

STORM SCHEDULE												
Upstream Node	Downstream Node	Inlet Rational Coeff.	Upstream Inlet Area (acres)	System Intensity (in/hr)	Pipe Discharge (cfs)	Pipe Capacity (cfs)	Section Size/Class (in)	Pipe Length (ft)	Pipe Slope (%)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Velocity Out (ft/s)
CB#21	FES#20	0.85	0.26	5.57	17.67	40.74	24 inch	37	3.24	279.00	277.80	10.8
CB#22	CB#21	0.85	0.42	5.64	16.63	20.42	18 inch	225	3.78	288.00	279.50	9.4
2GI#23	CB#22	0.60	1.57	6.10	10.26	10.30	18 inch	52	0.96	289.50	289.00	5.9
CB#24	2GI#23	0.70	1.04	6.13	4.50	9.36	15 inch	50	2.10	290.80	289.75	3.7
CB#25	CB#22	0.80	0.46	5.80	5.24	15.27	15 inch	431	5.59	314.90	290.80	11.3
CB#26	CB#25	0.90	0.33	6.04	3.22	12.26	15 inch	311	3.60	326.30	315.10	3.0
2GI#27	CB#26	0.80	0.29	6.13	1.43	4.66	15 inch	77	0.52	326.90	326.50	1.9
CB#31	FES#30	0.85	0.14	5.88	10.74	67.73	24 inch	58	8.97	269.00	263.80	15.0
2GI#32	CB#31	0.50	0.41	5.90	10.08	10.91	18 inch	51	1.08	270.55	270.00	7.0
CB#33	2GI#32	0.85	0.41	6.13	2.15	8.09	15 inch	51	1.57	274.30	273.50	5.6
2GI#34	2GI#32	0.50	1.09	6.03	6.92	7.64	18 inch	189	0.53	271.75	270.75	4.1
CB#35	2GI#34	0.85	0.21	6.12	2.20	4.95	15 inch	51	0.59	272.30	272.00	1.9
CB#35A	CB#35	0.85	0.21	6.13	1.10	6.81	15 inch	9	1.11	272.90	272.80	3.0
CB#36	2GI#34	0.85	0.28	6.13	1.47	4.91	15 inch	52	0.58	272.30	272.00	1.3
2GI#41A	FES#40	0.65	0.41	5.97	9.40	25.30	18 inch	112	5.80	272.50	266.00	13.3
CB#41	2GI#41A	0.85	0.22	5.98	8.22	10.31	15 inch	51	2.55	276.80	275.50	9.1
CB#42	CB#41	0.75	0.61	6.09	7.22	12.04	15 inch	216	3.47	284.50	277.00	5.9
2GI#43	CB#42	0.65	1.06	6.13	4.44	4.91	15 inch	52	0.58	285.00	284.70	3.6
CB#50	EXCB	0.90	0.02	5.95	4.84	9.86	15 inch	118	2.33	305.47	302.72	8.0
CB#51	CB#50	0.85	0.19	6.01	4.77	6.07	15 inch	102	0.88	307.90	307.00	5.5
2GI#52	CB#51	0.55	0.54	6.05	3.82	4.89	15 inch - Class IV	61	0.57	308.45	308.10	3.7
CB#53	2GI#52	0.60	0.45	6.09	2.03	5.04	15 inch - Class IV	41	0.61	308.90	308.65	2.5
CB#54	CB#53	0.60	0.10	6.13	0.37	5.90	15 inch - Class IV	12	0.83	309.20	309.10	0.7
CB#61	FES#60	0.85	0.16	5.90	6.41	15.29	18 inch	85	2.12	306.30	304.50	8.3
CB#62	CB#61	0.50	0.70	5.96	5.66	8.96	18 inch	103	0.73	307.25	306.50	4.2
CB#63	CB#62	0.50	0.56	6.08	3.63	9.94	18 inch	190	0.89	310.70	309.00	5.2
2GI#64	CB#63	0.65	0.48	6.13	1.93	4.95	15 inch	51	0.59	311.20	310.90	2.6
CB#71	FES#70	0.85	0.01	5.99	22.94	29.00	30 inch	40	0.50	310.60	310.40	6.8
2GI#71	CB#71	0.65	0.72	6.08	7.61	7.69	18 inch	56	0.54	313.80	313.50	5.7
CB#73	2GI#72	0.75	1.03	6.13	4.77	7.98	18 inch	52	0.58	314.25	313.95	2.9
CB#74	CB#71	0.60	0.21	6.13	15.40	16.17	24 inch	274	0.51	312.50	311.10	5.6
(2) 9' X 9' BOX CULVERTS	N/A	N/A	N/A	N/A	1795*	N/A	(2) 9' X 9' BOXES	204	0.69	254.50	253.10	11.4

* Q100 FLOW FOR PANTHER CREEK AT SR 1625 - SOURCE: FEMA FLOOD INSURANCE STUDY, VOLUME 1 OF 6, WAKE COUNTY, NORTH CAROLINA, DECEMBER 5, 1996

NOTES:

- RIM ELEVATION IS TOP OF CURB FOR CATCH BASINS AND TOP OF GRATE FOR DROP INLETS.
- CB - CATCH BASIN NCDOT STD. 840.01-02 WITH AND NCDOT STD. 840.03 FRAME & GRATE.
- 2GI - DOUBLE GRATED DROP INLET NCDOT STD. 840.17-19 WITH NCDOT STD. 840.24 OR 840.29 FRAME & GRATE.
- ALL STORM DRAIN FRAME, GRATE, AND HOODS SHALL BE STAMPED WITH "DRAINS TO RIVER" IN ACCORDANCE WITH TOWN OF CARY STANDARDS.
- THE WATERSHED FOR THIS PROJECT IS THE CAPE FEAR BASIN.
- ALL PIPE IS CLASS III RCP UNLESS OTHERWISE NOTED.

STRUCTURE SCHEDULE			
Structure Number	Rim or T/C Elevation	Sump Elevation	Depth of Box (ft)
CB#21	284.43	279.00	5.43
CB#22	295.49	288.00	7.49
2GI#23	292.21	289.50	2.71
CB#24	295.49	290.80	4.69
CB#25	319.80	314.90	4.90
CB#26	331.90	326.30	5.60
2GI#27	330.65	326.90	3.75
CB#31	279.43	269.00	10.43
2GI#32	276.13	270.55	5.58
CB#33	279.43	274.30	5.13
2GI#34	274.29	271.75	2.54
CB#35	277.58	272.30	5.28
CB#35A	277.60	272.90	4.70
CB#36	277.58	272.30	5.28
2GI#41A	278.75	272.50	6.25
CB#41	281.71	276.80	4.91
CB#42	290.89	284.50	6.39
2GI#43	287.76	285.00	2.76
CB#50	311.98	305.47	6.51
CB#51	312.96	307.90	5.06
2GI#52	311.76	308.45	3.31
CB#53	312.96	308.90	4.06
CB#54	312.82	309.20	3.62
CB#61	315.02	306.30	8.72
CB#62	315.02	307.25	7.77
CB#63	316.89	310.70	6.19
2GI#64	313.52	311.20	2.32
CB#71	320.55	310.60	9.95
2GI#72	316.50	313.80	2.70
CB#73	319.10	314.25	4.85
CB#74	323.73	312.50	11.23

CULVERT INSTALLATION SEQUENCE

- TEMPORARILY DIVERT THE UPSTREAM CREEKS TO THE SOUTH SIDE OF THE PROPOSED CULVERTS AND TO THE EXISTING SOUTHERN 84" CMP.
- REMOVE THE NORTHERN 84" CMP.
- CONSTRUCT THE NORTHERN 9' X 9' BOX CULVERT.
- TEMPORARILY DIVERT ALL FLOW TO THE NORTHERN BOX CULVERT.
- REMOVE SOUTHERN 84" CMP.
- CONSTRUCT THE SOUTHERN 9' X 9' BOX CULVERT.
- PERMANENTLY DIVERT FLOW TO BOTH BOX CULVERTS AS SHOWN ON THE PLANS.
- RESHAPE DOWNSTREAM BANK AND RESTORE RIP RAP AS SHOWN ON THE PLANS.

IMPORTANT NOTE - CARY PARK LAKE

THE ELEVATION OF THE LAKE AT CARY PARK SHALL NOT BE LOWERED DURING THE CONSTRUCTION OF GREEN LEVEL TO DURHAM ROAD. SHEET PILES OR OTHER METHODS MAY BE REQUIRED IN ORDER TO CONSTRUCT THE CULVERT CROSSING AND RAISE THE FILL SLOPES ALONG THIS PORTION OF THE PROJECT. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AN OUTLINE OF THE TYPE OF CONSTRUCTION METHOD(S) TO BE USED TO MAINTAIN THE LAKE WATER ELEVATION, WHILE ALLOWING ADEQUATE SPACE FOR CONSTRUCTION OF THE CULVERT/SLOPES. ANY STRUCTURAL METHODS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER AND THE CONTRACTOR SHALL INCLUDE SHOP DRAWINGS FOR ALL MATERIALS TO BE USED IN THE PROCESS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO ALL GUIDELINES SET FORTH IN THE GEOTECHNICAL REPORT, PREPARED BY GEOTECHNOLOGIES, INC., FOR THE FILL SLOPE CONSTRUCTION ALONG THE LAKE PORTION OF THE PROJECT.

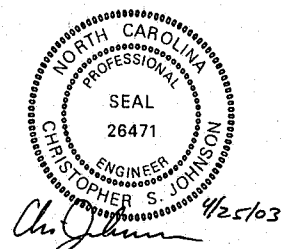
DISSIPATOR DESIGN										
OUTLET #	PIPE DIA. (IN)	Q10 FLOW (CFS)	V10 OUT (FPS)	APRON LENGTH (FT)	OUTLET WIDTH (FT)	D. STREAM WIDTH (FT)	RIP RAP THICKNESS (IN)	RIP RAP CLASS	SIZE (IN)	FILTER FABRIC (SY)
FES-20	24	17.7	10.8	12	6	14	22	B	6	13.3
FES-30	24	10.7	15.0	16	6	18	22	B	13	21.3
FES-40	18	9.4	13.3	12	5	14	22	B	13	12.7
FES-60	18	6.4	8.3	9	5	11	22	B	6	8.0
FES-70	30	22.9	6.8	15	8	18	22	B	6	21.7

NOTE:
ALL DISSIPATORS SHALL HAVE FILTER FABRIC UNDERLINERS.

FOREBAY AND LEVEL SPREADER DESIGN									
STRUCTURE	DRAINAGE AREA (AC)	FOREBAY DIMENSIONS			FOREBAY BOTTOM ELEVATION (FT)	FOREBAY TOP ELEVATION (FT)	LEVEL SPREADER OUTLET (FT)	GRASS SWALE WEIR ELEVATION (FT)	LEVEL SPREADER LENGTH (FT)
		LENGTH (FT)	WIDTH (FT)	DEPTH (FT)					
FES#30	2.75	24	12	3	260.80	263.80	262.50	24	
FES#40	1.89	20	10	3	265.00	268.00	266.70	20	

NOTE:
EMERGENCY GRASS SWALES SHALL BE LINED WITH REINFORCEMENT ROOT SYSTEM MATTING. (SEE DETAIL THIS SHEET)

APPROVED
TOWN OF CARY
DRC. 4-29-03 Date
Planning - JES Date 4-29-03
Engineering - JES Date 4-29-03



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1	TOC 1ST REVIEW COMMENTS	6/24/02	CSJ
2	TOC 2ND REVIEW COMMENTS	7/16/02	CSJ
3	TOC 3RD REVIEW COMMENTS	8/21/02	CSJ
4	WITHERS & RAVENEL, INC.	12/12/02	CSJ
5	NCDOT 1st REVIEW COMMENTS	4/1/03	CSJ
6	NCDOT 2nd REVIEW COMMENTS	4/25/03	CSJ

Designer	CSJ	Scale	1" = 50'
Drawn By	CSJ	Date	APRIL, 2003
Checked By	JEC	Job No.	201115

**GREEN LEVEL TO DURHAM ROAD
WIDENING AT CARY PARK PUD
CARY, NORTH CAROLINA**

STORM DRAINAGE DETAILS

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
111 MacKenan Drive Cary, North Carolina 27511 tel: 919-469-3340 fax: 919-467-6009 www.withersravenel.com

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