STORM DRAINAGE ANALYSIS

FOR

PRESERVE AT JONES DAIRY

KB HOMES CAROLINAS
4506 SOUTH MIAMI BLVD
DURHAM, NC 27703
P: 919.768.7977

BY:

BCSC
BATEMAN CIVIL SURVEY COMPANY

ENGINEER:
Douglas Cooper, PE
NCBELS # 32648

Digitally signed by Douglas B Cooper
Date: 2023.12.01 10:20:09-05'00'

NORTH CAROLINA PROFESSIONAL SEAL 32648 ENGINEER DOUGLAS B. COOPER

12/01/2023 10:19:20 AM

November 30, 2023

NOAA Atlas 14, Volume 2, Version 3
Location name: Rolesville, North Carolina, USA*
Latitude: 35.9433°, Longitude: -78.4637°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.403** (0.370-0.441)	**0.468** (0.430-0.511)	**0.534** (0.489-0.582)	**0.599** (0.548-0.653)	**0.665** (0.606-0.725)	**0.717** (0.651-0.781)	**0.764** (0.688-0.832)	**0.804** (0.721-0.878)	**0.850** (0.756-0.928)	**0.891** (0.785-0.975)
10-min	**0.644** (0.591-0.704)	**0.749** (0.687-0.818)	**0.855** (0.784-0.933)	**0.959** (0.877-1.04)	**1.06** (0.966-1.16)	**1.14** (1.04-1.24)	**1.21** (1.09-1.32)	**1.28** (1.14-1.39)	**1.34** (1.20-1.47)	**1.40** (1.24-1.54)
15-min	**0.805** (0.738-0.880)	**0.942** (0.864-1.03)	**1.08** (0.991-1.18)	**1.21** (1.11-1.32)	**1.34** (1.22-1.46)	**1.45** (1.31-1.58)	**1.53** (1.38-1.67)	**1.61** (1.44-1.76)	**1.69** (1.50-1.85)	**1.76** (1.55-1.93)
30-min	**1.10** (1.01-1.21)	**1.30** (1.19-1.42)	**1.54** (1.41-1.68)	**1.76** (1.61-1.92)	**1.99** (1.81-2.17)	**2.18** (1.98-2.37)	**2.35** (2.12-2.56)	**2.50** (2.24-2.73)	**2.69** (2.39-2.94)	**2.85** (2.51-3.12)
60-min	**1.38** (1.26-1.50)	**1.63** (1.50-1.78)	**1.97** (1.81-2.15)	**2.29** (2.09-2.49)	**2.65** (2.41-2.89)	**2.95** (2.68-3.22)	**3.24** (2.92-3.52)	**3.51** (3.15-3.83)	**3.86** (3.44-4.22)	**4.16** (3.67-4.56)
2-hr	**1.61** (1.46-1.77)	**1.92** (1.75-2.10)	**2.34** (2.13-2.56)	**2.74** (2.49-3.00)	**3.22** (2.91-3.53)	**3.65** (3.28-3.98)	**4.05** (3.62-4.43)	**4.47** (3.96-4.88)	**5.01** (4.40-5.47)	**5.48** (4.77-6.00)
3-hr	**1.71** (1.55-1.89)	**2.03** (1.86-2.24)	**2.49** (2.26-2.74)	**2.94** (2.67-3.24)	**3.49** (3.15-3.84)	**3.98** (3.57-4.37)	**4.47** (3.97-4.90)	**4.98** (4.39-5.46)	**5.66** (4.94-6.20)	**6.28** (5.41-6.90)
6-hr	**2.05** (1.87-2.26)	**2.44** (2.23-2.69)	**2.99** (2.72-3.29)	**3.54** (3.22-3.88)	**4.22** (3.81-4.62)	**4.83** (4.34-5.28)	**5.45** (4.85-5.95)	**6.09** (5.37-6.64)	**6.97** (6.06-7.60)	**7.77** (6.67-8.49)
12-hr	**2.42** (2.21-2.66)	**2.88** (2.64-3.16)	**3.54** (3.24-3.88)	**4.22** (3.85-4.62)	**5.06** (4.59-5.53)	**5.84** (5.25-6.35)	**6.62** (5.90-7.20)	**7.47** (6.57-8.10)	**8.63** (7.47-9.36)	**9.70** (8.28-10.5)
24-hr	**2.86** (2.66-3.08)	**3.45** (3.22-3.72)	**4.34** (4.04-4.67)	**5.04** (4.68-5.42)	**5.99** (5.55-6.44)	**6.75** (6.23-7.25)	**7.52** (6.92-8.10)	**8.33** (7.64-8.97)	**9.44** (8.61-10.2)	**10.3** (9.37-11.1)
2-day	**3.32** (3.09-3.57)	**4.00** (3.73-4.30)	**4.98** (4.64-5.36)	**5.75** (5.35-6.19)	**6.80** (6.30-7.32)	**7.63** (7.05-8.21)	**8.48** (7.81-9.13)	**9.36** (8.59-10.1)	**10.6** (9.64-11.4)	**11.5** (10.5-12.5)
3-day	**3.52** (3.28-3.77)	**4.23** (3.95-4.53)	**5.24** (4.89-5.62)	**6.04** (5.63-6.48)	**7.13** (6.62-7.65)	**8.00** (7.40-8.58)	**8.89** (8.20-9.54)	**9.80** (9.00-10.5)	**11.1** (10.1-11.9)	**12.0** (11.0-13.0)
4-day	**3.72** (3.48-3.98)	**4.46** (4.17-4.77)	**5.51** (5.15-5.88)	**6.34** (5.91-6.76)	**7.47** (6.94-7.98)	**8.37** (7.76-8.95)	**9.29** (8.58-9.94)	**10.2** (9.42-11.0)	**11.5** (10.6-12.4)	**12.6** (11.4-13.5)
7-day	**4.31**	**5.15**	**6.28**	**7.17**	**8.40**	**9.37**	**10.4**	**11.4**	**12.8**	**13.9**

	(4.04-4.61)	(4.82-5.50)	(5.87-6.70)	(6.70-7.65)	(7.82-8.96)	(8.71-10.0)	(9.60-11.1)	(10.5-12.2)	(11.8-13.7)	(12.7-15.0)
10-day	**4.91** (4.60-5.23)	**5.84** (5.48-6.22)	**7.03** (6.59-7.49)	**7.96** (7.45-8.48)	**9.22** (8.61-9.83)	**10.2** (9.51-10.9)	**11.2** (10.4-12.0)	**12.2** (11.3-13.1)	**13.6** (12.6-14.6)	**14.7** (13.5-15.8)
20-day	**6.59** (6.20-7.01)	**7.78** (7.32-8.27)	**9.20** (8.65-9.78)	**10.3** (9.70-11.0)	**11.9** (11.1-12.6)	**13.1** (12.2-13.9)	**14.3** (13.3-15.2)	**15.5** (14.4-16.5)	**17.2** (15.9-18.4)	**18.5** (17.0-19.8)
30-day	**8.18** (7.72-8.68)	**9.62** (9.08-10.2)	**11.2** (10.6-11.9)	**12.4** (11.7-13.2)	**14.0** (13.2-14.9)	**15.3** (14.3-16.3)	**16.5** (15.5-17.6)	**17.8** (16.6-18.9)	**19.4** (18.0-20.7)	**20.7** (19.2-22.1)
45-day	**10.4** (9.89-11.0)	**12.2** (11.6-12.9)	**14.0** (13.3-14.7)	**15.4** (14.6-16.2)	**17.1** (16.2-18.1)	**18.5** (17.5-19.5)	**19.8** (18.7-20.9)	**21.1** (19.9-22.4)	**22.9** (21.4-24.2)	**24.2** (22.6-25.6)
60-day	**12.5** (11.9-13.1)	**14.6** (13.9-15.3)	**16.5** (15.7-17.4)	**18.0** (17.1-18.9)	**19.9** (18.9-20.9)	**21.4** (20.2-22.5)	**22.7** (21.5-24.0)	**24.1** (22.7-25.4)	**25.8** (24.3-27.3)	**27.2** (25.5-28.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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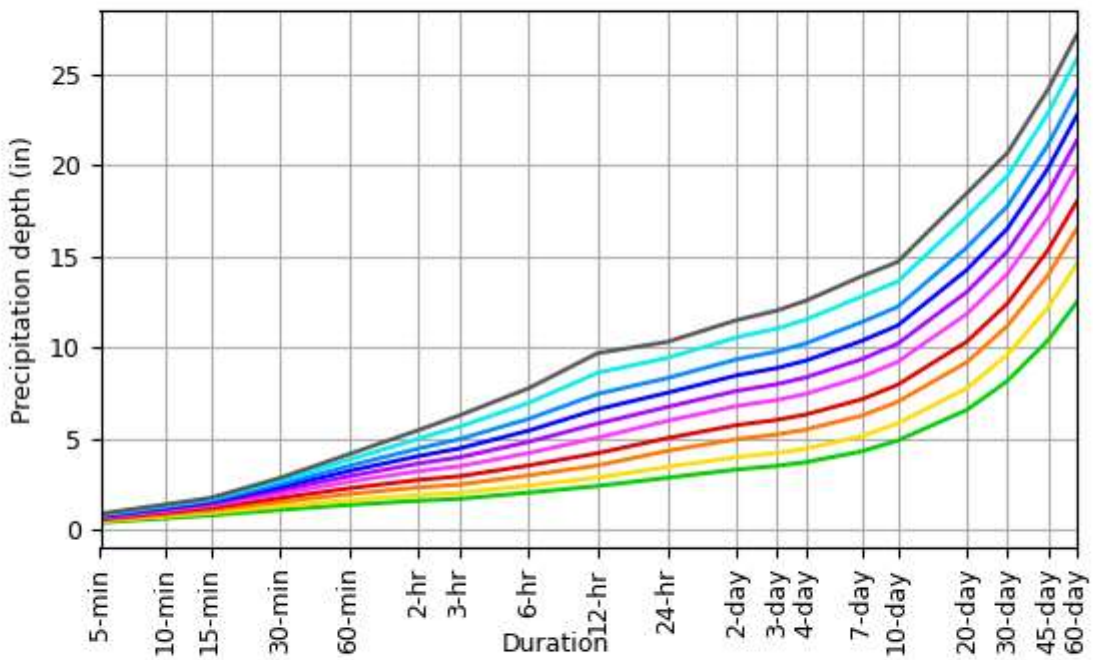
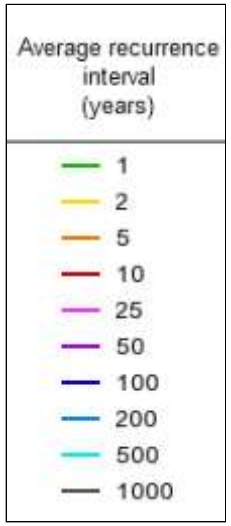
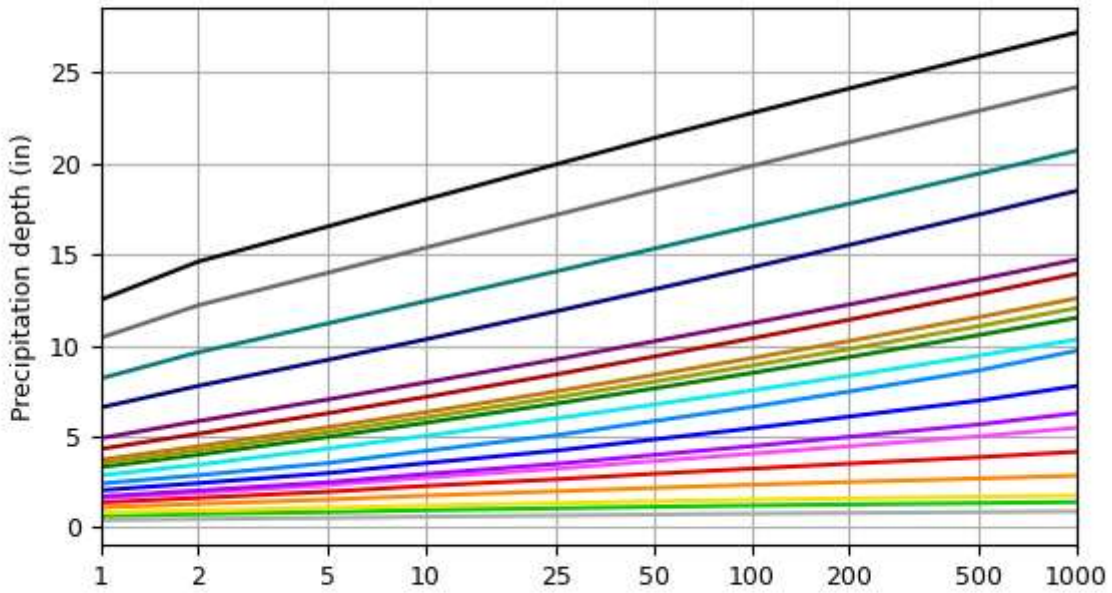
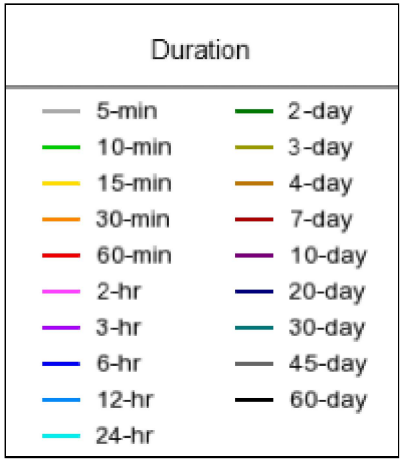
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 35.9433°, Longitude: -78.4637°









Average recurrence interval (years)

NOAA Atlas 14, Volume 2, Version 3

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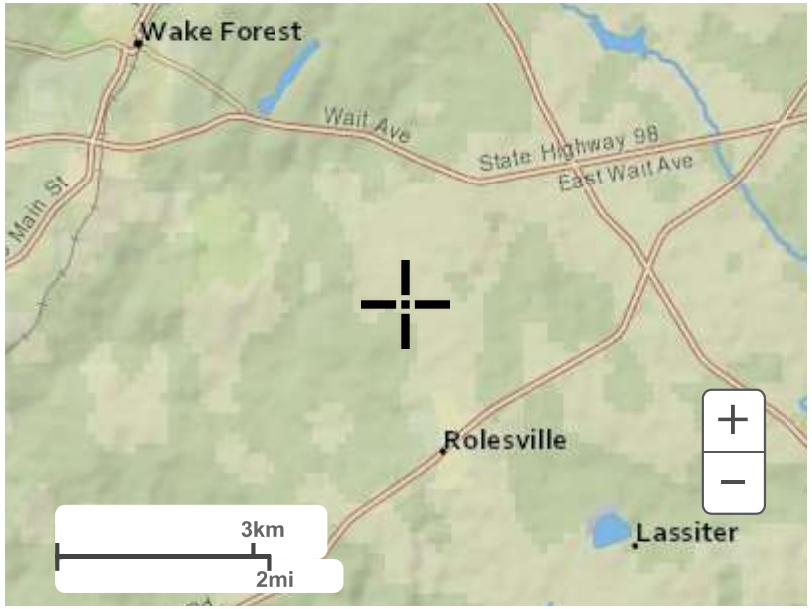
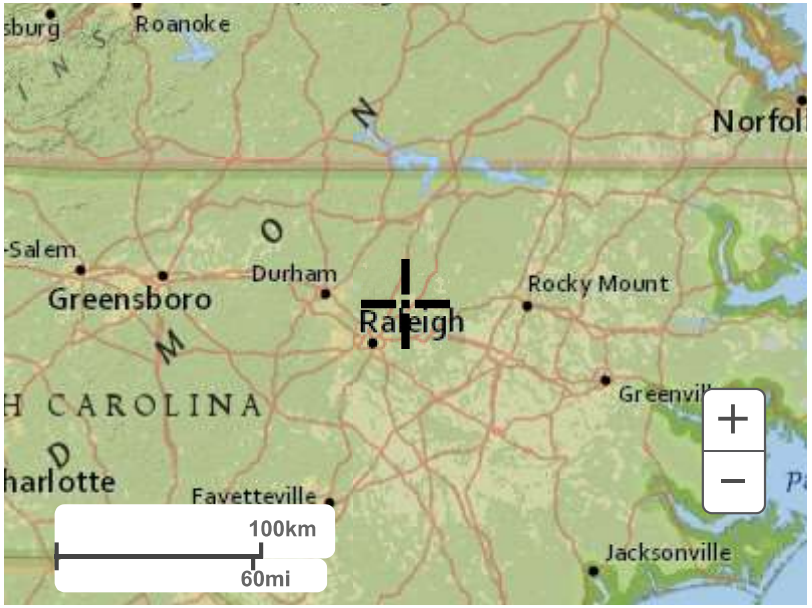
Maps & aerials

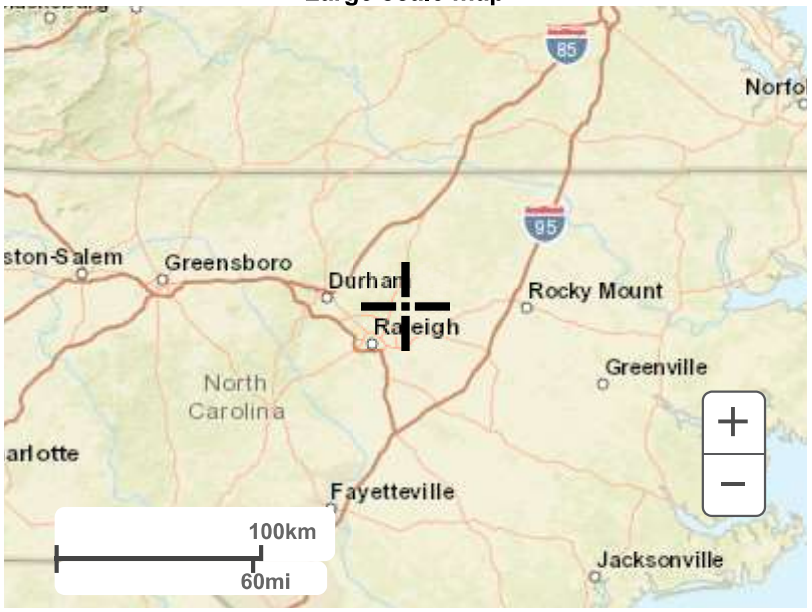
Small scale terrain



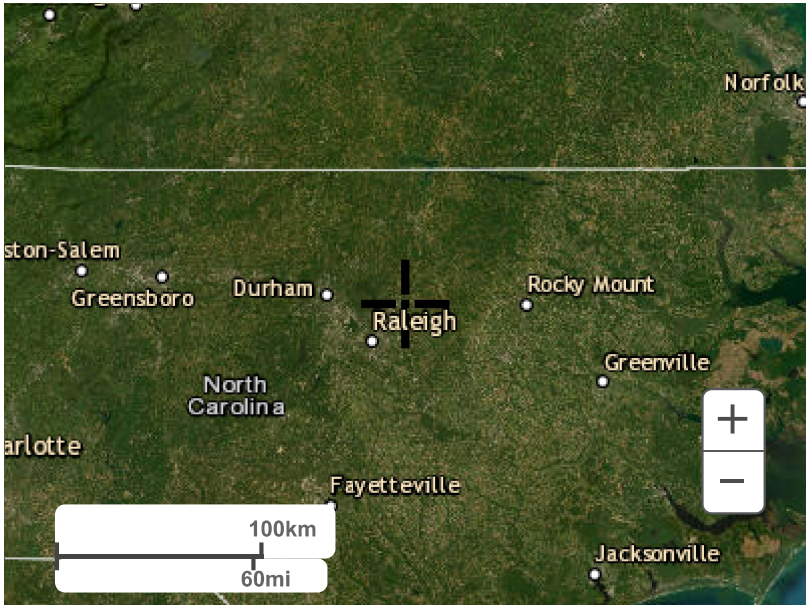
Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

NOAA Atlas 14, Volume 2, Version 3
Location name: Rolesville, North Carolina, USA*
Latitude: 35.9433°, Longitude: -78.4637°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.84** (4.44-5.29)	**5.62** (5.16-6.13)	**6.41** (5.87-6.98)	**7.19** (6.58-7.84)	**7.98** (7.27-8.70)	**8.60** (7.81-9.37)	**9.17** (8.26-9.98)	**9.65** (8.65-10.5)	**10.2** (9.07-11.1)	**10.7** (9.42-11.7)
10-min	**3.86** (3.55-4.22)	**4.49** (4.12-4.91)	**5.13** (4.70-5.60)	**5.75** (5.26-6.27)	**6.36** (5.80-6.93)	**6.85** (6.22-7.47)	**7.28** (6.56-7.93)	**7.65** (6.86-8.35)	**8.07** (7.17-8.81)	**8.42** (7.42-9.21)
15-min	**3.22** (2.95-3.52)	**3.77** (3.46-4.11)	**4.33** (3.96-4.72)	**4.85** (4.44-5.29)	**5.38** (4.90-5.86)	**5.78** (5.25-6.30)	**6.14** (5.53-6.68)	**6.44** (5.77-7.02)	**6.77** (6.02-7.39)	**7.04** (6.21-7.71)
30-min	**2.21** (2.02-2.41)	**2.60** (2.39-2.84)	**3.07** (2.82-3.35)	**3.51** (3.21-3.83)	**3.98** (3.63-4.34)	**4.36** (3.95-4.75)	**4.70** (4.24-5.12)	**5.01** (4.49-5.47)	**5.39** (4.79-5.88)	**5.70** (5.03-6.24)
60-min	**1.38** (1.26-1.50)	**1.63** (1.50-1.78)	**1.97** (1.81-2.15)	**2.29** (2.09-2.49)	**2.65** (2.41-2.89)	**2.95** (2.68-3.22)	**3.24** (2.92-3.52)	**3.51** (3.15-3.83)	**3.86** (3.44-4.22)	**4.16** (3.67-4.56)
2-hr	**0.805** (0.732-0.887)	**0.957** (0.875-1.05)	**1.17** (1.06-1.28)	**1.37** (1.24-1.50)	**1.61** (1.45-1.76)	**1.82** (1.64-1.99)	**2.03** (1.81-2.21)	**2.23** (1.98-2.44)	**2.50** (2.20-2.73)	**2.74** (2.38-3.00)
3-hr	**0.568** (0.516-0.629)	**0.676** (0.618-0.746)	**0.828** (0.754-0.914)	**0.980** (0.888-1.08)	**1.16** (1.05-1.28)	**1.33** (1.19-1.46)	**1.49** (1.32-1.63)	**1.66** (1.46-1.82)	**1.88** (1.64-2.06)	**2.09** (1.80-2.30)
6-hr	**0.341** (0.311-0.377)	**0.407** (0.372-0.448)	**0.499** (0.454-0.548)	**0.590** (0.537-0.648)	**0.704** (0.636-0.771)	**0.807** (0.724-0.882)	**0.909** (0.809-0.993)	**1.02** (0.896-1.11)	**1.16** (1.01-1.27)	**1.30** (1.11-1.42)
12-hr	**0.200** (0.183-0.220)	**0.238** (0.219-0.261)	**0.293** (0.269-0.322)	**0.349** (0.319-0.383)	**0.420** (0.380-0.458)	**0.484** (0.435-0.527)	**0.549** (0.489-0.597)	**0.619** (0.545-0.672)	**0.716** (0.620-0.777)	**0.805** (0.687-0.875)
24-hr	**0.119** (0.111-0.128)	**0.143** (0.134-0.155)	**0.180** (0.168-0.194)	**0.209** (0.194-0.225)	**0.249** (0.231-0.268)	**0.281** (0.259-0.302)	**0.313** (0.288-0.337)	**0.347** (0.318-0.373)	**0.393** (0.358-0.423)	**0.429** (0.390-0.464)
2-day	**0.069** (0.064-0.074)	**0.083** (0.077-0.089)	**0.103** (0.096-0.111)	**0.119** (0.111-0.128)	**0.141** (0.131-0.152)	**0.158** (0.146-0.170)	**0.176** (0.162-0.190)	**0.194** (0.178-0.210)	**0.220** (0.200-0.237)	**0.239** (0.217-0.259)
3-day	**0.048** (0.045-0.052)	**0.058** (0.054-0.062)	**0.072** (0.067-0.078)	**0.083** (0.078-0.089)	**0.099** (0.091-0.106)	**0.111** (0.102-0.119)	**0.123** (0.113-0.132)	**0.136** (0.125-0.146)	**0.153** (0.140-0.165)	**0.167** (0.152-0.180)
4-day	**0.038** (0.036-0.041)	**0.046** (0.043-0.049)	**0.057** (0.053-0.061)	**0.065** (0.061-0.070)	**0.077** (0.072-0.083)	**0.087** (0.080-0.093)	**0.096** (0.089-0.103)	**0.106** (0.098-0.114)	**0.120** (0.110-0.129)	**0.131** (0.119-0.140)
7-day	**0.025**	**0.030**	**0.037**	**0.042**	**0.049**	**0.055**	**0.061**	**0.067**	**0.076**	**0.082**

	(0.024-0.027)	(0.028-0.032)	(0.034-0.039)	(0.039-0.045)	(0.046-0.053)	(0.051-0.059)	(0.057-0.066)	(0.062-0.072)	(0.069-0.081)	(0.075-0.089)
10-day	**0.020** (0.019-0.021)	**0.024** (0.022-0.025)	**0.029** (0.027-0.031)	**0.033** (0.031-0.035)	**0.038** (0.035-0.040)	**0.042** (0.039-0.045)	**0.046** (0.043-0.049)	**0.050** (0.047-0.054)	**0.056** (0.052-0.060)	**0.061** (0.056-0.065)
20-day	**0.013** (0.012-0.014)	**0.016** (0.015-0.017)	**0.019** (0.018-0.020)	**0.021** (0.020-0.022)	**0.024** (0.023-0.026)	**0.027** (0.025-0.028)	**0.029** (0.027-0.031)	**0.032** (0.029-0.034)	**0.035** (0.033-0.038)	**0.038** (0.035-0.041)
30-day	**0.011** (0.010-0.012)	**0.013** (0.012-0.014)	**0.015** (0.014-0.016)	**0.017** (0.016-0.018)	**0.019** (0.018-0.020)	**0.021** (0.019-0.022)	**0.022** (0.021-0.024)	**0.024** (0.023-0.026)	**0.026** (0.025-0.028)	**0.028** (0.026-0.030)
45-day	**0.009** (0.009-0.010)	**0.011** (0.010-0.011)	**0.012** (0.012-0.013)	**0.014** (0.013-0.014)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)	**0.021** (0.019-0.022)	**0.022** (0.020-0.023)
60-day	**0.008** (0.008-0.009)	**0.010** (0.009-0.010)	**0.011** (0.010-0.012)	**0.012** (0.011-0.013)	**0.013** (0.013-0.014)	**0.014** (0.014-0.015)	**0.015** (0.014-0.016)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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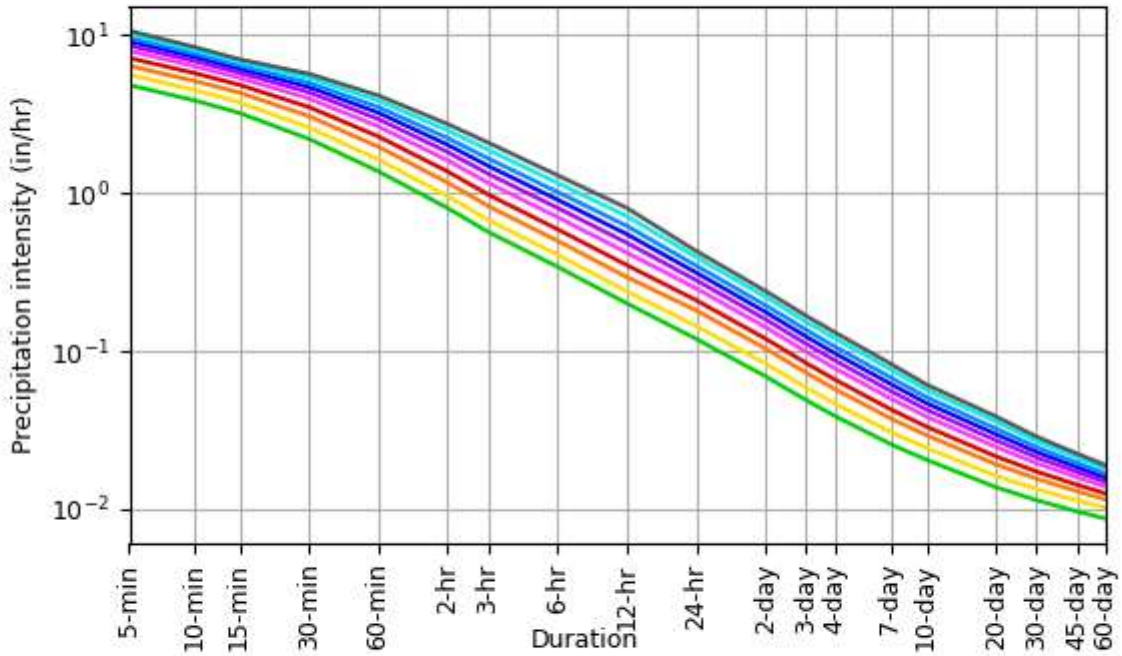
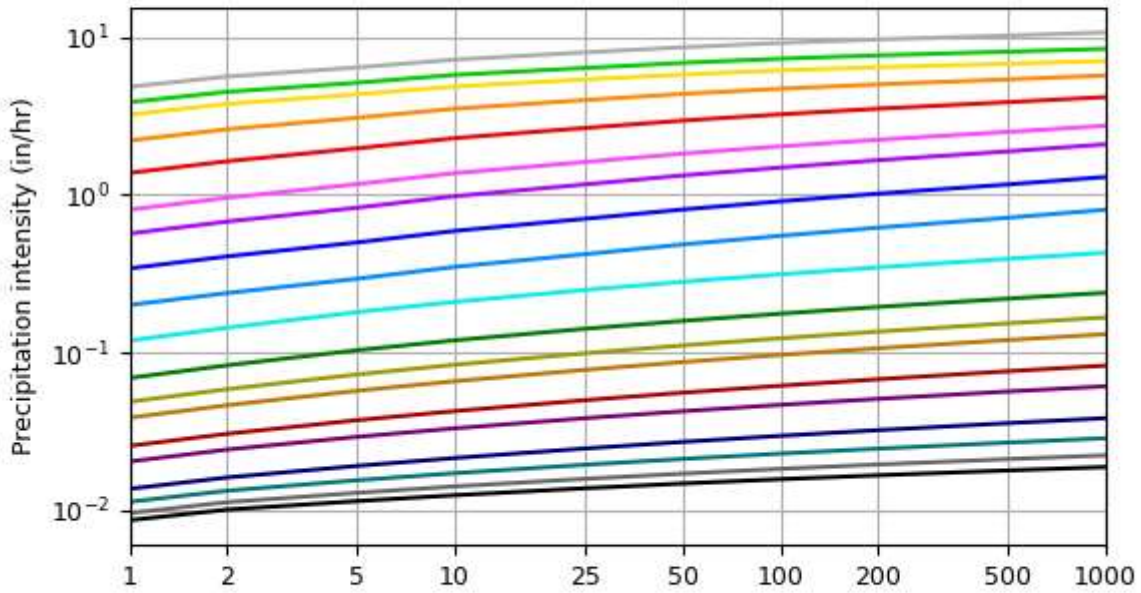
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 35.9433°, Longitude: -78.4637°





Average recurrence interval (years)

- 1
- 2
- 5
- 10
- 25
- 50
- 100
- 200
- 500
- 1000

Duration

- 5-min
- 10-min
- 15-min
- 30-min
- 60-min
- 2-hr
- 3-hr
- 6-hr
- 12-hr
- 24-hr
- 2-day
- 3-day
- 4-day
- 7-day
- 10-day
- 20-day
- 30-day
- 45-day
- 60-day

Average recurrence interval (years)

NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Thu Nov 9 21:35:32 2023

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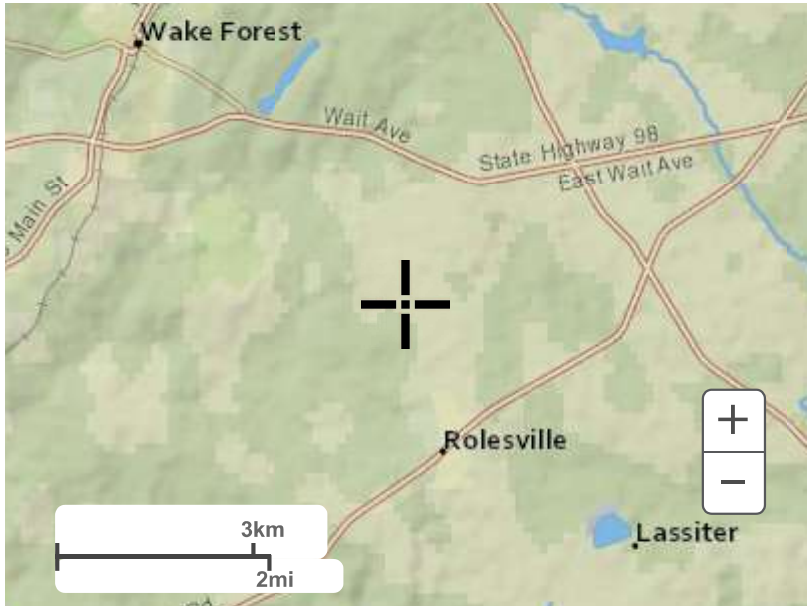
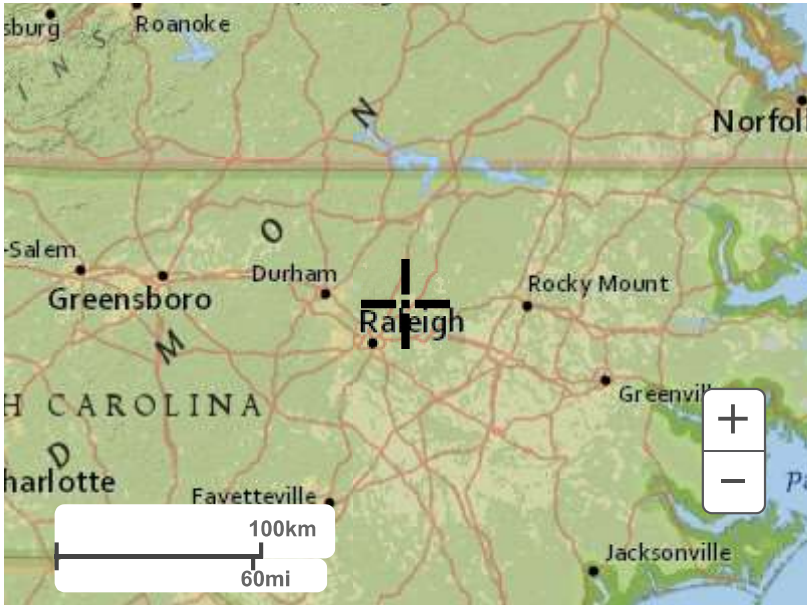
Maps & aerials

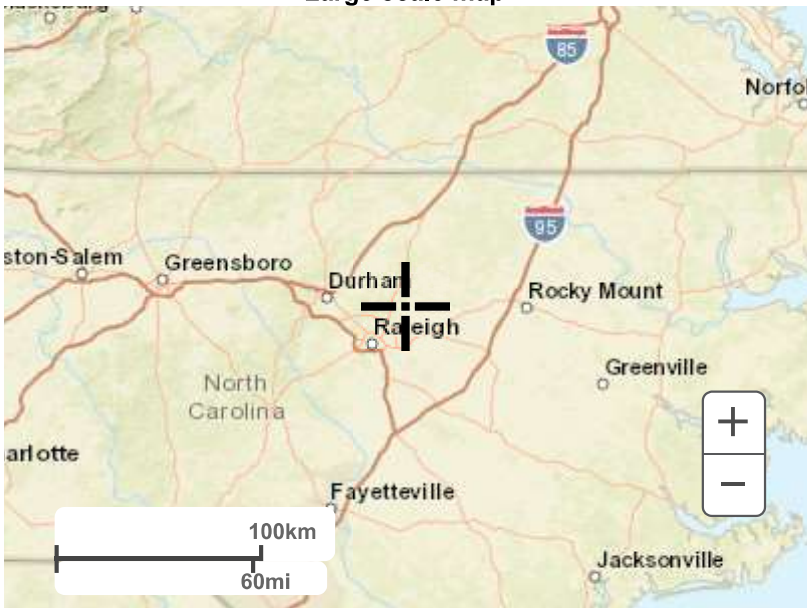
Small scale terrain



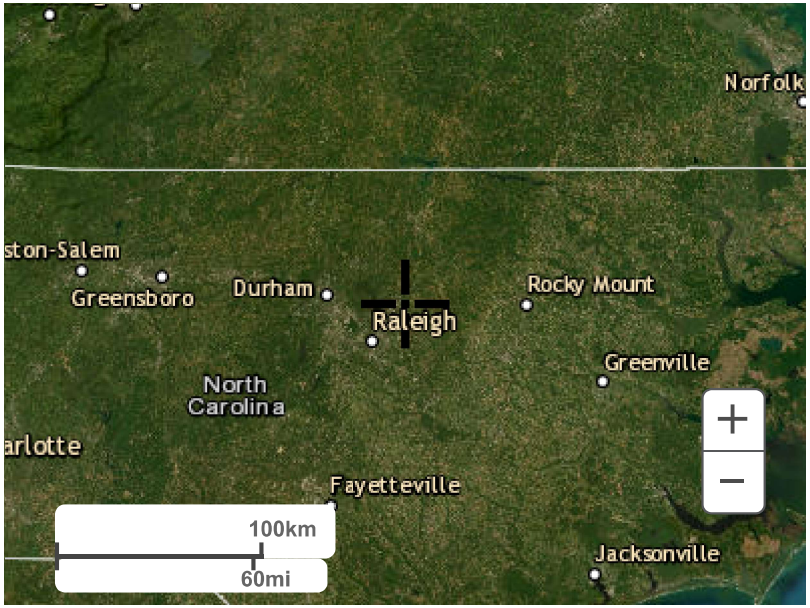
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

DRAINAGE AREA CALCULATIONS
DESIGN RUNOFF COEFFICIENT (Cd) = 0.9
INTENSITY (i10) = 7.18 IN/HR
APPROXIMATE AREA (CB21) = 0.56
CIA = (0.9)(7.18)(0.56) = 3.61 CFS
APPROXIMATE AREA (CB 12) = 0.58
CIA = (0.9)(7.18)(0.58) = 3.74 CFS

208
6,000.0 SF

207
6,000.0 SF

206
7,084.7 SF

205
7,267.4 SF

213
6,890.1 SF

214
6,890.1 SF

215
6,890.1 SF

85
6,373.9 SF

84
6,390.9 SF

83
7,195.8 SF

PROPOSED AMENITY AREA
(0.67 AC)

DA TO EXISTING CB #21
APPROXIMATE AREA
24635 SQFT (0.56 AC)
TC = 5 MIN

DA TO EXISTING CB #31
APPROXIMATE AREA
25427 SQFT (0.58 AC)
TC = 5 MIN

EX. HYDRANT

PREVIOUSLY ALLOCATED
IMPERVIOUS = 1 AC

EX CB #31
STA. 19+22.13
RIM: 408.06
INV. OUT: 404.24

EX CB #23
STA. 19+22.13
RIM: 408.07
INV. IN: 402.72(CB #31)

EX MH #7
STA. 18+88.90

EX CB #22
STA. 18+32.40
RIM: 409.11

EX CB #21
STA. 17+23.97
RIM: 410.35
INV. IN: 406.70
INV. OUT: 406.70

EX MH #7A
STA. 105+08.66
RIM: 409.65
INV. IN: 401.75
INV. OUT: 401.55

EX CB #20
STA. 17+24.16
RIM: 410.36
INV. IN: 405.02(CB #19)
INV. IN: 405.02(CB #21)
INV. OUT: 404.82

EX MH #8
STA. 16+88.11
RIM: 410.61
INV. IN: 402.38
INV. OUT: 402.18

EX CB #19
STA. 16+68.30
RIM: 411.00
INV. IN: 405.47
INV. OUT: 405.27

118.26 LF 8" PVC @0.90%

115.40 LF 30" RCP @0.84%

95.95 LF 30" RCP @1.00%

59.86 LF 30" RCP @0.42%

146.15 LF 30" RCP @1.08%

35.00 LF 18" RCP @1.22%

35.00 LF 24" RCP @1.22%

SHADOWDALE LANE
(60' PUBLIC ROW)

STREET
PUBLIC ROW)

HC

PRELIMINARY

NOT FOR CONSTRUCTION

Bateman Civil Survey Company
Engineers •Surveyors •Planners
2524 Reliance Avenue, Apex, North Carolina 27539
Phone: 919.577.1080 Fax: 919.577.1081
NCBELS FIRM No. C-2378

PRESERVE AT
JONES DAIRY
140 SHADOWDALE LANE
ROLESVILLE, NC 27571
WAKE COUNTY

PRELIMINARY DRAINAGE AREA MAP

SHEET
EX-1

P:\2023 Projects\230462 Preserve at Jones Dairy Amenity\ENG\DWG\Exhibits\Drainage Area Exhibits\Sheets\P230462_DRAN_PRLM_EXBT.dwg

IMPERVIOUS CALCULATIONS
POOL DECK = 3528 SQFT (0.08 AC)
SIDEWALK = 380 SF (0.01 AC)
AMENITY BUILDING = 960 SF (0.02 AC)
ROADWAY B-B = 8157 SF (0.19 AC)
TOTAL IMPERVIOUS = 13,395 SF (0.3 AC)
IMPERVIOUS PERCENTAGE = 46%

208
6,000.0 SF

207
6,000.0 SF

206
7,084.7 SF

205
7,267.4 SF

213
6,890.1 SF

214
6,890.1 SF

215
6,890.1 SF

85
6,373.9 SF

84
6,390.9 SF

83
7,195.8 SF

DA TO CB #A1
APPROXIMATE AREA
4356 SQFT (0.1 AC)
TC = 5 MIN

DA TO CB #A2
APPROXIMATE AREA
10693 SQFT (0.24AC)
TC = 5 MIN

DA TO DI #A3
APPROXIMATE AREA
1668 SQFT (0.03 AC)
TC = 5 MIN

DA TO EXISTING CB #21
APPROXIMATE AREA
16605 SQFT (0.38 AC)
TC = 5 MIN

DA TO EXISTING CB #31
APPROXIMATE AREA
33456 SQFT (0.76 AC)
TC = 5 MIN

PROPOSED AMENITY AREA
(0.67 AC)

POOL
AREA =1647 SF

POOL BUILDING
AREA = 433 SF
FFE = 413.50

PREVIOUSLY ALLOCATED
IMPERVIOUS = 1 AC

EX CB #31
STA. 19+22.13
RIM: 408.06
INV. OUT: 404.24

EX CB #23
STA. 19+22.13
RIM: 408.07
INV. IN: 402.72(CB #31)

EX MH #7
STA. 18+88.90

EX CB #22
STA. 18+32.40
RIM: 409.11

EX CB #21
STA. 17+23.97
RIM: 410.35
INV. IN: 406.70
INV. OUT: 406.50

EX MH #7A
STA. 105+08.66
RIM: 409.65
INV. IN: 401.75
INV. OUT: 401.55

EX CB #20
STA. 17+24.16
RIM: 410.36
INV. IN: 405.02(CB #19)
INV. IN: 405.02(CB #21)
INV. OUT: 404.82

EX CB #19
STA. 16+68.30
RIM: 411.00
INV. IN: 405.47
INV. OUT: 405.27

EX MH #8
STA. 16+88.11
RIM: 410.61
INV. IN: 402.38
INV. OUT: 402.18

118.26 LF 8" PVC @0.90%
115.40 LF 30" RCP @0.84%
95.95 LF 30" RCP @1.00%
59.86 LF 30" RCP @0.42%
146.15 LF 30" RCP @1.00%
35.00 LF 18" RCP @1.22%
35.00 LF 24" RCP @1.22%

SHADOWDALE LANE
(60' PUBLIC R/W)

PUBLIC STREET
(PUBLIC R/W)

P:\2023 Projects\230462 Preserve at Jones Dairy Amenity\ENG\DWG\Exhibits\Drainage Area Exhibits\Sheets\P2300462_DRAN_POST_EXBT.dwg

PRELIMINARY

NOT FOR CONSTRUCTION

Bateman Civil Survey Company
Engineers •Surveyors •Planners
2524 Reliance Avenue, Apex, North Carolina 27539
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NCBELS FIRM No. C-2378

PRESERVE AT
JONES DAIRY
140 SHADOWDALE LANE
ROLESVILLE, NC 27571
WAKE COUNTY

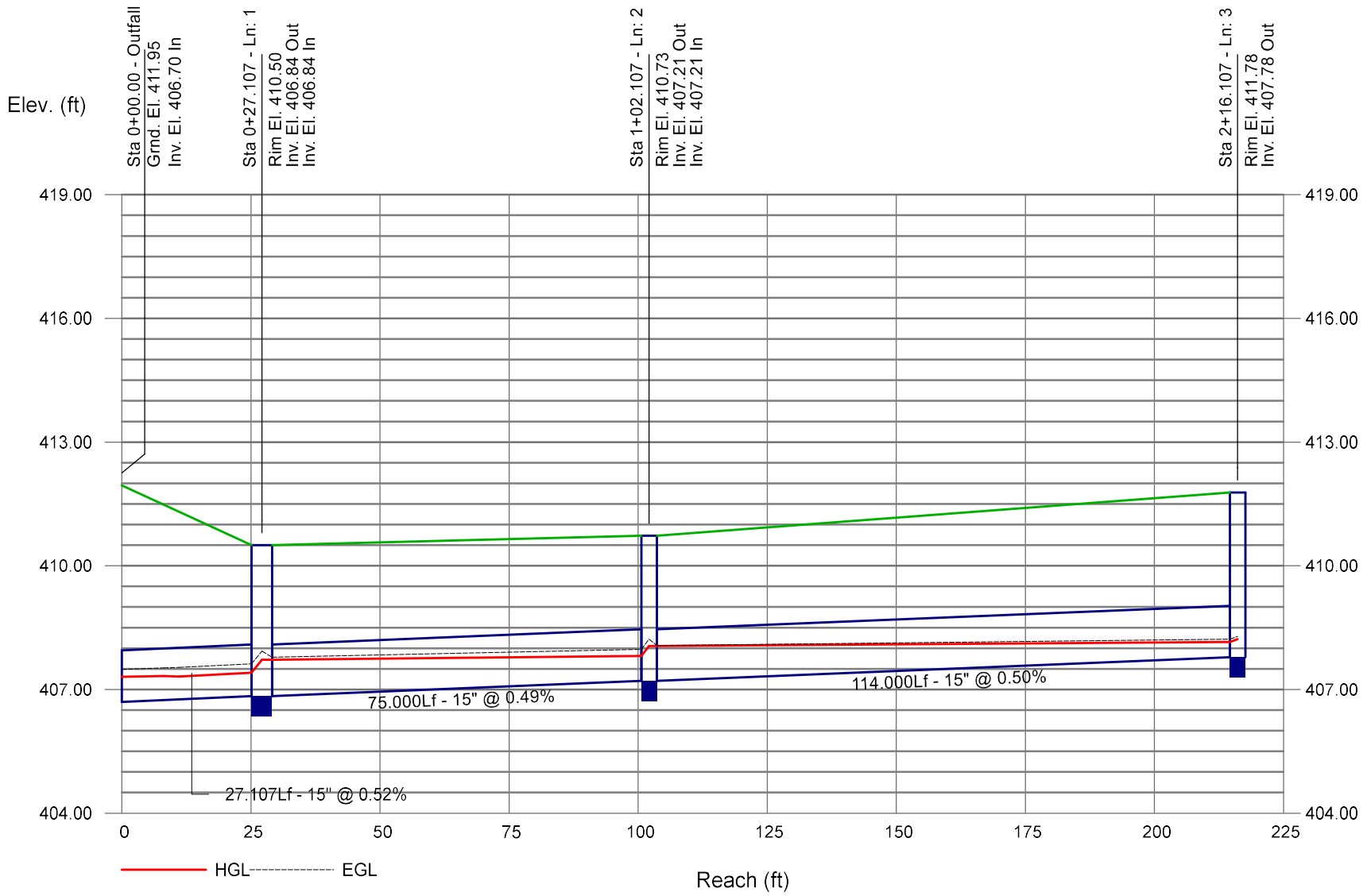
POST DRAINAGE AREA MAP

SHEET
EX-2

Storm Sewer Profile

Proj. file: 230462 PJD Storm Sewers.stm

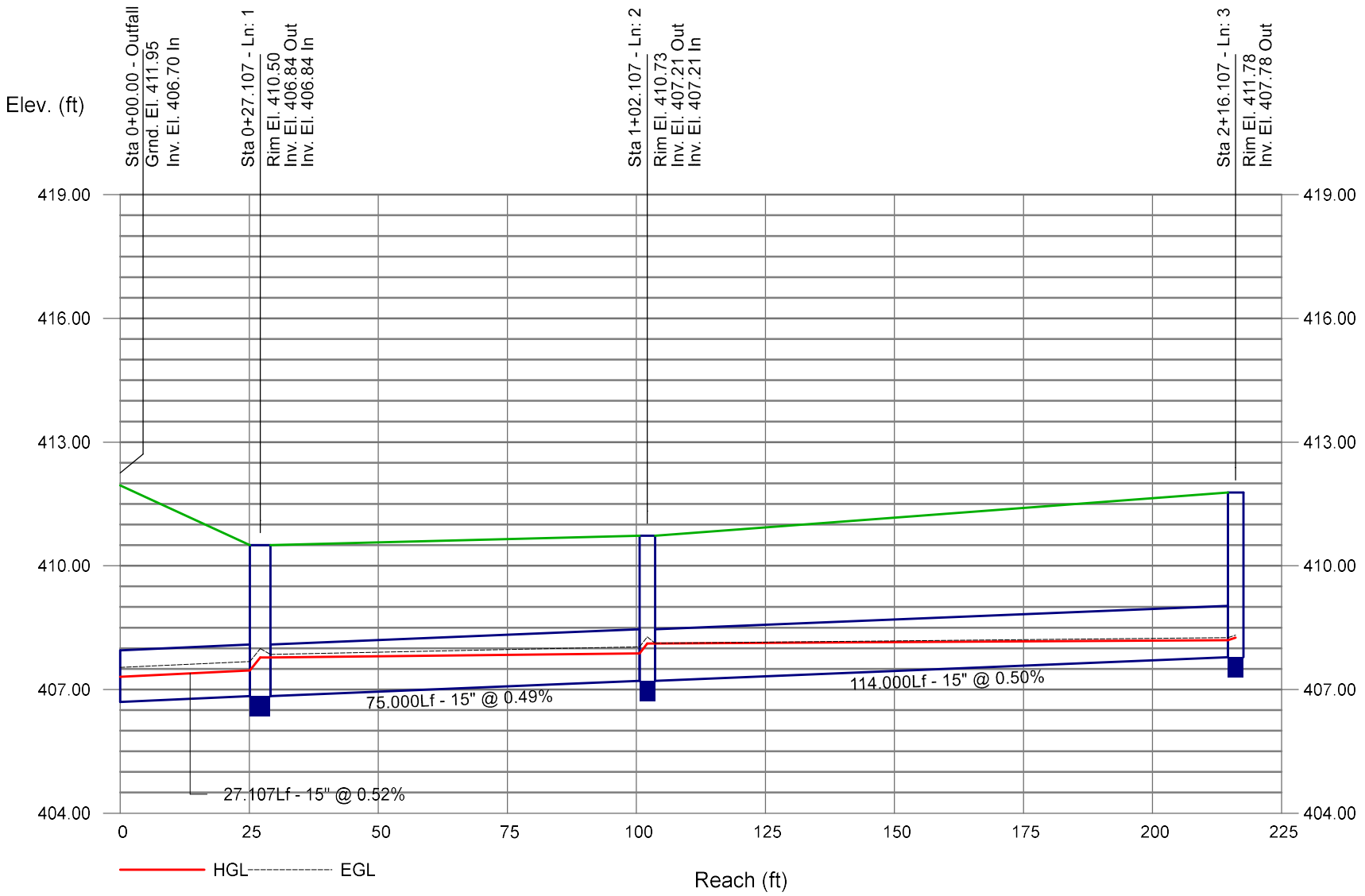
10 YEAR FLOW = 7.19 IN / HR



Storm Sewer Profile

Proj. file: 230462 PJD Storm Sewers.stm

25 YEAR FLOW = 7.98 IN / HR



10 YEAR FLOW = 7.19 IN / HR

Line No.	Area Dn	Area Up	Bypass Line No.	C1	C2	C3	Capacity Full	Critical Depth	Cross Slope, Sw	Cross Slope, Sx	Curb Length	Defl. Angle	Depth Dn
	(sqft)	(sqft)		(C)	(C)	(C)	(cfs)	(ft)	(ft/ ft)	(ft/ ft)	(ft)	(Deg)	(ft)
1	0.54	0.54	2	0.20	0.50	0.90	4.64	0.56	0.050	0.020	....	-127.789	0.61
2	0.92	0.59	Sag	0.20	0.50	0.90	4.54	0.55	0.040	0.010	3.00	78.368	0.88
3	0.88	0.31	Offsite	0.20	0.50	0.90	4.57	0.31	0.040	0.010	3.00	-90.000	0.85
	Notes: j-Line contains hyd. jump												

10 YEAR FLOW = 7.19 IN / HR

Line No.	Depth Up	DnStrm Line No.	Drainage Area	Easting X	EGL Dn	EGL Up	Energy Loss	Flow Rate	Sf Ave	Sf Dn	Grate Area	Grate Length	Grate Width
	(ft)		(ac)	(ft)	(ft)	(ft)	(ft)	(cfs)	(ft/ ft)	(ft/ ft)	(sqft)	(ft)	(ft)
1	0.57**	Outfall	0.03	2158715.91	407.49	407.62	0.130	2.00	0.479	0.417	....	3.00	3.00
2	0.60	1	0.24	2158764.70	407.78	407.97	0.191	1.89	0.254	0.120	6.00	3.00	2.00
3	0.38	2	0.10	2158678.12	408.06	408.22	0.158	0.65	0.139	0.016	....	3.00	2.00

10 YEAR FLOW = 7.19 IN / HR

Line No.	Grnd/ Rim Elev Dn	Grnd/ Rim Elev Up	Gutter Depth	Gutter Slope	Gutter Spread	Gutter Width	HGL Dn	HGL Up	HGL Jnct	HGL Jmp Dn	HGL Jmp Up	Incr CxA	Incr Q
	(ft)	(ft)	(ft)	(ft/ ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)
1	0.00	410.50	0.10	0.010	2.09	2.00	407.31	407.41 j	407.72	407.33	407.32	0.03	0.19
2	410.50	410.73	0.17	Sag	11.45	2.00	407.72	407.81	408.06	....	....	0.22	1.55
3	410.73	411.78	0.13	0.010	7.44	2.00	408.06	408.16	408.22	....	....	0.09	0.65

10 YEAR FLOW = 7.19 IN / HR

Line No.	Inlet Depth	Inlet Eff	Inlet ID	Inlet Location		Inlet Time	i Sys	i Inlet	Invert Dn	Invert Up	Jump Loc	Jump Len	Vel Hd Jmp Dn	Vel Hd Jmp Up
	(ft)	(%)			(ft)	(min)	(in/ hr)	(in/ hr)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	0.10	100	DI A1	On Grade		5.0	6.01	7.19	406.70	406.84	8.13	2.92	0.20	0.22
2	0.26	100	CB A2	Sag		5.0	6.17	7.19	406.84	407.21	....	....	0.00	0.00
3	0.22	78	CB A3	On Grade		5.0	7.19	7.19	407.21	407.78	....	....	0.00	0.00

10 YEAR FLOW = 7.19 IN / HR

Line No.	J-Loss Coeff	Junct Type	Known Q	Cost RCP	Cost CMP	Cost PVC	Line ID	Line Length	Line Size	Line Slope	Line Type	Local Depr	n-value Gutter	n-value Pipe
			(cfs)					(ft)	(in)	(%)		(in)		
1	1.47	Grate	0.00	910	819	774	EXCB21	27.107	15	0.52	Cir	0.0	0.013	0.013
2	1.50	Comb.	0.00	2,350	2,115	1,998	A2-A1	75.000	15	0.49	Cir	1.0	....	0.013
3	1.00	Comb.	0.00	3,520	3,168	2,992	A3-A2	114.000	15	0.50	Cir	1.0	0.013	0.013

10 YEAR FLOW = 7.19 IN / HR

Line No.	Minor Loss	Northing Y	Pipe Travel	Q Bypass	Q Captured	Q Carryover	Line Rise	Runoff Coeff	Line Span	Subarea A1	Subarea A2	Subarea A3
	(ft)	(ft)	(min)	(cfs)	(cfs)	(cfs)	(in)	(C)	(in)	(ac)	(ac)	(ac)
1	n/a	798699.09	0.24	0.00	0.19	0.00	15	0.90	15	0.00	0.00	0.00
2	0.24	798756.05	0.72	0.00	1.55	0.00	15	0.90	15	0.00	0.00	0.00
3	0.07	798830.21	3.60	0.14	0.50	0.00	15	0.90	15	0.00	0.00	0.00

10 YEAR FLOW = 7.19 IN / HR

Line No.	Tc	Throat Ht	Total Area	Total CxA	Total Runoff	Vel Ave	Vel Dn	Vel Hd Dn	Vel Hd Up	Vel Up	Cover Dn	Cover Up	Storage
	(min)	(in)	(ac)		(cfs)	(ft/s)	(ft/s)	(ft)	(ft)	(ft/s)	(ft)	(ft)	(cft)
1	9.3	....	0.37	0.33	2.00	3.53	3.36	0.18	0.21	3.70	n/a	2.41	15.38
2	8.6	6.0	0.34	0.31	1.89	2.64	2.05	0.07	0.16	3.23	2.41	2.27	56.73
3	5.0	6.0	0.10	0.09	0.65	1.41	0.73	0.01	0.07	2.09	2.27	2.75	67.88

25 YEAR FLOW = 7.98 IN / HR

Line No.	Area Dn	Area Up	Bypass Line No.	C1	C2	C3	Capacity Full	Critical Depth	Cross Slope, Sw	Cross Slope, Sx	Curb Length	Defl. Angle	Depth Dn
	(sqft)	(sqft)		(C)	(C)	(C)	(cfs)	(ft)	(ft/ ft)	(ft/ ft)	(ft)	(Deg)	(ft)
1	0.59	0.61	2	0.20	0.50	0.90	4.64	0.60	0.050	0.020	....	-127.789	0.61
2	0.99	0.66	Sag	0.20	0.50	0.90	4.54	0.58	0.040	0.010	3.00	78.368	0.94
3	0.95	0.35	Offsite	0.20	0.50	0.90	4.57	0.33	0.040	0.010	3.00	-90.000	0.91

25 YEAR FLOW = 7.98 IN / HR

Line No.	Depth Up	DnStrm Line No.	Drainage Area	Easting X	EGL Dn	EGL Up	Energy Loss	Flow Rate	Sf Ave	Sf Dn	Grate Area	Grate Length	Grate Width
	(ft)		(ac)	(ft)	(ft)	(ft)	(ft)	(cfs)	(ft/ ft)	(ft/ ft)	(sqft)	(ft)	(ft)
1	0.62	Outfall	0.03	2158715.91	407.53	407.68	0.141	2.26	0.520	0.533	....	3.00	3.00
2	0.66	1	0.24	2158764.70	407.85	408.03	0.183	2.13	0.244	0.131	6.00	3.00	2.00
3	0.41	2	0.10	2158678.12	408.12	408.26	0.135	0.72	0.119	0.016	....	3.00	2.00

25 YEAR FLOW = 7.98 IN / HR

Line No.	Grnd/ Rim Elev Dn	Grnd/ Rim Elev Up	Gutter Depth	Gutter Slope	Gutter Spread	Gutter Width	HGL Dn	HGL Up	HGL Jnct	HGL Jmp Dn	HGL Jmp Up	Incr CxA	Incr Q
	(ft)	(ft)	(ft)	(ft/ ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)
1	0.00	410.50	0.11	0.010	2.29	2.00	407.31	407.46	407.78	....	....	0.03	0.22
2	410.50	410.73	0.19	Sag	12.72	2.00	407.78	407.87	408.12	....	....	0.22	1.72
3	410.73	411.78	0.14	0.010	7.85	2.00	408.12	408.19	408.26	....	....	0.09	0.72

25 YEAR FLOW = 7.98 IN / HR

Line No.	Inlet Depth	Inlet Eff	Inlet ID	Inlet Location		Inlet Time	i Sys	i Inlet	Invert Dn	Invert Up	Jump Loc	Jump Len	Vel Hd Jmp Dn	Vel Hd Jmp Up
	(ft)	(%)			(ft)	(min)	(in/ hr)	(in/ hr)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	0.11	100	DI A1	On Grade		5.0	6.79	7.98	406.70	406.84	....	....	0.00	0.00
2	0.27	100	CB A2	Sag		5.0	6.96	7.98	406.84	407.21	....	....	0.00	0.00
3	0.22	75	CB A3	On Grade		5.0	7.98	7.98	407.21	407.78	....	....	0.00	0.00

25 YEAR FLOW = 7.98 IN / HR

Line No.	J-Loss Coeff	Junct Type	Known Q	Cost RCP	Cost CMP	Cost PVC	Line ID	Line Length	Line Size	Line Slope	Line Type	Local Depr	n-value Gutter	n-value Pipe
			(cfs)					(ft)	(in)	(%)		(in)		
1	1.47	Grate	0.00	910	819	774	EXCB21	27.107	15	0.52	Cir	0.0	0.013	0.013
2	1.50	Comb.	0.00	2,350	2,115	1,998	A2-A1	75.000	15	0.49	Cir	1.0	....	0.013
3	1.00	Comb.	0.00	3,520	3,168	2,992	A3-A2	114.000	15	0.50	Cir	1.0	0.013	0.013

25 YEAR FLOW = 7.98 IN / HR

Line No.	Minor Loss	Northing Y	Pipe Travel	Q Bypass	Q Captured	Q Carryover	Line Rise	Runoff Coeff	Line Span	Subarea A1	Subarea A2	Subarea A3
	(ft)	(ft)	(min)	(cfs)	(cfs)	(cfs)	(in)	(C)	(in)	(ac)	(ac)	(ac)
1	0.32	798699.09	0.22	0.00	0.22	0.00	15	0.90	15	0.00	0.00	0.00
2	0.24	798756.05	0.65	0.00	1.72	0.00	15	0.90	15	0.00	0.00	0.00
3	0.06	798830.21	3.25	0.18	0.54	0.00	15	0.90	15	0.00	0.00	0.00

25 YEAR FLOW = 7.98 IN / HR

Line No.	Tc	Throat Ht	Total Area	Total CxA	Total Runoff	Vel Ave	Vel Dn	Vel Hd Dn	Vel Hd Up	Vel Up	Cover Dn	Cover Up	Storage
	(min)	(in)	(ac)		(cfs)	(ft/s)	(ft/s)	(ft)	(ft)	(ft/s)	(ft)	(ft)	(cft)
1	8.9	....	0.37	0.33	2.26	3.77	3.80	0.22	0.22	3.73	n/a	2.41	16.28
2	8.2	6.0	0.34	0.31	2.13	2.69	2.16	0.07	0.16	3.22	2.41	2.27	62.08
3	5.0	6.0	0.10	0.09	0.72	1.39	0.75	0.01	0.06	2.02	2.27	2.75	74.72