STORM_10-5_13-14
HYDRAULIC GRADE LINE ANALYSIS

PROJECT: Dominion Access Road

DESIGNED BY: IJH

Checked: KPO

INCIDENCE PROBABILITY **10** **Year**

INLET OR JUNCTION	INLET STATION	OUTLET WATER SURFACE ELEV.	DIA. PIPE Do (In)	DESIGN DISCH. Qo (CFS)	LENGTH PIPE Lo (Ft)	FRICTION SLOPE, Sfo (FT/FT)	FRICTION LOSS Hf (Ft)	JUNCTION LOSS Vo	Ho (Ft)	Qi	Vi	QiVi	Vi*2/2g	Hi	Angle	HΔ	Ht	1.3 Ht	0.5 Ht	FINAL H (Ft)	Inlet Water Surface Elevation	Rim Elev	Comments
11-2	5+44.37	150.04	24	6.827	150	0.09%	0.137	4.751	0.088	3.768	7.647	28.811	0.908	0.318	90	0.636	1.041	0	TRUE	0.657	150.697	156.93	OK -6.233
10-14A	4+75.37	150.697	18	5.323	69	0.26%	0.177	4.428	0.076	5.358	3.708	19.865	0.213	0.075	0	0	0.151	0	FALSE	0.328	151.025	156.723	OK -5.698
10-14	3+44.37	152.557	18	5.358	131	0.26%	0.341	3.708	0.053	3.748	5.072	19.013	0.399	0.14	90	0.28	0.473	0	TRUE	0.577	153.134	156.33	OK -3.196
10-9	2+94.37	153.134	18	3.417	50	0.11%	0.053	3.402	0.045	2.863	3.224	9.231	0.161	0.056	90	0.167	0.269	0	TRUE	0.187	153.321	156.18	OK -2.859
10-7	1+71.67	153.321	15	2.863	122.68	0.20%	0.241	3.224	0.04	2.058	2.998	6.172	0.14	0.049	5.788	0.008	0.098	0.127	TRUE	0.304	153.626	155.569	OK -1.943
10-6	1+48.34	153.626	15	2.058	23.325	0.10%	0.024	2.998	0.035	1.717	2.867	4.924	0.128	0.045	3.411	0	0.08	0	TRUE	0.063	153.689	155.569	OK -1.88
10-5	1+25.00	153.689	15	1.717	23.336	0.07%	0.016	2.867	0.032	0	0	0	0	0	0	0	0.032	0.041	FALSE	0.058	153.747	155.654	OK -1.907
11-1	5+44.37	152.81	15	3.768	56	0.34%	0.19	7.647	0.227	3.2	3.272	10.471	0.166	0.058	54.591	0.083	0.368	0	TRUE	0.375	153.185	157.07	OK -3.885
Str. 3-2	4+78.18	154.28	15	3.2	81.218	0.25%	0.199	3.272	0.042	1.56	2.798	4.367	0.122	0.043	35.526	0.052	0.136	0.177	TRUE	0.288	154.568	156.77	OK -2.202
Str. 3-1	11+96.24	154.62	15	1.56	34.025	0.06%	0.02	2.798	0.03	0	0	0	0	0	0	0	0.03	0.04	TRUE	0.04	154.66	156.77	OK -2.11
10-13	3+44.37	153.134	15	3.748	56	0.34%	0.189	5.072	0.1	2.927	12.607	36.907	2.468	0.864	90	0.203	1.167	0	TRUE	0.772	153.906	156.33	OK -2.424
10-10	3+19.37	153.906	15	1.066	25	0.03%	0.007	3.725	0.054	0	0	0	0	0	0	0	0.054	0.07	FALSE	0.077	153.983	156.448	OK -2.465
10-12	3+69.37	153.906	15	1.122	25	0.03%	0.008	4.32	0.072	0	0	0	0	0	0	0	0.072	0.094	FALSE	0.102	154.008	156.405	OK -2.397
3-9	3+44.37	153.906	15	2.927	9.552	0.21%	0.02	12.607	0.617	0	0	0	0	0	0	0	0.617	0.802	FALSE	0.822	154.728	155.438	OK -0.71
10-8	2+94.37	154	15	0.664	8.346	0.01%	0.001	3.922	0.06	0	0	0	0	0	0	0	0.06	0.078	FALSE	0.079	154.079	154.563	OK -0.484

3-3 to 3-8
HYDRAULIC GRADE LINE ANALYSIS

PROJECT: Dominion Access Road (Turnaround Road)

DESIGNED BY: IJH

Checked: KPO

INCIDENCE PROBABILITY **10** **Year**

INLET OR JUNCTION	INLET STATION	OUTLET WATER SURFACE ELEV.	DIA. PIPE Do (In)	DESIGN DISCH. Qo (CFS)	LENGTH PIPE Lo (Ft)	FRICTION SLOPE, Sfo (FT/FT)	FRICTION LOSS Hf (Ft)	JUNCTION LOSS Vo	Ho (Ft)	Qi	Vi	QiVi	Vi*2/2g	Hi	Angle	HΔ	Ht	1.3 Ht	0.5 Ht	FINAL H (Ft)	Inlet Water Surface Elevation	Rim Elev	Comments
EX-3	14+69.00	146.54	27	21.6	194	0.49%	0.944	7.313	0.208	21.773	6.906	150.37	0.741	0.259	2.447	0	0.467	0	FALSE	1.411	147.951	155.83	OK -7.879
EX-2	13+57.71	148	27	21.773	111.28	0.49%	0.55	6.906	0.185	21.555	6.764	145.802	0.71	0.249	2.339	0	0.434	0	FALSE	0.984	148.984	158.166	OK -9.182
EX-1	11+71.21	148.984	27	21.555	186.51	0.48%	0.903	6.764	0.178	6.447	9.849	63.502	1.506	0.527	30.479	0.527	1.232	1.602	FALSE	2.505	151.489	157.25	OK -5.761
3-8	11+32.99	151.66	18	6.447	38.214	0.38%	0.144	9.849	0.377	3.267	3.366	10.996	0.176	0.062	59.054	0.099	0.537	0.698	TRUE	0.493	152.153	157.48	OK -5.327
3-7	11+14.90	153.05	18	3.267	18.088	0.10%	0.017	3.366	0.044	3.304	3.375	11.152	0.177	0.062	90.121	0.124	0.23	0	TRUE	0.132	153.182	157.36	OK -4.178
3-6	10+67.40	153.2	18	3.304	47	0.10%	0.047	3.375	0.044	3.324	3.38	11.233	0.177	0.062	89.691	0.124	0.23	0	TRUE	0.162	153.362	157.24	OK -3.878
3-5	10+43.98	153.44	18	3.324	23.927	0.10%	0.024	3.38	0.044	1.797	2.883	5.182	0.129	0.045	89.78	0.045	0.135	0.175	TRUE	0.112	153.552	156.76	OK -3.208
3-4	10+43.98	153.61	18	1.797	10.38	0.03%	0.003	2.883	0.032	0	0	0	0	0	0	0	0.032	0.042	FALSE	0.045	153.655	155.53	OK -1.875
4-8	13+93.63	150.043	15	0.743	72.925	0.01%	0.01	5.395	0.113	0.747	5.448	4.069	0.461	0.161	31.089	0.161	0.436	0	FALSE	0.445	150.488	157.172	OK -6.684
4-7	13+92.68	152.691	8	0.747	34.512	0.23%	0.078	5.448	0.115	0.748	5.752	4.304	0.514	0.18	89.417	0.36	0.655	0	FALSE	0.733	153.424	156.91	OK -3.486
4-6	14+04.39	153.783	8	0.748	11.71	0.23%	0.027	5.752	0.128	0.752	5.761	4.334	0.515	0.18	89.759	0.361	0.67	0	TRUE	0.361	154.145	157.633	OK -3.488
4-5	14+03.11	154.145	8	0.752	38.09	0.23%	0.087	5.761	0.129	0	0	0	0	0	0	0	0.129	0.167	TRUE	0.171	154.316	157.3	OK -2.984
3-3	10+18.98	153.61	18	0.536	25	0.00%	0.001	2.043	0.016	0	0	0	0	0	0	0	0.016	0.021	FALSE	0.022	153.632	156.83	OK -3.198

4-1 to EX-6
HYDRAULIC GRADE LINE ANALYSIS

PROJECT: Dominion Access Road (Fuel Farm Road)

DESIGNED BY: IJH

Checked: KPO

INCIDENCE PROBABILITY **10** **Year**

INLET OR JUNCTION	INLET STATION	OUTLET WATER SURFACE ELEV.	DIA. PIPE Do (In)	DESIGN DISCH. Qo (CFS)	LENGTH PIPE Lo (Ft)	FRICTION SLOPE, Sfo (FT/FT)	FRICTION LOSS Hf (Ft)	JUNCTION LOSS Vo	Ho (Ft)	Qi	Vi	QiVi	Vi*2/2g	Hi	Angle	HΔ	Ht	1.3 Ht	0.5 Ht	FINAL H (Ft)	Inlet Water Surface Elevation	Rim Elev	Comments
EX-6	11+72.39	151.59	15	4.22	57.876	0.43%	0.247	3.955	0.061	2.149	3.787	8.138	0.223	0.078	83.103	0.147	0.286	0.371	FALSE	0.618	152.208	159.76	OK -7.552 (Exist. Str.)
EX-5	11+00.52	152.208	15	2.149	71.862	0.11%	0.08	3.787	0.056	1.401	2.72	3.81	0.115	0.04	49.73	0.057	0.153	0.199	FALSE	0.279	152.487	158.84	OK -6.353 (Exist. Str.)
4-2	10+85.03	152.487	15	1.401	15.499	0.05%	0.007	2.72	0.029	1.045	5.851	6.114	0.532	0.186	11.701	0.069	0.284	0.369	FALSE	0.376	152.864	153.923	OK -1.059 (Prop Str.)
4-1	10+19.83	152.864	15	1.045	65.191	0.03%	0.017	5.851	0.133	0	0	0	0	0	0	0	0.133	0.173	FALSE	0.19	153.053	155.138	OK -2.084 (Prop Str.)

COMMONWEALTH OF VIRGINIA
KEVIN O'MEARA
Lic. No. 049232
6/30/2019
PROFESSIONAL ENGINEER

REVISION DESCRIPTION | DATE

DATE 6/30/2019
DRAWN BY KPO
DESIGNED BY KPO
CHECKED BY CMK
SCALE N.T.S.

YOUR VISION ACHIEVED THROUGH OURS.

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.5500 FAX 804.560.1016 www.timmons.com

TIMMONS GROUP

Site Development | Residential | Infrastructure | Technology

EAST RAMP 3 ACCESS ROAD
HENRICO COUNTY - VIRGINIA
HYDRAULIC GRADE LINE ANALYSIS

JOB NO. 40930.001
SHEET NO. 02H(04)

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

L:\2030\40930-RIC_Airport\001-203-DOM_Access_Road\DWG\Sheet\CD\40930.001-203C-02H.dwg | Plotted on 6/26/2019 11:28 AM | by Kevin O'Meara