	270	51.41	264	3.60	60	74.55	101.53	105.17	3240	0	0.95	1.00	99272
162	163	28194	4446	13447	0	734	12108	-3345	-191	80162	49249	0.00	270	51.41	264	3.60	60	75.20	102.53	106.17	3240	0	0.95	1.00	98744
163	163	28263	4444	13431	0	738	12101	-3345	-192	79770	49295	0.00	270	51.41	264	3.60	60	75.20	102.53	106.17	3240	0	0.95	1.00	98744
163	164	28062	4388	12893	0	350	11761	-3006	-168	79337	47125	0.00	270	51.41	264	3.60	60	76.10	103.90	107.55	3241	0	0.95	1.00	97561
164	164	28129	4387	12876	0	365	11755	-3006	-169	78922	47172	0.00	270	51.41	264	3.60	60	76.10	103.90	107.55	3241	0	0.95	1.00	97561
164	165	27274	4243	12336	0	-35	11244	-2667	-144	77193	46009	0.00	270	51.41	264	3.60	60	77.27	105.71	109.36	3243	0	0.95	1.00	95709
165	165	27341	4241	12318	0	-8	11238	-2667	-146	76866	45740	0.00	270	51.41	264	3.60	60	77.27	105.71	109.36	3243	0	0.95	1.00	95709
165	166	25829	4010	11776	0	-419	10591	-2329	-120	74074	44569	0.00	270	51.41	264	3.60	60	78.69	107.90	111.54	3244	0	0.95	1.00	93180
166	166	25894	4007	11758	0	-375	10593	-2329	-123	73852	44350	0.00	270	51.41	264	3.60	60	78.69	107.90	111.54	3244	0	0.95	1.00	93180
166	167	23722	3688	11213	0	-796	9768	-1991	-97	69846	42114	0.00	270	51.41	264	3.60	60	80.35	110.46	114.10	3245	0	0.95	1.00	89979
167	167	23786	3685	11194	0	-730	9772	-1991	-101	69683	41876	0.00	270	51.41	264	3.60	60	80.35	110.46	114.10	3245	0	0.95	1.00	89979
167	168	20948	3280	10646	0	-1160	8759	-1653	-74	64507	37815	0.00	270	51.41	264	3.60	60	82.28	113.45	117.10	3247	0	0.95	1.00	86109
168	168	21010	3276	10627	0	-1066	8765	-1653	-80	64381	38206	0.00	270	51.41	264	3.60	60	82.28	113.45	117.10	3247	0	0.95	1.00	86109

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Forces Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Forces.xls]

Props&Reinf Worksheet: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Props&Reinf.xls]

Ultimate Moment Capacity (T=1) Rating Truck HL-93 LL Factor Inventory

Material Properties:

Concrete			*P-T Strands*			*Mild Steel*						
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_y =	*60.00*	ksi				
β_1 =	*0.800*		f_{pe} =	*65%*								
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2	*for bottom flange <11.5"*	I_{tendon}=	*1670.0*	I_{tendon}= *405.0*
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	A_{bar} =	*0.310*	in^3	*for bottom flange >11.5"*	N_s=	*2.0*	N_s= *0.0*

Draped Tendon Bonded

		MOMENTS (t=1)										*Positive Bending Capacity*													
		Service Loads								Ultimate		As^*_{bottom} Bottom	f_{ps}	As^*_{bottom} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	$\phi M_n(+)$
ELEM	Node	DC	DW	PSEC	PTLS	CR & SH	Max LL	Min LL	TU	$M_{u\ (LLmax)}$	$M_{u\ (LLmin)}$														
		(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(k-ft)	(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)
168	169	17500	2784	10076	0	-1502	7537	-1316	-53	58024	31605	0.00	270	51.41	264	3.60	60	84.49	116.89	120.54	3249	0	0.95	1.00	81645
169	169	17565	2779	10056	0	-1371	7545	-1315	-61	55790	32262	0.00	270	51.41	264	3.60	60	84.49	116.89	120.54	3249	0	0.95	1.00	81645
169	170	13394	2201	9475	0	-1848	6081	-979	-31	48164	26435	0.00	270	51.41	265	3.60	60	86.52	120.63	124.28	3251	0	0.95	1.00	75228
170	170	13455	2196	9455	0	-1654	6091	-979	-43	48087	26848	0.00	270	51.41	265	3.60	60	86.52	120.63	124.28	3251	0	0.95	1.00	75228
170	171	8585	1532	8872	0	-2121	4369	-644	-14	39157	18096	0.00	270	51.41	265	3.60	60	87.31	124.81	128.47	3253	0	0.95	1.00	69817
171	171	8645	1528	8852	0	-1847	4380	-644	-32	39067	18591	0.00	270	51.41	265	3.60	60	87.31	124.81	128.47	3253	0	0.95	1.00	69817
171	172	3055	777	8266	0	-2295	2384	-320	-4	28817	8786	0.00	270	51.41	265	3.60	60	88.02	129.37	133.03	3255	0	0.95	1.00	63926
172	172	3116	774	8245	0	-1919	2393	-318	-30	33294	4750	0.00	270	51.41	265	3.60	60	88.02	129.37	133.03	3255	0	0.95	1.00	63926
172	173	-4992	-63	7657	0	-2338	483	-780	-4	998	-1212	0.00	270	51.41	265	3.60	60	89.67	134.37	138.03	3258	0	0.95	1.00	56756

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	5.00	ksi	f_{pu} =	270.00	ksi	f_{pu} =	60.00	ksi
β_1 =	0.800		f_{pe} =	65%		f_{pe} =	0%	
ϕ_{bonded} =	0.95		A_{strand} =	0.153	in^2	A_{bar} =	0.200	in^2
$\phi_{unbonded}$ =	0.90		k* =	0.280	Low-lax	k* =	0.000	

Negative Bending Capacity															RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps}	As^*_{top} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	Section No.	POSITIVE		NEGATIVE				POSITIVE			NEGATIVE		
(in²)	(ksi)	(in²)	(ksi)	(in²)	(ksi)	(in)	(in)	(in)	(in²)				(kip-ft)		RF	Status	RF	Status	f_{cpe} (top) (ksf)	f_{cpe} (bot) (ksf)	Mcr (+)	ϕ Mn (-) / 1.2Mcr	Status	Mcr (-)	ϕ Mn (-) / 1.2Mcr	Status
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-1693	1	600.07	OK	15.64	OK	0.00	0.00	8197	5.22	OK	-17852	0.08	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-31884	2	7.64	OK	66.87	OK	0.00	0.00	8197	2.12	OK	-17852	1.49	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-31884	2	13.29	OK	4.40	OK	-36.89	-65.28	15121	1.15	OK	-26375	1.01	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-31466	3	12.33	OK	4.55	OK	-36.30	-66.54	15256	1.16	OK	-26239	1.00	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-31466	3	11.99	OK	4.51	OK	-36.30	-66.54	15256	1.16	OK	-26239	1.00	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-26262	4	4.24	OK	4.59	OK	-29.74	-81.91	16886	1.31	OK	-24722	0.89	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-26262	4	4.30	OK	4.56	OK	-29.78	-81.85	16879	1.31	OK	-24732	0.88	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-23087	5	2.92	OK	4.42	OK	-26.91	-89.16	17655	1.40	OK	-24070	0.80	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-23087	5	2.95	OK	4.38	OK	-27.01	-88.95	17633	1.40	OK	-24093	0.80	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-20834	6	2.31	OK	4.24	OK	-26.21	-91.64	17918	1.49	OK	-23907	0.73	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-20834	6	2.33	OK	4.19	OK	-26.31	-91.43	17895	1.49	OK	-23930	0.73	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19456	7	2.00	OK	4.02	OK	-27.49	-89.74	17717	1.57	OK	-24203	0.67	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19456	7	2.01	OK	3.96	OK	-27.60	-89.52	17694	1.57	OK	-24230	0.67	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19010	8	1.84	OK	3.77	OK	-30.95	-83.17	17020	1.66	OK	-25001	0.63	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19010	8	1.85	OK	3.71	OK	-31.05	-82.96	16997	1.66	OK	-25025	0.63	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19494	9	1.77	OK	3.49	OK	-36.62	-71.90	15824	1.76	OK	-26312	0.62	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-19494	9	1.79	OK	3.14	OK	-36.72	-71.70	15803	1.76	OK	-26335	0.62	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-20882	10	1.78	OK	2.89	OK	-44.47	-55.80	14116	1.89	OK	-28125	0.62	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-20882	10	1.79	OK	2.87	OK	-44.57	-55.58	14093	1.89	OK	-28148	0.62	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-23186	11	1.83	OK	2.64	OK	-54.62	-34.88	11897	2.07	OK	-30470	0.63	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-23186	11	1.83	OK	2.63	OK	-54.69	-34.70	11879	2.08	OK	-30487	0.63	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-25164	12	1.90	OK	2.49	OK	-62.54	-18.43	10152	2.27	OK	-32300	0.65	OK
0.00	270	22.03	264	7.60	60	74.01	13.55	4.32	1476	0	0.95	1.00	-25164	12	2.01	OK	2.37	OK	-62.41	-18.06	10113	2.28	OK	-32270	0.65	OK
0.00	270	22.03	264	7.60	60	71.06	7.23	3.62	1476	0	0.95	1.00	-29088	13	2.11	OK	2.23	OK	-75.53	8.18	9681	2.07	OK	-36816	0.66	OK
0.00	270	22.03	264	7.60	60	71.06	7.23	3.62	1476	0	0.95	1.00	-29088	13	2.11	OK	2.24	OK	-75.66	8.28	9681	2.07	OK	-36847	0.66	OK
0.00	270	33.05	261	7.60	60	68.45	10.77	5.24	2137	0	0.95	1.00	-43877	14	3.60	OK	2.52	OK	-100.92	4.42	11052	2.31	OK	-44109	0.83	OK
0.00	270	33.05	261	7.60	60	68.45	10.77	5.24	2137	0	0.95	1.00	-43877	14	3.59	OK	2.53	OK	-101.07	4.46	11052	2.31	OK	-44149	0.83	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-53799	15	3.52	OK	2.54	OK	-126.73	44.37	12309	1.45	OK	-51390	0.87	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-53799	15	3.65	OK	2.44	OK	-127.18	44.12	12309	1.45	OK	-51502	0.87	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-62718	16	9.76	OK	2.43	OK	-154.45	80.80	12309	0.84	OK	-58373	0.90	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-62718	16	9.78	OK	2.42	OK	-154.51	80.88	12309	0.84	OK	-58387	0.90	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-63520	17	10.16	OK	2.18	OK	-160.11	85.80	12309	0.78	OK	-59798	0.89	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-63520	17	10.18	OK	2.18	OK	-160.14	85.84	12309	0.78	OK	-59805	0.89	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-63259	18	9.82	OK	2.59	OK	-159.35	84.28	12309	0.80	OK	-59606	0.88	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-63259	18	9.83	OK	2.59	OK	-159.42	84.37	12309	0.80	OK	-59624	0.88	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-59394	19	9.47	OK	1.85	OK	-150.12	68.23	12309	1.07	OK	-57281	0.86	OK
0.00	270	33.05	261	7.60	60	66.16	10.47	5.24	2137	0	0.95	1.00	-59394	19	9.32	OK	1.89	OK	-150.11	68.46	12309	1.07	OK	-57277	0.86	OK
0.00	270	33.05	261	7.60	60	67.48	10.47	5.24	2137	0	0.95	1.00	-51685	20	6.79	OK	2.71	OK	-132.15	39.25	11581	1.63	OK	-52263	0.82	OK
0.00	270	33.05	261	7.60	60	67.48	10.47	5.24	2137	0	0.95	1.00	-51685	20	6.85	OK	2.70	OK	-132.21	39.41	11581	1.63	OK	-52277	0.82	OK
0.00	270	33.05	261	7.60	60	68.96	12.34	5.29	2137	0	0.95	1.00	-43421	21	5.36	OK	3.42	OK	-112.31	2.94	10780	2.40	OK	-46712	0.77	OK
0.00	270	33.05	261	7.60	60	68.96	12.34	5.29	2137	0	0.95	1.00	-43421	21	5.44	OK	3.40	OK	-112.38	3.10	10780	2.40	OK	-46730	0.77	OK
0.00	270	33.05	261	7.60	60	70.49	18.30	5.92	2137	0	0.95	1.00	-35781	22	4.09	OK	4.36	OK	-93.86	-34.63	14439	2.21	OK	-41503	0.72	OK
0.00	270	33.05	261	7.60	60	70.49	18.30	5.92	2137	0	0.95	1.00	-35781	22	4.15	OK	4.30	OK	-93.92	-34.44	14415	2.22	OK	-41517	0.72	OK
0.00	270	33.05	261	7.60	60	72.22	27.56	7.70	2137	0	0.95	1.00	-28235	23	3.29	OK	5.22	OK	-76.31	-74.81	17881	2.09	OK	-36452	0.65	OK
0.00	270	33.05	261	7.60	60	72.22	27.56	7.70	2137	0	0.95	1.00	-28235	23	3.34	OK	5.14	OK	-76.36	-74.64	17860	2.09	OK	-36466	0.65	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-20608	24	2.77	OK	5.74	OK	-59.46	-119.23	20845	2.01	OK	-31588	0.54	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-20608	24	2.93	OK	5.45	OK	-59.69	-119.22	20843	2.01	OK	-31641	0.54	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-15929	25	2.50	OK	6.01	OK	-46.01	-150.83	24196	1.90	OK	-28481	0.47	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-15929	25	2.53	OK	5.86	OK	-46.07	-150.67	24179	1.90	OK	-28494	0.47	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-12138	26	2.16	OK	6.25	OK	-34.59	-177.29	27004	1.82	OK	-25843	0.39	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-12138	26	2.18	OK	6.08	OK	-34.66	-177.16	26990	1.82	OK	-25860	0.39	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-9234	27	1.92	OK	6.34	OK	-25.47	-198.66	29270	1.76	OK	-23737	0.32	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-9234	27	1.94	OK	6.15	OK	-25.55	-198.52	29255	1.76	OK	-23754	0.32	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-7203	28	1.75	OK	6.34	OK	-18.63	-214.89	30992	1.72	OK	-22157	0.27	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-7203	28	1.77	OK	6.14	OK	-18.69	-214.76	30978	1.72	OK	-22170	0.27	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-6031	29	1.63	OK	6.17	OK	-14.10	-225.92	32162	1.69	OK	-21109	0.24	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-6031	29	1.65	OK	5.98	OK	-14.16	-225.78	32147	1.69	OK	-21123	0.24	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-5714	30	1.56	OK	5.95	OK	-11.88	-231.72	32777	1.67	OK	-20597	0.23	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-5714	30	1.58	OK	5.81	OK	-11.94	-231.62	32767	1.67	OK	-20610	0.23	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-6031	31	1.54	OK	5.79	OK	-11.75	-232.76	32887	1.65	OK	-20567	0.24	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-6031	31	1.55	OK	5.66	OK	-11.81	-232.65	32875	1.65	OK	-20580	0.24	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-7201	32	1.52	OK	5.63	OK	-13.64	-229.54	32545	1.64	OK	-21003	0.29	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-7201	32	1.54	OK	5.49	OK	-13.69	-229.42	32533	1.64	OK	-21016	0.29	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-9235	33	1.55	OK	5.45	OK	-17.94	-220.97	31636	1.63	OK	-21997	0.35	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-9235	33	1.57	OK	5.33	OK	-18.00	-220.82	31621	1.63	OK	-22011	0.35	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-12140	34	1.61	OK	5.22	OK	-24.65	-207.07	30162	1.63	OK	-23548	0.43	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-12140	34	1.62	OK	5.13	OK	-24.71	-206.96	30150	1.63	OK	-23561	0.43	OK

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	5.00	ksi	f_{pu} =	270.00	ksi	f_{pu} =	60.00	ksi
β_1 =	0.800		f_{pe} =	65%		f_{pe} =	0%	
ϕ_{bonded} =	0.95		A_{strand} =	0.153	in^2	A_{bar} =	0.200	in^2
$\phi_{unbonded}$ =	0.90		k* =	0.280	Low-lax	k* =	0.000	

Negative Bending Capacity															RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps}	As^*_{top} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	Section No.	POSITIVE		NEGATIVE				POSITIVE			NEGATIVE		
															RF	Status	RF	Status	f_{cpe} (top)	f_{cpe} (bot)	Mcr (+)	ϕ Mn (-) / 1.2Mcr	Status	Mcr (-)	ϕ Mn (-) / 1.2Mcr	Status
(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)						(ksf)	(ksf)						
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-15929	35	1.68	OK	4.94	OK	-33.90	-187.88	28126	1.63	OK	-25683	0.52	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-15929	35	1.70	OK	4.88	OK	-33.94	-187.78	28116	1.63	OK	-25693	0.52	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-20552	36	1.78	OK	4.65	OK	-45.71	-163.22	25511	1.65	OK	-28411	0.60	OK
0.00	270	33.05	261	7.60	60	74.01	36.60	10.66	2137	0	0.95	1.00	-20552	36	2.26	OK	3.79	OK	-45.58	-162.96	25484	1.65	OK	-28381	0.60	OK
0.00	270	33.05	261	7.60	60	71.85	25.60	7.22	2137	0	0.95	1.00	-28575	37	2.48	OK	3.69	OK	-61.99	-117.42	23364	1.60	OK	-33220	0.72	OK
0.00	270	33.05	261	7.60	60	71.85	25.60	7.22	2137	0	0.95	1.00	-28575	37	2.51	OK	3.23	OK	-62.05	-117.37	23358	1.60	OK	-33234	0.72	OK
0.00	270	61.51	253	7.60	60	69.88	73.01	22.17	3772	0	0.95	1.00	-47669	38	4.44	OK	3.76	OK	-122.64	-126.81	27180	1.83	OK	-48810	0.81	OK
0.00	270	61.51	253	7.60	60	69.88	73.01	22.17	3772	0	0.95	1.00	-47669	38	4.46	OK	3.75	OK	-122.73	-126.82	27182	1.83	OK	-48831	0.81	OK
0.00	270	61.51	253	7.60	60	68.08	62.01	17.53	3772	0	0.95	1.00	-72585	39	3.55	OK	5.16	OK	-170.64	-43.23	17547	1.90	OK	-61566	0.98	OK
0.00	270	61.51	253	7.60	60	68.08	62.01	17.53	3772	0	0.95	1.00	-72585	39	3.55	OK	5.16	OK	-170.74	-43.23	17547	1.90	OK	-61591	0.98	OK
0.00	270	61.51	253	7.60	60	66.44	51.01	13.93	3772	0	0.95	1.00	-88130	40	3.96	OK	4.82	OK	-199.34	0.24	12154	2.02	OK	-69552	1.06	OK
0.00	270	61.51	253	7.60	60	66.44	51.01	13.93	3772	0	0.95	1.00	-88130	40	3.98	OK	4.80	OK	-199.43	0.26	12154	2.02	OK	-69573	1.06	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-99669	41	4.58	OK	3.87	OK	-219.99	29.59	13056	1.34	OK	-75455	1.10	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-99669	41	2.76	OK	5.37	OK	-220.18	29.52	13056	1.34	OK	-75503	1.10	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-103876	42	11.32	OK	3.53	OK	-231.03	42.71	13056	1.07	OK	-78259	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-103876	42	11.32	OK	3.53	OK	-231.06	42.74	13056	1.07	OK	-78266	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-104158	43	11.88	OK	3.08	OK	-232.03	43.20	13056	1.05	OK	-78511	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-104158	43	11.87	OK	3.08	OK	-232.04	43.21	13056	1.05	OK	-78515	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-104016	44	11.72	OK	3.53	OK	-231.72	43.33	13056	1.06	OK	-78434	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-104016	44	11.70	OK	3.52	OK	-231.75	43.37	13056	1.06	OK	-78442	1.11	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-101780	45	10.88	OK	2.61	OK	-226.84	37.12	13056	1.20	OK	-77195	1.10	OK
0.00	270	61.51	253	7.60	60	64.84	39.22	11.23	3772	0	0.95	1.00	-101780	45	10.58	OK	2.69	OK	-226.80	37.24	13056	1.20	OK	-77184	1.10	OK
0.00	270	61.51	253	7.60	60	66.38	50.61	13.82	3772	0	0.95	1.00	-93582	46	8.17	OK	3.63	OK	-215.90	20.17	12186	1.64	OK	-73743	1.06	OK
0.00	270	61.51	253	7.60	60	66.38	50.61	13.82	3772	0	0.95	1.00	-93582	46	8.22	OK	3.63	OK	-215.91	20.23	12186	1.64	OK	-73747	1.06	OK
0.00	270	61.51	253	7.60	60	67.90	60.83	17.09	3772	0	0.95	1.00	-80564	47	6.04	OK	4.22	OK	-192.96	-13.78	13376	2.01	OK	-67212	1.00	OK
0.00	270	61.51	253	7.60	60	67.90	60.83	17.09	3772	0	0.95	1.00	-80564	47	6.16	OK	4.18	OK	-192.96	-13.71	13366	2.01	OK	-67212	1.00	OK
0.00	270	61.51	253	7.60	60	69.81	72.61	21.98	3772	0	0.95	1.00	-57208	48	6.73	OK	3.30	OK	-150.02	-90.01	22357	1.86	OK	-55532	0.86	OK
0.00	270	61.51	253	7.60	60	69.81	72.61	21.98	3772	0	0.95	1.00	-57208	48	6.86	OK	3.26	OK	-150.00	-89.90	22341	1.86	OK	-55528	0.86	OK
0.00	270	39.47	259	7.60	60	71.85	39.11	11.00	2515	0	0.95	1.00	-41442	49	3.80	OK	3.28	OK	-93.33	-70.57	17742	1.92	OK	-40694	0.85	OK
0.00	270	39.47	259	7.60	60	71.85	39.11	11.00	2515	0	0.95	1.00	-41442	49	3.84	OK	3.26	OK	-93.34	-70.49	17732	1.92	OK	-40698	0.85	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-32222	50	3.14	OK	3.36	OK	-80.11	-107.60	19611	1.97	OK	-36358	0.74	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-32222	50	3.30	OK	3.48	OK	-80.29	-107.68	19620	1.97	OK	-36402	0.74	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-27590	51	2.76	OK	3.79	OK	-70.26	-131.10	22103	1.93	OK	-34083	0.67	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-27590	51	2.79	OK	3.73	OK	-70.29	-131.05	22099	1.93	OK	-34090	0.67	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-23679	52	2.42	OK	4.01	OK	-61.96	-150.70	24182	1.90	OK	-32167	0.61	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-23679	52	2.45	OK	3.94	OK	-61.99	-150.65	24178	1.90	OK	-32174	0.61	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-20488	53	2.19	OK	4.21	OK	-55.41	-166.42	25850	1.88	OK	-30653	0.56	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-20488	53	2.22	OK	4.13	OK	-55.44	-166.39	25847	1.88	OK	-30660	0.56	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-18013	54	2.03	OK	4.36	OK	-50.63	-178.20	27100	1.87	OK	-29549	0.51	OK
0.00	270	39.47	259	7.60	60	74.01	50.11	15.58	2515	0	0.95	1.00	-18013	54	2.06	OK	4.27	OK	-50.66	-178.17	27097	1.87	OK	-29556	0.51	OK
0.00	270	39.47	259	7.60	60	74.14	50.12	15.58	2515	0	0.95	1.00	-16413	55	1.93	OK	4.45	OK	-47.85	-185.43	27940	1.87	OK	-28976	0.47	OK
0.00	270	39.47	259	7.60	60	74.14	50.12	15.58	2515	0	0.95	1.00	-16413	55	1.96	OK	4.35	OK	-47.88	-185.39	27935	1.87	OK	-28982	0.47	OK
0.00	270	39.47	259	7.60	60	74.55	50.14	15.59	2516	0	0.95	1.00	-15979	56	1.93	OK	4.25	OK	-47.36	-187.11	28365	1.87	OK	-29090	0.46	OK
0.00	270	39.47	259	7.60	60	74.55	50.14	15.59	2516	0	0.95	1.00	-15979	56	1.95	OK	4.17	OK	-47.38	-187.07	28361	1.87	OK	-29094	0.46	OK
0.00	270	39.47	259	7.60	60	75.20	50.17	15.60	2517	0	0.95	1.00	-16420	57	1.86	OK	4.21	OK	-48.84	-184.35	28460	1.88	OK	-29807	0.46	OK
0.00	270	39.47	259	7.60	60	75.20	50.17	15.60	2517	0	0.95	1.00	-16420	57	1.89	OK	4.13	OK	-48.86	-184.32	28457	1.88	OK	-29810	0.46	OK
0.00	270	39.47	260	7.60	60	76.10	50.21	15.62	2518	0	0.95	1.00	-17894	58	1.87	OK	4.09	OK	-52.46	-176.37	28117	1.89	OK	-31185	0.48	OK
0.00	270	39.47	260	7.60	60	76.10	50.21	15.62	2518	0	0.95	1.00	-17894	58	1.90	OK	4.01	OK	-52.46	-176.33	28112	1.89	OK	-31185	0.48	OK
0.00	270	39.47	260	7.60	60	77.27	50.27	15.64	2520	0	0.95	1.00	-20458	59	1.91	OK	3.99	OK	-58.13	-163.60	27363	1.91	OK	-33272	0.51	OK
0.00	270	39.47	260	7.60	60	77.27	50.27	15.64	2520	0	0.95	1.00	-20458	59	1.94	OK	3.92	OK	-58.13	-163.54	27357	1.91	OK	-33272	0.51	OK
0.00	270	39.47	260	7.60	60	78.69	50.34	15.67	2521	0	0.95	1.00	-24061	60	1.99	OK	3.90	OK	-65.61	-146.68	26192	1.94	OK	-36033	0.56	OK
0.00	270	39.47	260	7.60	60	78.69	50.34	15.67	2521	0	0.95	1.00	-24061	60	2.01	OK	3.84	OK	-65.61	-146.62	26185	1.95	OK	-36033	0.56	OK
0.00	270	39.47	260	7.60	60	80.35	50.41	15.69	2523	0	0.95	1.00	-28707	61	2.09	OK	3.82	OK	-74.71	-126.06	24588	1.99	OK	-39484	0.61	OK
0.00	270	39.47	260	7.60	60	80.35	50.41	15.69	2523	0	0.95	1.00	-28707	61	2.11	OK	3.32	OK	-74.71	-126.04	24586	1.99	OK	-39484	0.61	OK
0.00	270	39.47	260	7.60	60	82.28	50.49	15.73	2526	0	0.95	1.00	-34456	62	2.21	OK	3.24	OK	-85.23	-102.24	22554	2.05	OK	-43672	0.66	OK
0.00	270	39.47	260	7.60	60	82.28	50.49	15.73	2526	0	0.95	1.00	-34456	62	2.24	OK	3.21	OK	-85.23	-102.21	22550	2.05	OK	-43672	0.66	OK
0.00	270	39.47	261	7.60	60	84.49	50.58	15.76	2528	0	0.95	1.00	-41298	63	2.36	OK	3.12	OK	-96.93	-75.93	20088	2.14	OK	-48610	0.71	OK
0.00	270	39.47	261	7.60	60	84.49	50.58	15.76	2528	0	0.95	1.00	-41298	63	2.39	OK	3.09	OK	-96.91	-75.93	20088	2.14	OK	-48605	0.71	OK
0.00	270	39.47	261	7.60	60	86.88	50.67	15.79	2531	0	0.95	1.00	-49146	64	2.52	OK	2.99	OK	-109.54	-47.71	17148	2.28	OK	-54241	0.76	OK
0.00	270	39.47	261	7.60	60	86.88	50.67	15.79	2531	0	0.95	1.00	-49146	64	3.31	OK	2.18	OK	-109.25	-47.43	17110	2.28	OK	-54157	0.76	OK
0.00	270	39.47	261	7.60	60	86.72	38.19	10.67	2533	0	0.95	1.00	-62543	65	3.63	OK	2.23	OK	-123.18	-15.03	15154	2.28	OK	-62840	0.83	OK
0.00	270	39.47	261	7.60	60	86.72	38.19	10.67	2533	0	0.95	1.00	-62543	65	3.66	OK	2.22	OK	-123.18	-15.06	15158	2.28	OK	-62840	0.83	OK
0.00	270	67.93	255	7.60	60	86.90	84.76	26.37	4189	0	0.95	1.00	-97695	66	5.09	OK	3.30	OK	-185.41	-18.63	18459	2.48	OK	-88248	0.92	OK
0.00	270	67.93	255	7.60	60	86.90	84.76	26.37	4189	0	0.95	1.00	-97695	66	5.11	OK	3.29	OK	-185.39	-18.65	18462	2.48	OK	-88238	0.92	OK
0.00	270	67.93	256	7.60	60	87.44	72.48	20.83	4197	0	0.95	1.00	-131537	67	4.29	OK	4.42	OK	-220.10	36.92	17189	1.79	OK	-106632	1.03	OK
0.00	270	67.93	256	7.60	60	87.44	72.48	20.83	4197	0	0.95	1.00	-131537	67	4.32	OK	4.40	OK	-220.06	36.94	17189	1.79	OK	-106617	1.03	OK
0.00	270	67.93	256	7.60	60	88.28	60.20	16.48	4206	0	0.95	1.00	-155424	68	4.79	OK	4.05	OK	-238.92	60.13	19641	1.15	OK	-120680	1.07	OK

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_{pu} =	*60.00*	ksi
β_1 =	*0.800*		f_{pe} =	*65%*		f_{pe} =	*0%*	
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	k* =	*0.000*	

Negative Bending Capacity															RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps}	As^*_{top} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	Section No.	POSITIVE		NEGATIVE				POSITIVE			NEGATIVE		
															RF	Status	RF	Status	f_{cpe} (top)	f_{cpe} (bot)	Mcr (+)	ϕ Mn (+) / 1.2Mcr	Status	Mcr (-)	ϕ Mn (-) / 1.2Mcr	Status
(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)						(ksf)	(ksf)						
0.00	270	67.93	256	7.60	60	88.28	60.20	16.48	4206	0	0.95	1.00	-155424	68	4.79	OK	4.05	OK	-238.87	60.13	19641	1.15	OK	-120658	1.07	OK
0.00	270	67.93	257	7.60	60	89.41	47.93	13.31	4214	0	0.95	1.00	-174165	69	5.34	OK	3.53	OK	-247.84	70.32	22257	0.80	OK	-131911	1.10	OK
0.00	270	67.93	257	7.60	60	89.41	47.93	13.31	4214	0	0.95	1.00	-174165	69	3.03	OK	5.26	OK	-248.00	70.08	22257	0.80	OK	-131976	1.10	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185793	70	15.45	OK	3.83	OK	-251.77	75.41	23537	0.67	OK	-140615	1.10	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185793	70	15.46	OK	3.84	OK	-251.90	75.31	23537	0.67	OK	-140671	1.10	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185963	71	15.91	OK	3.52	OK	-253.28	76.12	23537	0.66	OK	-141261	1.10	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185963	71	11.57	OK	3.21	OK	-270.48	109.99	23537	0.66	OK	-148609	1.04	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185791	72	11.25	OK	3.55	OK	-269.83	109.20	23537	0.67	OK	-148332	1.04	OK
0.00	270	67.93	257	7.60	60	92.87	48.22	13.38	4222	0	0.95	1.00	-185791	72	11.24	OK	3.55	OK	-269.76	109.34	23537	0.67	OK	-148301	1.04	OK
0.00	270	67.93	257	7.60	60	89.41	47.93	13.31	4214	0	0.95	1.00	-173520	73	10.99	OK	2.19	OK	-268.46	104.76	22257	0.82	OK	-140278	1.03	OK
0.00	270	67.93	257	7.60	60	89.41	47.93	13.31	4214	0	0.95	1.00	-173520	73	10.75	OK	2.26	OK	-268.43	104.99	22257	0.82	OK	-140266	1.03	OK
0.00	270	67.93	256	7.60	60	87.73	57.06	15.56	4206	0	0.95	1.00	-154981	74	9.27	OK	2.88	OK	-261.60	94.98	20006	1.20	OK	-129707	1.00	OK
0.00	270	67.93	256	7.60	60	87.73	57.06	15.56	4206	0	0.95	1.00	-154981	74	9.36	OK	2.86	OK	-261.73	95.04	20006	1.20	OK	-129757	1.00	OK
0.00	270	67.93	256	7.60	60	86.15	65.41	18.18	4197	0	0.95	1.00	-132544	75	7.54	OK	3.53	OK	-245.72	72.40	18009	1.84	OK	-116763	0.95	OK
0.00	270	67.93	256	7.60	60	86.15	65.41	18.18	4197	0	0.95	1.00	-132544	75	7.63	OK	3.51	OK	-245.84	72.46	18009	1.84	OK	-116805	0.95	OK
0.00	270	67.93	255	7.60	60	84.86	74.15	21.53	4189	0	0.95	1.00	-105048	76	6.84	OK	3.65	OK	-220.74	30.60	16105	2.82	OK	-101691	0.86	OK
0.00	270	67.93	255	7.60	60	84.86	74.15	21.53	4189	0	0.95	1.00	-105048	76	6.91	OK	3.64	OK	-220.84	30.66	16105	2.82	OK	-101725	0.86	OK
0.00	270	56.92	257	7.60	60	83.84	60.48	17.32	3553	0	0.95	1.00	-79532	77	6.17	OK	3.14	OK	-179.86	14.64	14337	3.29	OK	-82826	0.80	OK
0.00	270	56.92	257	7.60	60	83.84	60.48	17.32	3553	0	0.95	1.00	-79532	77	6.25	OK	3.13	OK	-178.01	16.79	14337	3.29	OK	-82232	0.81	OK
0.00	270	56.92	257	7.60	60	82.98	68.92	20.99	3548	0	0.95	1.00	-61647	78	5.49	OK	3.19	OK	-161.91	-17.31	15575	3.48	OK	-72711	0.71	OK
0.00	270	56.92	257	7.60	60	82.98	68.92	20.99	3548	0	0.95	1.00	-61647	78	5.55	OK	3.18	OK	-161.96	-17.19	15557	3.49	OK	-72724	0.71	OK
0.00	270	56.92	257	7.60	60	82.51	77.77	25.54	3543	0	0.95	1.00	-44060	79	4.81	OK	3.16	OK	-144.81	-57.41	19482	3.11	OK	-63597	0.58	OK
0.00	270	56.92	257	7.60	60	82.51	77.77	25.54	3543	0	0.95	1.00	-44060	79	4.87	OK	3.14	OK	-144.86	-57.33	19469	3.12	OK	-63613	0.58	OK
0.00	270	56.92	256	7.60	60	82.28	86.62	30.83	3537	0	0.95	1.00	-26807	80	4.25	OK	3.01	OK	-126.56	-105.19	22925	2.90	OK	-54779	0.41	OK
0.00	270	56.92	256	7.60	60	82.28	86.62	30.83	3537	0	0.95	1.00	-26807	80	4.47	OK	3.07	OK	-126.89	-105.36	22946	2.89	OK	-54868	0.41	OK
0.00	270	56.92	256	7.60	60	80.35	86.45	30.76	3533	0	0.95	1.00	-17129	81	3.96	OK	3.35	OK	-110.04	-146.29	27034	2.65	OK	-48664	0.29	OK
0.00	270	56.92	256	7.60	60	80.35	86.45	30.76	3533	0	0.95	1.00	-17129	81	4.02	OK	3.32	OK	-110.12	-146.28	27033	2.65	OK	-48683	0.29	OK
0.00	270	56.92	255	7.60	60	78.69	86.30	30.69	3528	0	0.95	1.00	-8733	82	3.60	OK	3.60	OK	-94.08	-185.18	30695	2.48	OK	-43212	0.17	OK
0.00	270	56.92	255	7.60	60	78.69	86.30	30.69	3528	0	0.95	1.00	-8733	82	3.65	OK	3.57	OK	-94.13	-185.20	30697	2.48	OK	-43227	0.17	OK
0.00	270	56.92	255	7.60	60	77.27	86.17	30.63	3525	0	0.95	1.00	-1563	83	3.26	OK	3.79	OK	-79.30	-221.21	33908	2.36	OK	-38473	0.03	OK
0.00	270	56.92	255	7.60	60	77.27	86.17	30.63	3525	0	0.95	1.00	-1563	83	3.31	OK	3.76	OK	-79.34	-221.23	33910	2.36	OK	-38484	0.03	OK
0.00	270	56.92	255	7.60	60	76.10	86.05	30.58	3521	0	0.95	1.00	4394	84	2.97	OK	3.92	OK	-66.02	-253.51	36668	2.27	OK	-34446	-0.11	OK
0.00	270	56.92	255	7.60	60	76.10	86.05	30.58	3521	0	0.95	1.00	4394	84	3.01	OK	3.88	OK	-66.08	-253.54	36671	2.27	OK	-34460	-0.11	OK
0.00	270	56.92	255	7.60	60	75.20	85.96	30.54	3519	0	0.95	1.00	9084	85	2.74	OK	4.01	OK	-54.71	-281.19	38994	2.21	OK	-31192	-0.24	OK
0.00	270	56.92	255	7.60	60	75.20	85.96	30.54	3519	0	0.95	1.00	9084	85	2.78	OK	3.95	OK	-54.73	-281.20	38996	2.21	OK	-31198	-0.24	OK
0.00	270	56.92	255	7.60	60	74.55	85.89	30.51	3517	0	0.95	1.00	12592	86	2.56	OK	4.09	OK	-45.49	-303.83	40887	2.15	OK	-28653	-0.37	OK
0.00	270	56.92	255	7.60	60	74.55	85.89	30.51	3517	0	0.95	1.00	12592	86	2.60	OK	4.00	OK	-45.52	-303.84	40888	2.15	OK	-28660	-0.37	OK
0.00	270	56.92	255	7.60	60	74.14	85.85	30.49	3516	0	0.95	1.00	14927	87	2.43	OK	4.21	OK	-38.61	-321.02	42360	2.11	OK	-26835	-0.46	OK
0.00	270	56.92	255	7.60	60	74.14	85.85	30.49	3516	0	0.95	1.00	14927	87	2.46	OK	4.13	OK	-38.64	-321.00	42359	2.11	OK	-26841	-0.46	OK
0.00	270	56.92	254	7.60	60	74.01	85.84	30.49	3515	0	0.95	1.00	15601	88	2.40	OK	4.21	OK	-36.39	-326.71	42853	2.10	OK	-26259	-0.50	OK
0.00	270	56.92	254	7.60	60	74.01	85.84	30.49	3515	0	0.95	1.00	15601	88	2.41	OK	4.15	OK	-36.42	-326.65	42847	2.10	OK	-26265	-0.49	OK
0.00	270	56.92	255	7.60	60	74.14	85.85	30.49	3516	0	0.95	1.00	15966	89	2.34	OK	4.14	OK	-33.57	-334.27	43769	2.06	OK	-25668	-0.52	OK
0.00	270	56.92	255	7.60	60	74.14	85.85	30.49	3516	0	0.95	1.00	15966	89	2.36	OK	4.05	OK	-33.60	-334.20	43762	2.06	OK	-25674	-0.52	OK
0.00	270	56.92	255	7.60	60	74.55	85.89	30.51	3517	0	0.95	1.00	15103	90	2.29	OK	4.12	OK	-33.47	-335.29	44262	2.04	OK	-25847	-0.49	OK
0.00	270	56.92	255	7.60	60	74.55	85.89	30.51	3517	0	0.95	1.00	15103	90	2.32	OK	4.00	OK	-33.48	-335.17	44250	2.04	OK	-25850	-0.49	OK
0.00	270	56.92	255	7.60	60	75.20	85.96	30.54	3519	0	0.95	1.00	13079	91	2.29	OK	4.09	OK	-35.97	-330.18	44323	2.02	OK	-26764	-0.41	OK
0.00	270	56.92	255	7.60	60	75.20	85.96	30.54	3519	0	0.95	1.00	13079	91	2.32	OK	3.99	OK	-35.99	-330.05	44309	2.02	OK	-26768	-0.41	OK
0.00	270	56.92	255	7.60	60	76.10	86.05	30.58	3521	0	0.95	1.00	9887	92	2.33	OK	4.09	OK	-41.00	-319.19	43948	2.00	OK	-28430	-0.29	OK
0.00	270	56.92	255	7.60	60	76.10	86.05	30.58	3521	0	0.95	1.00	9887	92	2.36	OK	3.99	OK	-41.00	-319.05	43932	2.01	OK	-28430	-0.29	OK
0.00	270	56.92	255	7.60	60	77.27	86.17	30.63	3525	0	0.95	1.00	5443	93	2.39	OK	4.10	OK	-48.48	-302.39	43129	2.00	OK	-30902	-0.15	OK
0.00	270	56.92	255	7.60	60	77.27	86.17	30.63	3525	0	0.95	1.00	5443	93	2.43	OK	4.01	OK	-48.48	-302.21	43110	2.00	OK	-30902	-0.15	OK
0.00	270	56.92	255	7.60	60	78.69	86.30	30.69	3528	0	0.95	1.00	-193	94	2.47	OK	4.10	OK	-58.15	-280.47	41839	2.00	OK	-34152	0.00	OK
0.00	270	56.92	255	7.60	60	78.69	86.30	30.69	3528	0	0.95	1.00	-193	94	2.50	OK	4.01	OK	-58.15	-280.32	41822	2.00	OK	-34152	0.00	OK
0.00	270	56.92	256	7.60	60	80.35	86.45	30.76	3533	0	0.95	1.00	-7038	95	2.97	OK	3.30	OK	-69.78	-253.99	40057	2.00	OK	-38205	0.15	OK
0.00	270	56.92	256	7.60	60	80.35	86.45	30.76	3533	0	0.95	1.00	-7038	95	2.99	OK	3.27	OK	-69.77	-253.86	40042	2.00	OK	-38201	0.15	OK
0.00	270	56.92	256	7.60	60	82.28	86.62	30.83	3537	0	0.95	1.00	-15183	96	3.15	OK	3.18	OK	-83.15	-223.40	37776	2.02	OK	-43111	0.29	OK
0.00	270	56.92	256	7.60	60	82.28	86.62	30.83	3537	0	0.95	1.00	-15183	96	3.17	OK	3.15	OK	-83.13	-223.30	37763	2.02	OK	-43107	0.29	OK
0.00	270	56.92	257	7.60	60	84.49	86.80	30.92	3543	0	0.95	1.00	-24617	97	3.36	OK	3.04	OK	-97.91	-189.68	35002	2.05	OK	-48883	0.42	OK
0.00	270	56.92	257	7.60	60	84.49	86.80	30.92	3543	0	0.95	1.00	-24617	97	3.36	OK	2.63	OK	-97.89	-189.60	34993	2.05	OK	-48879	0.42	OK
0.00	270	56.92	257	7.60	60	86.88	86.99	31.00	3548	0	0.95	1.00	-35250	98	3.58	OK	2.52	OK	-113.73	-153.48	31659	2.10	OK	-55458	0.53	OK
0.00	270	56.92	257	7.60	60	86.88	86.99	31.00	3548	0	0.95	1.00	-35250	98	3.58	OK	2.51	OK	-113.67	-153.46	31657	2.10	OK	-55441	0.53	OK
0.00	270	56.92	257	7.60	60	89.54	87.19	31.09	3553	0	0.95	1.00	-47044	99	3.82	OK	2.40	OK	-130.15	-115.95	27846	2.19	OK	-62858	0.62	OK
0.00	270	56.92	257	7.60	60	89.54	87.19	31.09	3553	0	0.95	1.00	-47044	99	3.61	OK	2.64	OK	-129.66	-115.55	27787	2.19	OK	-62709	0.63	OK
0.00	270	56.92	258	7.60	60	89.71	75.61	24.29	3559	0	0.95	1.00	-68859	100	3.82	OK	2.95	OK	-148.32	-66.59	24650	2.19	OK	-73817	0.78	OK
0.00	270	56.92	258	7.60	60	89.71	75.61	24.29	3559	0	0.95	1.00	-68859	100	3.83	OK	2.94	OK	-148.33	-66.63	24658	2.19	OK	-73821	0.78	OK
0.00	270	82.62	253	7.60	60	87.97	104.70	33.13	5022	0	0.95	1.00	-98576	101	5.23	OK	3.49	OK	-165.44	-28.41	23063	2.89	OK	-86724	0.95	OK
0.00	270	82.62	253	7.60	60	87.97	104.70	33.13	5022	0	0.95	1.00	-98576	101	5.25	OK	3.48	OK	-165.44	-28.47	23075	2.88	OK	-86724	0.95	OK

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	5.00	ksi	f_{pu} =	270.00	ksi	f_{pu} =	60.00	ksi
β_1 =	0.800		f_{pe} =	65%		f_{pe} =	0%	
ϕ_{bonded} =	0.95		A_{strand} =	0.153	in^2	A_{bar} =	0.200	in^2
$\phi_{unbonded}$ =	0.90		k* =	0.280	Low-lax	k* =	0.000	

Negative Bending Capacity															RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps}	As^*_{top} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	Section No.	POSITIVE		NEGATIVE				POSITIVE			NEGATIVE		
															RF	Status	RF	Status	f_{cpe} (top)	f_{cpe} (bot)	Mcr (+)	ϕ Mn (+) / 1.2Mcr	Status	Mcr (-)	ϕ Mn (-) / 1.2Mcr	Status
(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)						(ksf)	(ksf)						
0.00	270	82.62	253	7.60	60	88.91	93.35	27.64	5035	0	0.95	1.00	-131503	102	5.38	OK	3.88	OK	-231.62	-18.56	23841	2.32	OK	-117483	0.93	OK
0.00	270	82.62	253	7.60	60	88.91	93.35	27.64	5035	0	0.95	1.00	-131503	102	5.42	OK	3.86	OK	-231.60	-18.58	23845	2.32	OK	-117472	0.93	OK
0.00	270	82.62	254	7.60	60	90.14	82.00	23.01	5047	0	0.95	1.00	-171292	103	4.56	OK	4.81	OK	-266.27	35.08	21748	1.69	OK	-138930	1.03	OK
0.00	270	82.62	254	7.60	60	90.14	82.00	23.01	5047	0	0.95	1.00	-171292	103	4.59	OK	4.80	OK	-266.23	35.08	21748	1.69	OK	-138913	1.03	OK
0.00	270	82.62	255	7.60	60	91.68	71.03	19.36	5059	0	0.95	1.00	-201241	104	4.82	OK	4.57	OK	-285.96	58.82	24394	1.06	OK	-155987	1.08	OK
0.00	270	82.62	255	7.60	60	91.68	71.03	19.36	5059	0	0.95	1.00	-201241	104	4.82	OK	4.58	OK	-285.87	58.82	24394	1.06	OK	-155950	1.08	OK
0.00	270	82.62	255	7.60	60	93.36	59.67	16.41	5071	0	0.95	1.00	-225618	105	5.29	OK	3.96	OK	-294.49	69.26	27268	0.72	OK	-169480	1.11	OK
0.00	270	82.62	255	7.60	60	93.36	59.67	16.41	5071	0	0.95	1.00	-225618	105	5.52	OK	3.79	OK	-294.62	68.96	27268	0.72	OK	-169539	1.11	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-241350	106	13.85	OK	4.31	OK	-297.19	73.45	28897	0.58	OK	-180219	1.12	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-241350	106	13.85	OK	4.33	OK	-297.30	73.30	28897	0.58	OK	-180275	1.12	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-241709	107	14.31	OK	4.00	OK	-298.31	73.53	28897	0.57	OK	-180760	1.11	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-241709	107	13.93	OK	3.92	OK	-292.98	64.43	28897	0.57	OK	-178196	1.13	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-239042	108	13.94	OK	4.20	OK	-292.56	65.82	28897	0.65	OK	-177995	1.12	OK
0.00	270	82.62	256	7.60	60	97.15	60.08	16.51	5082	0	0.95	1.00	-239042	108	13.93	OK	4.19	OK	-292.64	65.88	28897	0.65	OK	-178029	1.12	OK
0.00	270	82.62	255	7.60	60	93.36	59.67	16.41	5071	0	0.95	1.00	-222267	109	12.90	OK	2.63	OK	-292.72	64.86	27268	0.82	OK	-168673	1.10	OK
0.00	270	82.62	255	7.60	60	93.36	59.67	16.41	5071	0	0.95	1.00	-222267	109	12.97	OK	2.61	OK	-292.90	64.93	27268	0.82	OK	-168752	1.10	OK
0.00	270	82.62	255	7.60	60	91.68	71.03	19.36	5059	0	0.95	1.00	-201857	110	11.45	OK	3.17	OK	-289.54	58.32	24394	1.04	OK	-157527	1.07	OK
0.00	270	82.62	255	7.60	60	91.68	71.03	19.36	5059	0	0.95	1.00	-201857	110	11.55	OK	3.15	OK	-289.66	58.39	24394	1.04	OK	-157576	1.07	OK
0.00	270	82.62	254	7.60	60	90.14	82.00	23.01	5047	0	0.95	1.00	-176383	111	9.06	OK	3.72	OK	-274.55	39.43	21748	1.49	OK	-142279	1.03	OK
0.00	270	82.62	254	7.60	60	90.14	82.00	23.01	5047	0	0.95	1.00	-176383	111	9.10	OK	3.73	OK	-274.69	39.50	21748	1.49	OK	-142337	1.03	OK
0.00	270	82.62	253	7.60	60	88.91	93.35	27.64	5035	0	0.95	1.00	-137955	112	10.13	OK	3.00	OK	-241.40	-14.98	22949	2.17	OK	-121202	0.95	OK
0.00	270	82.62	253	7.60	60	88.91	93.35	27.64	5035	0	0.95	1.00	-137955	112	10.19	OK	3.01	OK	-241.50	-14.92	22935	2.17	OK	-121240	0.95	OK
0.00	270	54.16	259	7.60	60	87.97	46.92	12.85	3405	0	0.95	1.00	-100118	113	7.05	OK	2.48	OK	-166.41	-8.67	18755	2.07	OK	-87069	0.96	OK
0.00	270	54.16	259	7.60	60	87.97	46.92	12.85	3405	0	0.95	1.00	-100118	113	7.15	OK	2.46	OK	-165.11	-7.80	18566	2.09	OK	-86606	0.96	OK
0.00	270	54.16	258	7.60	60	87.22	58.13	16.69	3400	0	0.95	1.00	-83641	114	6.06	OK	2.57	OK	-153.55	-34.04	21154	2.08	OK	-77335	0.90	OK
0.00	270	54.16	258	7.60	60	87.22	58.13	16.69	3400	0	0.95	1.00	-83641	114	6.12	OK	2.55	OK	-153.60	-33.91	21130	2.08	OK	-77355	0.90	OK
0.00	270	54.16	258	7.60	60	86.88	69.73	21.95	3394	0	0.95	1.00	-66779	115	5.10	OK	2.57	OK	-141.39	-64.83	23154	2.10	OK	-68426	0.81	OK
0.00	270	54.16	258	7.60	60	86.88	69.73	21.95	3394	0	0.95	1.00	-66779	115	5.16	OK	2.56	OK	-141.47	-64.67	23128	2.10	OK	-68449	0.81	OK
0.00	270	54.16	258	7.60	60	86.88	81.34	28.51	3389	0	0.95	1.00	-49616	116	4.33	OK	2.47	OK	-128.49	-101.35	24507	2.15	OK	-59743	0.69	OK
0.00	270	54.16	258	7.60	60	86.88	81.34	28.51	3389	0	0.95	1.00	-49616	116	4.57	OK	2.32	OK	-128.79	-101.36	24509	2.15	OK	-59831	0.69	OK
0.00	270	54.16	257	7.60	60	84.49	81.16	28.44	3385	0	0.95	1.00	-40467	117	3.93	OK	2.53	OK	-117.52	-130.38	27227	2.08	OK	-54355	0.62	OK
0.00	270	54.16	257	7.60	60	84.49	81.16	28.44	3385	0	0.95	1.00	-40467	117	3.98	OK	2.51	OK	-117.60	-130.23	27208	2.08	OK	-54380	0.62	OK
0.00	270	54.16	257	7.60	60	82.28	81.00	28.37	3380	0	0.95	1.00	-32340	118	3.44	OK	2.71	OK	-106.95	-157.90	29546	2.04	OK	-49508	0.54	OK
0.00	270	54.16	257	7.60	60	82.28	81.00	28.37	3380	0	0.95	1.00	-32340	118	3.49	OK	3.01	OK	-107.04	-157.75	29528	2.04	OK	-49531	0.54	OK
0.00	270	54.16	256	7.60	60	80.35	80.85	28.30	3376	0	0.95	1.00	-25299	119	3.03	OK	3.22	OK	-97.21	-183.53	31537	2.01	OK	-45331	0.47	OK
0.00	270	54.16	256	7.60	60	80.35	80.85	28.30	3376	0	0.95	1.00	-25299	119	3.07	OK	3.19	OK	-97.30	-183.43	31525	2.01	OK	-45354	0.46	OK
0.00	270	54.16	256	7.60	60	78.69	80.71	28.24	3372	0	0.95	1.00	-19360	120	2.71	OK	3.37	OK	-88.66	-206.48	33186	1.99	OK	-41847	0.39	OK
0.00	270	54.16	256	7.60	60	78.69	80.71	28.24	3372	0	0.95	1.00	-19360	120	2.74	OK	3.34	OK	-88.73	-206.34	33169	1.99	OK	-41865	0.39	OK
0.00	270	54.16	256	7.60	60	77.27	80.59	28.19	3368	0	0.95	1.00	-14446	121	2.46	OK	3.52	OK	-81.43	-226.22	34478	1.97	OK	-38997	0.31	OK
0.00	270	54.16	256	7.60	60	77.27	80.59	28.19	3368	0	0.95	1.00	-14446	121	2.49	OK	3.48	OK	-81.52	-226.09	34463	1.97	OK	-39018	0.31	OK
0.00	270	54.16	256	7.60	60	76.10	80.48	28.14	3365	0	0.95	1.00	-10547	122	2.27	OK	3.67	OK	-75.79	-242.21	35415	1.96	OK	-36792	0.24	OK
0.00	270	54.16	256	7.60	60	76.10	80.48	28.14	3365	0	0.95	1.00	-10547	122	2.30	OK	3.61	OK	-75.87	-242.08	35401	1.96	OK	-36813	0.24	OK
0.00	270	54.16	255	7.60	60	75.20	80.40	28.11	3363	0	0.95	1.00	-7727	123	2.14	OK	3.84	OK	-72.03	-253.63	35996	1.96	OK	-35286	0.18	OK
0.00	270	54.16	255	7.60	60	75.20	80.40	28.11	3363	0	0.95	1.00	-7727	123	2.17	OK	3.76	OK	-72.10	-253.50	35982	1.96	OK	-35303	0.18	OK
0.00	270	54.16	255	7.60	60	74.55	80.34	28.08	3361	0	0.95	1.00	-5912	124	2.04	OK	3.98	OK	-70.26	-260.28	36215	1.97	OK	-34434	0.14	OK
0.00	270	54.16	255	7.60	60	74.55	80.34	28.08	3361	0	0.95	1.00	-5912	124	2.07	OK	3.90	OK	-70.33	-260.14	36199	1.97	OK	-34451	0.14	OK
0.00	270	54.16	255	7.60	60	74.14	80.30	28.06	3360	0	0.95	1.00	-5100	125	2.00	OK	3.95	OK	-70.59	-261.89	36072	1.98	OK	-34241	0.12	OK
0.00	270	54.16	255	7.60	60	74.14	80.30	28.06	3360	0	0.95	1.00	-5100	125	2.01	OK	3.90	OK	-70.65	-261.81	36063	1.98	OK	-34254	0.12	OK
0.00	270	54.16	255	7.60	60	74.01	80.29	28.06	3360	0	0.95	1.00	-5017	126	1.98	OK	3.90	OK	-71.37	-261.20	35904	1.98	OK	-34339	0.12	OK
0.00	270	54.16	255	7.60	60	74.01	80.29	28.06	3360	0	0.95	1.00	-5017	126	2.02	OK	3.81	OK	-71.40	-261.06	35889	1.98	OK	-34346	0.12	OK
0.00	270	54.16	255	7.60	60	74.55	80.34	28.08	3361	0	0.95	1.00	-6623	127	1.98	OK	3.89	OK	-76.00	-252.09	35336	2.00	OK	-35775	0.15	OK
0.00	270	54.16	255	7.60	60	74.55	80.34	28.08	3361	0	0.95	1.00	-6623	127	2.01	OK	3.81	OK	-76.06	-251.88	35314	2.00	OK	-35789	0.15	OK
0.00	270	54.16	255	7.60	60	75.20	80.40	28.11	3363	0	0.95	1.00	-9025	128	2.00	OK	3.88	OK	-82.50	-238.61	34362	2.02	OK	-37760	0.20	OK
0.00	270	54.16	255	7.60	60	75.20	80.40	28.11	3363	0	0.95	1.00	-9025	128	2.03	OK	3.80	OK	-82.53	-238.41	34340	2.02	OK	-37766	0.20	OK
0.00	270	54.16	256	7.60	60	76.10	80.48	28.14	3365	0	0.95	1.00	-12436	129	2.06	OK	3.86	OK	-90.94	-220.39	32997	2.06	OK	-40434	0.26	OK
0.00	270	54.16	256	7.60	60	76.10	80.48	28.14	3365	0	0.95	1.00	-12436	129	2.09	OK	3.79	OK	-90.98	-220.19	32974	2.06	OK	-40444	0.26	OK
0.00	270	54.16	256	7.60	60	77.27	80.59	28.19	3368	0	0.95	1.00	-16927	130	2.15	OK	3.85	OK	-101.20	-197.73	31240	2.11	OK	-43855	0.32	OK
0.00	270	54.16	256	7.60	60	77.27	80.59	28.19	3368	0	0.95	1.00	-16927	130	2.17	OK	3.79	OK	-101.23	-197.54	31219	2.11	OK	-43862	0.32	OK
0.00	270	54.16	256	7.60	60	78.69	80.71	28.24	3372	0	0.95	1.00	-22437	131	2.27	OK	3.85	OK	-113.00	-171.39	29082	2.18	OK	-47984	0.39	OK
0.00	270	54.16	256	7.60	60	78.69	80.71	28.24	3372	0	0.95	1.00	-22437	131	2.30	OK	3.34	OK	-113.03	-171.23	29063	2.18	OK	-47991	0.39	OK
0.00	270	54.16	256	7.60	60	80.35	80.85	28.30	3376	0	0.95	1.00	-28972	132	2.43	OK	3.33	OK	-126.09	-141.98	26514	2.27	OK	-52832	0.46	OK
0.00	270	54.16	256	7.60	60	80.35	80.85	28.30	3376	0	0.95	1.00	-28972	132	2.99	OK	2.59	OK	-126.10	-141.84	26496	2.27	OK	-52836	0.46	OK
0.00	270	54.16	257	7.60	60	82.28	81.00	28.37	3380	0	0.95	1.00	-36611	133	3.26	OK	2.44	OK	-140.27	-110.00	23529	2.41	OK	-58463	0.52	OK
0.00	270	54.16	257	7.60	60	82.28	81.00	28.37	3380	0	0.95	1.00	-36611	133	3.28	OK	2.43	OK	-140.27	-109.87	23513	2.41	OK	-58463	0.52	OK
0.00	270	54.16	257	7.60	60	84.49	81.16	28.44	3385	0	0.95	1.00	-45301	134	3.59	OK	2.27	OK	-155.22	-76.29	20136	2.61	OK	-64875	0.58	OK
0.00	270	54.16	257	7.60	60	84.49	81.16	28.44	3385	0	0.95	1.00	-45301	134	3.45	OK	2.45	OK	-154.93	-75.93	20088	2.62	OK	-64795	0.58	OK
0.00	270	54.16	258	7.60	60	84.61	71.12	22.68	3389	0	0.95	1.00	-61739	135	3.79	OK	2.64	OK	-171.46	-36.20	17360	2.76	OK	-74314	0.69	OK

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	5.00	ksi	f_{pu} =	270.00	ksi	f_{pu} =	60.00	ksi
β_1 =	0.800		f_{pe} =	65%		f_{pe} =	0%	
ϕ_{bonded} =	0.95		A_{strand} =	0.153	in^2	A_{bar} =	0.200	in^2
$\phi_{unbonded}$ =	0.90		k* =	0.280	Low-lax	k* =	0.000	

Negative Bending Capacity														RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps} Top	As^*_{top} Draped/External	f_{ps} Draped/External	$As^*_{mild\ steel}$ Mild Steel	fy Mild Steel	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	POSITIVE		NEGATIVE		f_{cpe} (top)	f_{cpe} (bot)	POSITIVE			NEGATIVE			Section No.
(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)	RF	Status	RF	Status	(ksf)	(ksf)	Mcr (+)	ϕ Mn (-) / 1.2Mcr	Status	Mcr (-)	ϕ Mn (-) / 1.2Mcr	Status	
0.00	270	54.16	258	7.60	60	84.61	71.12	22.68	3389	0	0.95	1.00	-61739	3.82	OK	2.63	OK	-171.49	-36.17	17355	2.76	OK	-74323	0.69	OK	135
0.00	270	54.16	258	7.60	60	85.08	61.09	17.92	3394	0	0.95	1.00	-78164	4.18	OK	2.70	OK	-187.19	-3.02	14148	3.02	OK	-84264	0.77	OK	136
0.00	270	54.16	258	7.60	60	85.08	61.09	17.92	3394	0	0.95	1.00	-78164	4.21	OK	2.70	OK	-187.21	-3.01	14146	3.02	OK	-84273	0.77	OK	136
0.00	270	54.16	258	7.60	60	85.82	51.06	14.13	3400	0	0.95	1.00	-94569	4.61	OK	2.69	OK	-202.18	25.11	15519	2.39	OK	-94689	0.83	OK	137
0.00	270	54.16	258	7.60	60	85.82	51.06	14.13	3400	0	0.95	1.00	-94569	4.64	OK	2.69	OK	-202.19	25.14	15519	2.39	OK	-94694	0.83	OK	137
0.00	270	79.87	253	7.60	60	86.79	92.94	27.94	4869	0	0.95	1.00	-127802	6.07	OK	3.32	OK	-271.48	22.00	17602	2.58	OK	-125586	0.85	OK	138
0.00	270	79.87	253	7.60	60	86.79	92.94	27.94	4869	0	0.95	1.00	-127802	6.13	OK	3.30	OK	-271.45	22.06	17602	2.58	OK	-125575	0.85	OK	138
0.00	270	79.87	254	7.60	60	88.07	83.14	23.72	4881	0	0.95	1.00	-163024	5.20	OK	4.24	OK	-306.58	75.14	19778	1.47	OK	-146660	0.93	OK	139
0.00	270	79.87	254	7.60	60	88.07	83.14	23.72	4881	0	0.95	1.00	-163024	5.26	OK	4.21	OK	-306.50	75.20	19778	1.47	OK	-146633	0.93	OK	139
0.00	270	79.87	255	7.60	60	89.61	73.33	20.17	4892	0	0.95	1.00	-187584	6.12	OK	3.66	OK	-324.62	93.86	22119	0.98	OK	-162922	0.96	OK	140
0.00	270	79.87	255	7.60	60	89.61	73.33	20.17	4892	0	0.95	1.00	-187584	6.13	OK	3.68	OK	-324.52	93.90	22119	0.98	OK	-162882	0.96	OK	140
0.00	270	79.87	255	7.60	60	91.29	63.12	17.18	4903	0	0.95	1.00	-207520	6.75	OK	3.04	OK	-329.85	100.04	24673	0.73	OK	-175093	0.99	OK	141
0.00	270	79.87	255	7.60	60	91.29	63.12	17.18	4903	0	0.95	1.00	-207520	6.98	OK	2.91	OK	-329.93	99.85	24673	0.73	OK	-175130	0.99	OK	141
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220643	23.52	OK	3.46	OK	-331.65	103.09	26116	0.63	OK	-185420	0.99	OK	142
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220643	24.44	OK	3.59	OK	-331.76	102.96	26116	0.63	OK	-185472	0.99	OK	142
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220774	24.82	OK	3.30	OK	-333.12	103.67	26116	0.63	OK	-186086	0.99	OK	143
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220774	25.25	OK	3.37	OK	-333.12	103.67	26116	0.63	OK	-186086	0.99	OK	143
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220651	24.24	OK	3.67	OK	-332.02	102.72	26116	0.63	OK	-185590	0.99	OK	144
0.00	270	79.87	256	7.60	60	94.90	63.52	17.28	4914	0	0.95	1.00	-220651	24.33	OK	3.50	OK	-331.86	102.87	26116	0.63	OK	-185518	0.99	OK	144
0.00	270	79.87	255	7.60	60	91.29	63.12	17.18	4903	0	0.95	1.00	-206736	23.59	OK	2.08	OK	-329.80	97.23	24673	0.76	OK	-175074	0.98	NG	145
0.00	270	79.87	255	7.60	60	91.29	63.12	17.18	4903	0	0.95	1.00	-206736	22.88	OK	2.18	OK	-329.70	97.47	24673	0.76	OK	-175031	0.98	OK	145
0.00	270	79.87	255	7.60	60	89.67	73.72	20.30	4892	0	0.95	1.00	-184852	17.22	OK	2.67	OK	-322.11	85.74	22073	1.08	OK	-161859	0.95	OK	146
0.00	270	79.87	255	7.60	60	89.67	73.72	20.30	4892	0	0.95	1.00	-184852	17.46	OK	2.65	OK	-322.19	85.69	22073	1.08	OK	-161888	0.95	OK	146
0.00	270	79.87	254	7.60	60	88.14	83.53	23.88	4881	0	0.95	1.00	-157813	13.02	OK	3.06	OK	-300.74	58.12	19733	1.69	OK	-144380	0.91	OK	147
0.00	270	79.87	254	7.60	60	88.14	83.53	23.88	4881	0	0.95	1.00	-157813	13.09	OK	3.06	OK	-300.77	58.05	19733	1.69	OK	-144391	0.91	OK	147
0.00	270	79.87	253	7.60	60	86.86	93.34	28.12	4869	0	0.95	1.00	-120237	12.92	OK	2.33	OK	-261.00	-5.05	18705	2.76	OK	-121755	0.82	OK	148
0.00	270	79.87	253	7.60	60	86.86	93.34	28.12	4869	0	0.95	1.00	-120237	12.98	OK	2.33	OK	-261.03	-5.14	18724	2.76	OK	-121766	0.82	OK	148
0.00	270	51.41	259	7.60	60	85.82	45.33	12.45	3239	0	0.95	1.00	-83695	8.14	OK	1.87	OK	-180.22	-8.11	17147	2.49	OK	-87248	0.80	OK	149
0.00	270	51.41	259	7.60	60	85.82	45.33	12.45	3239	0	0.95	1.00	-83695	8.19	OK	1.86	OK	-177.87	-6.00	16725	2.55	OK	-86453	0.81	OK	149
0.00	270	51.41	259	7.60	60	85.08	55.38	15.93	3235	0	0.95	1.00	-67105	6.48	OK	1.91	OK	-159.18	-44.32	21424	2.29	OK	-75340	0.74	OK	150
0.00	270	51.41	259	7.60	60	85.08	55.38	15.93	3235	0	0.95	1.00	-67105	6.53	OK	1.90	OK	-159.16	-44.34	21427	2.29	OK	-75335	0.74	OK	150
0.00	270	51.41	258	7.60	60	84.61	65.43	20.44	3230	0	0.95	1.00	-50548	5.27	OK	1.88	OK	-139.19	-89.80	25559	2.15	OK	-64673	0.65	OK	151
0.00	270	51.41	258	7.60	60	84.61	65.43	20.44	3230	0	0.95	1.00	-50548	5.31	OK	1.87	OK	-139.16	-89.84	25565	2.15	OK	-64665	0.65	OK	151
0.00	270	51.41	258	7.60	60	84.49	75.49	25.98	3226	0	0.95	1.00	-34114	4.36	OK	1.78	OK	-117.89	-144.35	29059	2.08	OK	-54460	0.52	OK	152
0.00	270	51.41	258	7.60	60	84.49	75.49	25.98	3226	0	0.95	1.00	-34114	4.61	OK	1.63	OK	-118.21	-144.79	29117	2.07	OK	-54548	0.52	OK	152
0.00	270	51.41	257	7.60	60	82.28	75.35	25.92	3222	0	0.95	1.00	-24865	3.86	OK	1.80	OK	-99.55	-188.09	33340	1.95	OK	-47519	0.44	OK	153
0.00	270	51.41	257	7.60	60	82.28	75.35	25.92	3222	0	0.95	1.00	-24865	3.90	OK	2.01	OK	-99.55	-188.28	33363	1.95	OK	-47519	0.44	OK	153
0.00	270	51.41	257	7.60	60	80.35	75.21	25.86	3218	0	0.95	1.00	-16756	3.32	OK	2.23	OK	-81.66	-229.94	37149	1.86	OK	-41291	0.34	OK	154
0.00	270	51.41	257	7.60	60	80.35	75.21	25.86	3218	0	0.95	1.00	-16756	3.36	OK	2.21	OK	-81.65	-230.18	37179	1.86	OK	-41287	0.34	OK	154
0.00	270	51.41	257	7.60	60	78.69	75.08	25.81	3214	0	0.95	1.00	-9759	2.90	OK	2.45	OK	-64.86	-269.47	40552	1.79	OK	-35844	0.23	OK	155
0.00	270	51.41	257	7.60	60	78.69	75.08	25.81	3214	0	0.95	1.00	-9759	2.93	OK	2.42	OK	-64.83	-269.78	40589	1.79	OK	-35837	0.23	OK	155
0.00	270	51.41	257	7.60	60	77.27	74.97	25.76	3211	0	0.95	1.00	-3769	2.57	OK	2.69	OK	-49.26	-306.35	43579	1.74	OK	-31093	0.10	OK	156
0.00	270	51.41	257	7.60	60	77.27	74.97	25.76	3211	0	0.95	1.00	-3769	2.60	OK	2.65	OK	-49.22	-306.69	43619	1.74	OK	-31082	0.10	OK	156
0.00	270	51.41	256	7.60	60	76.10	74.88	25.72	3209	0	0.95	1.00	1169	2.33	OK	2.94	OK	-35.32	-339.68	46220	1.69	OK	-27066	-0.04	OK	157
0.00	270	51.41	256	7.60	60	76.10	74.88	25.72	3209	0	0.95	1.00	1169	2.36	OK	2.88	OK	-35.28	-340.01	46257	1.69	OK	-27056	-0.04	OK	157
0.00	270	51.41	256	7.60	60	75.20	74.81	25.69	3207	0	0.95	1.00	4892	2.14	OK	3.17	OK	-23.75	-367.99	48437	1.66	OK	-23875	-0.17	OK	158
0.00	270	51.41	256	7.60	60	75.20	74.81	25.69	3207	0	0.95	1.00	4892	2.17	OK	3.11	OK	-23.69	-368.34	48474	1.65	OK	-23861	-0.17	OK	158
0.00	270	51.41	256	7.60	60	74.55	74.75	25.67	3205	0	0.95	1.00	7428	1.98	OK	3.48	OK	-14.83	-390.48	50184	1.62	OK	-21498	-0.29	OK	159
0.00	270	51.41	256	7.60	60	74.55	74.75	25.67	3205	0	0.95	1.00	7428	2.01	OK	3.40	OK	-14.77	-390.80	50218	1.62	OK	-21485	-0.29	OK	159
0.00	270	51.41	256	7.60	60	74.14	74.72	25.65	3204	0	0.95	1.00	8990	1.86	OK	3.87	OK	-8.27	-407.33	51540	1.60	OK	-19809	-0.38	OK	160
0.00	270	51.41	256	7.60	60	74.14	74.72	25.65	3204	0	0.95	1.00	8990	1.88	OK	3.79	OK	-8.21	-407.52	51560	1.59	OK	-19796	-0.38	OK	160
0.00	270	51.41	256	7.60	60	74.14	74.72	25.65	3204	0	0.95	1.00	9267	1.82	OK	4.03	OK	-6.34	-412.21	52059	1.58	OK	-19362	-0.40	OK	161
0.00	270	51.41	256	7.60	60	74.14	74.72	25.65	3204	0	0.95	1.00	9267	1.85	OK	3.95	OK	-6.29	-412.34	52073	1.58	OK	-19352	-0.40	OK	161
0.00	270	51.41	256	7.60	60	74.55	74.75	25.67	3205	0	0.95	1.00	8913	1.72	OK	4.68	OK	-4.33	-417.46	53077	1.56	OK	-19048	-0.39	OK	162
0.00	270	51.41	256	7.60	60	74.55	74.75	25.67	3205	0	0.95	1.00	8913	1.74	OK	4.59	OK	-4.25	-417.57	53090	1.56	OK	-19028	-0.39	OK	162
0.00	270	51.41	256	7.60	60	75.20	74.81	25.69	3207	0	0.95	1.00	7316	1.69	OK	5.36	OK	-5.96	-411.91	53214	1.55	OK	-19672	-0.31	OK	163
0.00	270	51.41	256	7.60	60	75.20	74.81	25.69	3207	0	0.95	1.00	7316	1.70	OK	5.26	OK	-5.90	-412.00	53224	1.55	OK	-19658	-0.31	OK	163
0.00	270	51.41	256	7.60	60	76.10	74.88	25.72	3209	0	0.95	1.00	4673	1.74	OK	6.07	OK	-10.24	-400.19	52927	1.54	OK	-21036	-0.19	OK	164
0.00	270	51.41	256	7.60	60	76.10	74.88	25.72	3209	0	0.95	1.00	4673	1.75	OK	5.95	OK	-10.20	-400.25	52934	1.54	OK	-21026	-0.19	OK	164
0.00	270	51.41	257	7.60	60	77.27	74.97	25.76	3211	0	0.95	1.00	900	1.78	OK	7.16	OK	-17.16	-382.35	52213	1.53	OK	-23206	-0.03	OK	165
0.00	270	51.41	257	7.60	60	77.27	74.97	25.76	3211	0	0.95	1.00	900	1.80	OK	6.98	OK	-17.09	-382.38	52216	1.53	OK	-23188	-0.03	OK	165
0.00	270	51.41	257	7.60	60	78.69	75.08	25.81	3214	0	0.95	1.00	-3947	1.93	OK	8.12	OK	-26.34	-359.22	51049	1.52	OK	-26130	0.13	OK	166
0.00	270	51.41	257	7.60	60	78.69	75.08	25.81	3214	0	0.95	1.00	-3947	1.93	OK	8.00	OK	-26.27	-359.24	51051	1.52	OK	-26112	0.13	OK	166
0.00	270	51.41	257	7.60	60	80.35	75.21	25.86	3218	0	0.95	1.00	-9867	2.09	OK	9.37	OK	-37.47	-331.50	49431	1.52	OK	-29810	0.28	OK	167
0.00	270	51.41	257	7.60	60	80.35	75.21	25.86	3218	0	0.95	1.00	-9867	2.08	OK	9.24	OK	-37.38	-331.52	49432	1.52	OK	-29788	0.28	OK	167
0.00	270	51.41	257	7.60	60	82.28	75.35	25.92	3222	0	0.95	1.00	-16929	2.29	OK	11.04	OK	-50.36	-299.69	47361	1.52	OK	-34300	0.41	OK	168
0.00	270	51.41	257	7.60	60	82.28	75.35	25.92	3222	0	0.95	1.00	-16929	2.28	OK	10.89	OK	-50.26	-299.71	47362	1.52	OK	-34273	0.41	OK	168

URS CORPORATION

JOB: **Cline Avenue Mainline Seg 1 Girder 1** COMPUTED BY: TSP DATE: 12/4/08

DESCRP: **Ultimate Flexural Strength** CHECKED BY: DATE:

FILENAME: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Segment1\Rating Gdr 1\[Flexural Strength.xls]Mn (t=00)

Ultimate Moment Capacity (T=00)

Material Properties:

Concrete			*P-T Strands*			*P-T Bars*		
f'_c =	*5.00*	ksi	f_{pu} =	*270.00*	ksi	f_{pu} =	*60.00*	ksi
β_1 =	*0.800*		f_{pe} =	*65%*		f_{pe} =	*0%*	
ϕ_{bonded} =	*0.95*		A_{strand} =	*0.153*	in^2	A_{bar} =	*0.200*	in^2
$\phi_{unbonded}$ =	*0.90*		k* =	*0.280*	Low-lax	k* =	*0.000*	

Negative Bending Capacity														RATING FLEXURAL RESISTANCE, RF				LIMITS FOR MINIMUM REINFORCEMENT							
As^*_{top} Top	f_{ps}	As^*_{top} Draped/External	f_{ps}	$As^*_{mild\ steel}$ Mild Steel	fy	Section Centroid	y_{na}	y_{cg}	Area Concrete	Equilibrium	ϕ	ϕ_w	ϕM_n (-)	POSITIVE		NEGATIVE				POSITIVE			NEGATIVE			Section No.
(in^2)	(ksi)	(in^2)	(ksi)	(in^2)	(ksi)	(in)	(in)	(in)	(in^2)				(kip-ft)	RF	Status	RF	Status	f_{cpe} (top) (ksf)	f_{cpe} (bot) (ksf)	Mcr (+)	ϕMn (+) / 1.2Mcr	Status	Mcr (-)	ϕMn (-) / 1.2Mcr	Status	
0.00	270	51.41	258	7.60	60	84.49	75.49	25.98	3226	0	0.95	1.00	-25065	2.59	OK	13.37	OK	-64.48	-264.87	44862	1.52	OK	-39557	0.53	OK	169
0.00	270	51.41	258	7.60	60	84.49	75.49	25.98	3226	0	0.95	1.00	-25065	2.46	OK	13.73	OK	-64.22	-264.79	44850	1.52	OK	-39484	0.53	OK	169
0.00	270	51.41	258	7.60	60	86.52	74.08	25.12	3230	0	0.95	1.00	-36481	2.81	OK	18.15	OK	-81.84	-212.34	40450	1.55	OK	-46425	0.65	OK	170
0.00	270	51.41	258	7.60	60	86.52	74.08	25.12	3230	0	0.95	1.00	-36481	2.79	OK	17.98	OK	-81.73	-212.40	40458	1.55	OK	-46396	0.66	OK	170
0.00	270	51.41	259	7.60	60	87.31	65.99	20.70	3235	0	0.95	1.00	-51298	3.43	OK	26.12	OK	-98.93	-165.20	38761	1.50	OK	-54880	0.78	OK	171
0.00	270	51.41	259	7.60	60	87.31	65.99	20.70	3235	0	0.95	1.00	-51298	3.40	OK	26.00	OK	-98.81	-165.27	38773	1.50	OK	-54844	0.78	OK	171
0.00	270	51.41	259	7.60	60	88.02	56.33	16.30	3239	0	0.95	1.00	-67010	4.39	OK	41.54	OK	-115.70	-122.31	36705	1.45	OK	-64196	0.87	OK	172
0.00	270	51.41	259	7.60	60	88.02	56.33	16.30	3239	0	0.95	1.00	-67010	4.73	OK	39.16	OK	-115.59	-122.37	36716	1.45	OK	-64158	0.87	OK	172
0.00	270	51.41	259	7.60	60	89.67	49.82	13.87	3244	0	0.95	1.00	-82352	67.00	OK	60.41	OK	-131.72	-84.61	33130	1.43	OK	-73730	0.93	OK	173
														1.52		1.63										