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November 6, 2007

Grayson Baur
 Lappas + Havener, PA
 The Imperial Building
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RE: Hydraulic Modeling Results for Dry Creek Project

Mr Grayson Baur:

Baker Engineering has constructed a representative hydraulic model for the Dry Creek project. This model simulates the portion of the creek where the greenway boardwalk crossing is proposed and its immediate vicinity upstream and downstream. The hydraulic model that has been prepared is a preliminary model and does not constitute the final hydraulic analysis for this project. Although the results obtained from this model are not final hydraulics results, they provide a general idea of how each of the three simulated bridge crossing scenarios can be expected to affect flood levels through the area. This letter summarizes the results obtained from the preliminary hydraulic model for the Dry Creek project.

BRIDGE SCENARIO No. 1

The first bridge scenario studied in this analysis included a 410 foot long boardwalk bridge crossing the span of the Dry Creek channel and floodplain. This boardwalk bridge was simulated without any railing, and included a side curb along the entire length of the bridge. The top elevation of the curb was set seven inches above the elevation of the surface deck. Under this bridge scenario, the following results were obtained:

Results For 2-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.29	273.29	0
Just upstream of bridge	8712	270.4	270.52	0.12
Just downstream of bridge	8542	270.32	270.32	0
530 ft downstream of bridge	8139	269.75	269.75	0
765 ft downstream of bridge (downstream limit of model)	7904	268.24	268.24	0

Results For 5-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.66	273.66	0
Just upstream of bridge	8712	270.96	271.06	0.1
Just downstream of bridge	8542	270.85	270.85	0
530 ft downstream of bridge	8139	270.06	270.06	0
765 ft downstream of bridge (downstream limit of model)	7904	269.45	269.45	0

Results For 10-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	275.43	275.44	0.01
Just upstream of bridge	8712	275.41	275.41	0
Just downstream of bridge	8542	275.4	275.4	0
530 ft downstream of bridge	8139	275.38	275.38	0
765 ft downstream of bridge (downstream limit of model)	7904	275.37	275.37	0

Results For 25-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	277.27	277.27	0
Just upstream of bridge	8712	277.26	277.26	0
Just downstream of bridge	8542	277.26	277.26	0
530 ft downstream of bridge	8139	277.25	277.25	0
765 ft downstream of bridge (downstream limit of model)	7904	277.24	277.24	0

Results For 50-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.48	282.48	0
Just upstream of bridge	8712	282.48	282.48	0
Just downstream of bridge	8542	282.47	282.47	0
530 ft downstream of bridge	8139	282.47	282.47	0
765 ft downstream of bridge (downstream limit of model)	7904	282.47	282.47	0

Results For 100-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.55	282.55	0
Just upstream of bridge	8712	282.55	282.55	0
Just downstream of bridge	8542	282.55	282.55	0
530 ft downstream of bridge	8139	282.54	282.54	0
765 ft downstream of bridge (downstream limit of model)	7904	282.54	282.54	0

The results from the preliminary hydraulic simulation for Bridge Scenario No. 1 show that construction of this bridge alternative would not affect the regulatory base flood levels (100-year levels) throughout the area, in compliance with Sections 5-60 and 5-61 of the Town of Chapel Hill Flood Damage Prevention Ordinance.

BRIDGE SCENARIO No. 2

This bridge scenario also included a 410 foot long boardwalk bridge crossing the span of the Dry Creek channel and floodplain. This boardwalk bridge was simulated with railing along a 160 ft center section of the boardwalk bridge, and the remaining portions of the bridge were kept without railing but with side curb as in Scenario No. 1. The top of the railing was set at an elevation three and a half feet above the elevation of the deck surface. Under this bridge scenario, the following results were obtained:

Results For 2-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.29	273.29	0
Just upstream of bridge	8712	270.4	270.52	0.12
Just downstream of bridge	8542	270.32	270.32	0
530 ft downstream of bridge	8139	269.75	269.75	0
765 ft downstream of bridge (downstream limit of model)	7904	268.24	268.24	0

Results For 5-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.66	273.66	0
Just upstream of bridge	8712	270.96	271.06	0.1
Just downstream of bridge	8542	270.85	270.85	0
530 ft downstream of bridge	8139	270.06	270.06	0
765 ft downstream of bridge (downstream limit of model)	7904	269.45	269.45	0

Results For 10-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	275.43	275.44	0.01
Just upstream of bridge	8712	275.41	275.41	0
Just downstream of bridge	8542	275.4	275.4	0
530 ft downstream of bridge	8139	275.38	275.38	0
765 ft downstream of bridge (downstream limit of model)	7904	275.37	275.37	0

Results For 25-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	277.27	277.27	0
Just upstream of bridge	8712	277.26	277.26	0
Just downstream of bridge	8542	277.26	277.26	0
530 ft downstream of bridge	8139	277.25	277.25	0
765 ft downstream of bridge (downstream limit of model)	7904	277.24	277.24	0

Results For 50-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.48	282.48	0
Just upstream of bridge	8712	282.48	282.48	0
Just downstream of bridge	8542	282.47	282.47	0
530 ft downstream of bridge	8139	282.47	282.47	0
765 ft downstream of bridge (downstream limit of model)	7904	282.47	282.47	0

Results For 100-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.55	282.55	0
Just upstream of bridge	8712	282.55	282.55	0
Just downstream of bridge	8542	282.55	282.55	0
530 ft downstream of bridge	8139	282.54	282.54	0
765 ft downstream of bridge (downstream limit of model)	7904	282.54	282.54	0

The results from the preliminary hydraulic simulation for Bridge Scenario No. 2 show that construction of this bridge alternative would not affect the regulatory base flood levels (100-year levels) throughout the area, in compliance with Sections 5-60 and 5-61 of the Town of Chapel Hill Flood Damage Prevention Ordinance.

BRIDGE SCENARIO No. 3

This bridge scenario also included a 410 foot long boardwalk bridge crossing the span of the Dry Creek channel and floodplain. This boardwalk bridge was simulated with railing along the entire span of the bridge. The top of the railing was set at an elevation three and a half feet above the elevation of the deck surface. Under this bridge scenario, the following results were obtained:

Results For 2-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.29	273.29	0
Just upstream of bridge	8712	270.4	270.63	0.23
Just downstream of bridge	8542	270.32	270.32	0
530 ft downstream of bridge	8139	269.75	269.75	0
765 ft downstream of bridge (downstream limit of model)	7904	268.24	268.24	0

Results For 5-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	273.66	273.66	0
Just upstream of bridge	8712	270.96	271.18	0.22
Just downstream of bridge	8542	270.85	270.85	0
530 ft downstream of bridge	8139	270.06	270.06	0
765 ft downstream of bridge (downstream limit of model)	7904	269.45	269.45	0

Results For 10-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	275.43	275.44	0.01
Just upstream of bridge	8712	275.41	275.41	0
Just downstream of bridge	8542	275.4	275.4	0
530 ft downstream of bridge	8139	275.38	275.38	0
765 ft downstream of bridge (downstream limit of model)	7904	275.37	275.37	0

Results For 25-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	277.27	277.28	0.01
Just upstream of bridge	8712	277.26	277.26	0
Just downstream of bridge	8542	277.26	277.26	0
530 ft downstream of bridge	8139	277.25	277.25	0
765 ft downstream of bridge (downstream limit of model)	7904	277.24	277.24	0

Results For 50-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.48	282.48	0
Just upstream of bridge	8712	282.48	282.48	0
Just downstream of bridge	8542	282.47	282.47	0
530 ft downstream of bridge	8139	282.47	282.47	0
765 ft downstream of bridge (downstream limit of model)	7904	282.47	282.47	0

Results For 100-Year Storm:

Location	River Station	Water Surface Elevation (ft)		Difference (ft)
		Existing	Proposed	
650 ft upstream of bridge	9332	282.55	282.55	0
Just upstream of bridge	8712	282.55	282.55	0
Just downstream of bridge	8542	282.55	282.55	0
530 ft downstream of bridge	8139	282.54	282.54	0
765 ft downstream of bridge (downstream limit of model)	7904	282.54	282.54	0

The results from the preliminary hydraulic simulation for Bridge Scenario No. 3 show that construction of this bridge alternative would not affect the regulatory base flood levels (100-year levels) throughout the area, in compliance with Sections 5-60 and 5-61 of the Town of Chapel Hill Flood Damage Prevention Ordinance.

CONCLUSIONS

The results show that for all bridge alternatives, the proposed boardwalk bridge would affect flood levels along the area during small flow events such as the 2-year and 5-year floods, but would not affect flood levels under larger storm events such as the 50-year and 100-year floods.

This is due to the backwater effect from the larger stream (New Hope Creek) which Dry Creek discharges into at a location approximately one mile downstream from the proposed bridge location. During larger storm events such as the 50-year and 100-year floods, flood levels along New Hope Creek are substantially higher than those corresponding to the 50-year and 100-year floods discharge along Dry Creek. The higher flood levels along New Hope Creek will act as a control for flood levels along Dry Creek, raising flood levels along Dry Creek to an elevation at least 11 feet above the top of the boardwalk bridge. With such a large hydraulic influence from downstream backwater levels under large flow events, the hydraulic influence of the boardwalk bridge on Dry Creek flood levels becomes insignificant, and no change is observed between existing and proposed Dry Creek water levels for large storms.

If you have any additional questions regarding this matter, please feel free to contact me at 703-317-3070, or by email at eparrilla@mbakercorp.com. Thank you.

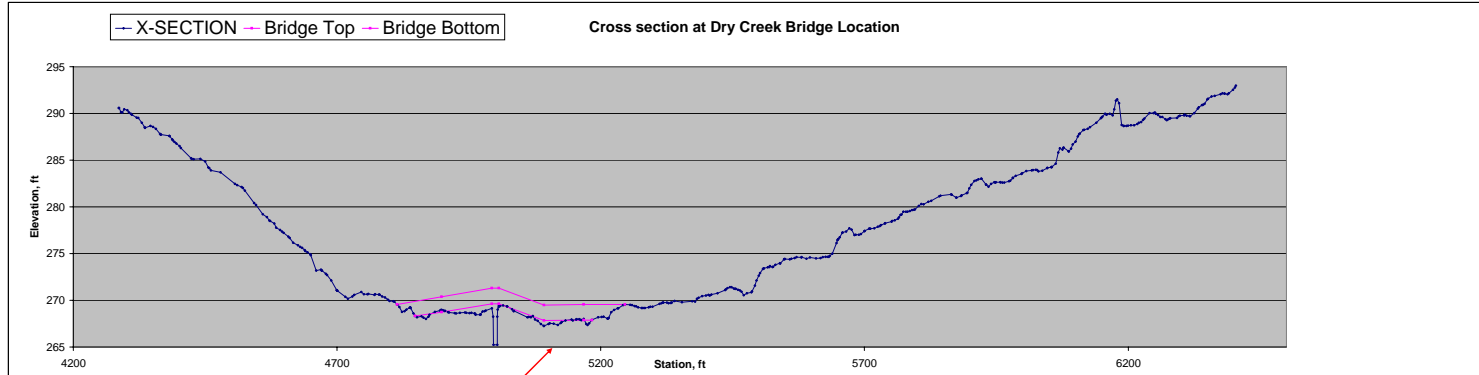
Cordially,



Elsie Parrilla Castellar, P.E.

CROSS-SECTION AT DRY CREEK BRIDGE LOCATION:

Station	Elevation
4286.1	290.58
4286.5	290.57
4290.6	290.12
4293	290.1
4296.4	290.43
4302.5	290.34
4305.4	290.1
4309.2	289.98
4311.2	289.85
4320.4	289.54
4323.4	289.52
4329.9	289
4335	288.53
4336	288.45
4346.1	288.66
4350.8	288.57
4356.4	288.34
4364.6	287.8
4365.9	287.75
4366.4	287.73
4381.9	287.61
4382.8	287.58
4387.5	287.22
4388.8	287.11
4391.7	286.96
4395.5	286.77
4401.7	286.52
4403.6	286.31
4423.1	285.2
4424.4	285.15
4428.1	285.1
4440.9	285.15
4450.2	284.86
4456.1	284.2
4457.6	284.14
4460.9	283.91
4479	283.71
4506.5	282.48
4510.8	282.33
4518.9	282.11
4521.4	282.01
4525.1	281.76
4543	280.4
4546.7	280.2
4558.9	279.22
4567.3	278.89
4571.8	278.52
4579	278.61
4580.9	278.23
4584.8	277.77
4592	277.55
4595.6	277.38
4598.4	277.22
4607.7	276.83
4610.3	276.68
4616.9	276.16
4626.2	275.88
4630.1	275.71
4634	275.6
4638.9	275.37
4640	275.28
4644	275.15
4648.3	274.92
4650.2	274.82
4660.3	273.18
4669.5	273.3
4670.7	273.2
4671.3	273.18
4678.9	272.83
4680.9	272.69
4688.8	272.11
4699.5	271.09
4700.1	271.05
4700.2	271.05
4700.3	271.04
4715.4	270.36
4720.5	270.18
4729	270.41
4732.7	270.57
4745.8	270.9
4750.8	270.66
4757.8	270.65
4759.2	270.67
4771.1	270.57
4772	270.65
4779.6	270.62
4780.9	270.61
4785.2	270.41
4791.1	270.32
4796.6	270.07
4799.6	269.94
4806.8	269.91
4808.8	269.85
4813.7	269.55
4818	269.29
4822.9	268.78
4829.2	268.82
4831.4	269.02
4837.5	269.22
4839.1	269.26
4839.7	269.18
4845	268.6
4847.9	268.33
4851.4	268.18



Invert Elevation = 265.2 ft

Bridge Deck + Curb Data Points:

Station	Top Elevation	Bottom Elevation
4813.7	269.55	268.33
4888.1	270.2867	268.72
4893.5	271.3	269.63
5007.1	271.3	269.63
5092.6	269.5	267.83
5167.9	269.55	267.88
5246.1	269.55	267.88

4860.3	268.29
4863.6	268.14
4868.5	268
4873.4	268.27
4875.5	268.47
4885.7	268.78
4895.5	268.92
4897.1	268.96
4908.1	268.97
4900.8	268.95
4903.5	268.88
4904.9	268.86
4910.6	268.74
4912.3	268.7
4923.4	268.62
4925.7	268.58
4932.9	268.67
4942.6	268.69
4945.3	268.65
4951.1	268.63
4954.6	268.67
4960.9	268.58
4961.8	268.57
4962.6	268.47
4971.5	268.45
4971.7	268.47
4971.9	268.48
4976	268.8
4979.4	268.85
4982.1	268.92
4993.5	269.13
4996	268.25
4996.4	265.25
5003.6	265.25
5004	268.25
5004.2	268.99
5006.6	269.29
5007.1	269.45
5008.8	269.38
5015.1	269.44
5021.9	269.35
5022.5	269.35
5031.7	269.05
5034.6	268.85
5035.6	268.86
5061	268.17
5063.4	268.23
5067.7	268.2
5071	268.33
5075.6	267.96
5080.2	267.82
5086.1	267.47
5091.8	267.25
5092.6	267.25
5101	267.45
5103.4	267.55
5110.9	267.49
5118.6	267.35
5124	267.58
5126.6	267.67
5133	267.84
5144.6	267.95
5147.1	267.85
5152.9	267.93
5154.4	267.98
5159.1	267.97
5161.8	267.91
5163.6	267.88
5167.9	268
5172.3	267.46
5175	267.35
5178.2	267.52
5183.7	267.91
5194.7	268.17
5201.5	268.22
5205	268.27
5212.5	268.05
5213.6	268.04
5215.1	268.11
5219.6	268.72
5225.3	268.96
5231.8	269.15
5233	269.16
5242.5	269.47
5246.1	269.55
5255.9	269.52
5259	269.48
5264.2	269.38
5267.2	269.36
5271.1	269.26
5277.7	269.18
5278.9	269.19
5283.5	269.17
5290.9	269.24
5294.1	269.3
5298.2	269.31
5311.2	269.62
5314.9	269.68
5317.5	269.75
5318.5	269.75
5325.6	269.76
5328.2	269.7
5332.9	269.72
5333.6	269.73
5334.6	269.75
5340	269.93
5354	269.81
5373.3	269.89

5378.7	269.85
5382.6	270.77
5385.6	270.28
5391.9	270.45
5399.6	270.5
5404.4	270.58
5406.7	270.52
5409.5	270.63
5421.5	270.74
5435.9	271.11
5437.2	271.18
5440.1	271.3
5445	271.41
5447.8	271.41
5452.2	271.27
5454.5	271.23
5456	271.24
5460.1	271.12
5463.8	271.06
5466.8	270.91
5471.1	270.56
5476.9	270.77
5485.6	270.84
5487.1	270.98
5492.1	271.59
5495.4	272.11
5499.8	272.63
5501.9	272.91
5507.4	273.34
5508.5	273.38
5509.5	273.44
5516.6	273.52
5519.6	273.57
5520.8	273.65
5525.8	273.55
5526.8	273.61
5530.9	273.79
5539.7	273.96
5539.9	273.95
5547.5	274.4
5548.1	274.41
5549.3	274.42
5558.4	274.4
5561.2	274.46
5567.3	274.52
5571	274.61
5580.4	274.6
5580.7	274.63
5589.9	274.45
5596.8	274.59
5608.1	274.49
5616.8	274.52
5620.9	274.63
5626.1	274.67
5630.9	274.65
5632.5	274.66
5634.4	274.75
5639	275.01
5646.9	276.14
5649.1	276.44
5649.6	276.52
5650.4	276.57
5652.9	276.76
5658.1	277.23
5658.8	277.26
5664.9	277.36
5671.2	277.71
5675.4	277.58
5680.8	276.98
5683.4	277.03
5689.3	277.03
5693.1	277.08
5700	277.4
5700.6	277.42
5708.7	277.66
5709.2	277.67
5711.1	277.67
5718.3	277.7
5725.4	277.87
5728.7	277.93
5731.5	278.05
5738.3	278.23
5739	278.25
5751.2	278.44
5752.6	278.48
5757.4	278.57
5763.6	278.74
5765.5	278.67
5768.5	279.13
5770.3	279.18
5773.5	279.47
5778.8	279.5
5781.6	279.48
5786	279.55
5790.2	279.67
5793.7	279.66
5795.4	279.74
5803	280.11
5808	280.3
5811.9	280.29
5821.3	280.56
5826.6	280.64
5841.7	281.13
5844.2	281.2
5864.2	281.32
5865.3	281.31
5874	281.01
5874.4	281

5882.8	281.16
5883.9	281.22
5894.2	281.47
5895	281.52
5899	281.98
5902.7	282.37
5908.4	282.77
5912.4	282.84
5915.7	282.96
5921.5	283.03
5921.7	283.03
5930.2	282.4
5931.1	282.37
5935.1	282.16
5940	282.48
5945.8	282.64
5948.2	282.81
5949.2	282.63
5957.4	282.64
5957.5	282.54
5961.1	282.6
5964.7	282.61
5973.9	282.75
5976.3	282.81
5981.1	283.09
5981.3	283.1
5986.9	283.31
5997.8	283.54
5999	283.6
6006.9	283.82
6017.3	283.8
6019.5	283.95
6024.8	283.97
6027.3	283.95
6030	283.8
6037.2	283.86
6045.9	284.13
6047	284.18
6054.3	284.24
6054.7	284.25
6055.3	284.29
6062.5	284.62
6067.7	285.82
6070.5	286.27
6075.4	286.14
6078.9	286.32
6077.7	286.32
6086.6	286.95
6087.3	286.94
6091.8	286.23
6094.8	286.68
6099.9	287
6104.4	287.53
6106.7	287.77
6108.3	287.85
6114.8	288.21
6116.3	288.26
6123.3	288.34
6127.6	288.54
6139.8	289.02
6148.4	289.48
6149.3	289.54
6151.3	289.66
6155.7	289.95
6157.2	289.94
6159	289.87
6165.3	289.98
6170.4	289.81
6173.5	290.43
6176.7	291.36
6178.9	291.52
6182.6	291.1
6187.5	288.78
6191.3	288.68
6191.7	288.68
6196.9	288.66
6199.4	288.69
6205.4	288.72
6211	288.72
6217.2	288.87
6220.3	288.99
6224.7	289.09
6228.3	289.33
6230.6	289.45
6240.1	290.04
6248.4	290.02
6250.6	290.1
6252.6	289.98
6256.8	289.82
6260.7	289.64
6264.8	289.61
6270.7	289.39
6273.1	289.27
6276.3	289.4
6278.4	289.45
6280	289.47
6292.8	289.53
6295.4	289.7
6297.9	289.75
6305.7	289.8
6306.3	289.84
6306.8	289.96
6310.5	289.76
6316.1	289.73
6317.1	289.69
6325.1	290.03
6332.2	290.52
6333.7	290.66

6339.6	290.88
6341.9	290.92
6344.6	291.04
6349.9	291.5
6351.3	291.57
6358.2	291.82
6364.2	291.88
6375	292.04
6378.6	292.16
6382.6	292.13
6383	292.13
6388.1	292.07
6390.8	292.16
6398.4	292.53
6402.2	292.79
6403.9	292.97