

Appendix E

Flow Balance Figures

Figure 1 (Appendix E)
 Supply vs. Demand Flow Balance
 Normal Operating Conditions
 (No Supply from/to Durham or Raleigh)
 Town of Cary Water Distribution System



Instructions for Using Flow Balance Spreadsheet (Normal Operating Conditions)

1. Ensure T1 (42" TM) and T2 (30" TM) flows are below firm capacity of WPZ and CPZ HSPS.
2. (Davis Drive BPS and Trinity Road BPS are not required during ADD or MDD conditions.)

Davis Drive Pumping Station (Durham)

YEAR	2007	2010	2015	2025	2045
ADD	0.0	0.0	0.0	0.0	0.0
MDD	0.0	0.0	0.0	0.0	0.0

Western Pressure Zone Demand Projections

YEAR	2007	2010	2015	2025	2045
ADD	3.16	5.47	7.13	8.01	10.99
MDD	5.18	8.98	11.69	13.13	18.02

Central Pressure Zone Demand Projections

YEAR	2007	2010	2015	2025	2045
ADD	8.75	9.93	10.78	11.22	12.90
MDD	14.35	16.28	17.68	18.40	21.16

Western Pressure Zone Pump Capacity

YEAR	2007	2010	2015	2025	2045
Firm	6.10	12.50	12.50	12.50	19.00
Total	10.80	19.00	19.00	19.00	25.00

Central Pressure Zone Pump Capacity

YEAR	2007	2010	2015	2025	2045
Firm	26.50	39.00	39.00	39.00	45.00
Total	32.40	44.00	44.00	44.00	45.00

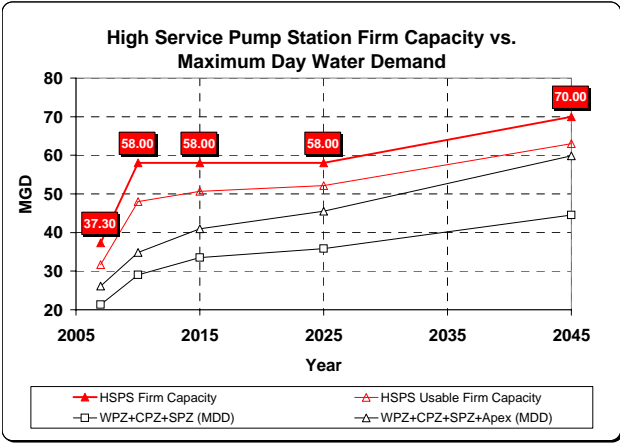
Total Central and Western Pump Capacity

YEAR	2007	2010	2015	2025	2045
Firm	37.30	58.00	58.00	58.00	70.00
Usable Firm	31.68	47.98	50.69	52.13	63.02
Total	43.20	63.00	63.00	63.00	70.00

Note 1: Firm capacity assumes only one large CPZ pump is out of service
 Note 2: Usable firm capacity assumes CPZ firm pump capacity plus WPZ max day demand

Apex Demand Projections

YEAR	2007	2010	2015	2025	2045
ADD	2.8	3.4	4.4	5.7	9
MDD	4.76	5.78	7.48	9.69	15.3



T5 = Supply to WPZ

YEAR	2007	2010	2015	2025	2045
ADD	3.16	5.47	7.13	8.01	10.99
MDD	5.18	8.98	11.69	13.13	18.02

T3 = Davis Drive PRV (Supply from CPZ to WPZ)

YEAR	2007	2010	2015	2025	2045
ADD	0.00	0.00	0.00	0.00	0.00
MDD	0.00	0.00	0.00	0.00	0.00

T2 = 30" TM Supply to WPZ

YEAR	2007	2010	2015	2025	2045
ADD	3.16	5.47	7.13	8.01	10.99
MDD	5.18	8.98	11.69	13.13	18.02

T4 = Supply to CPZ and SPZ

YEAR	2007	2010	2015	2025	2045
ADD	10.78	12.22	13.29	13.84	16.17
MDD	17.68	20.04	21.79	22.70	26.52

Trinity Road Pumping Station (Raleigh)

YEAR	2007	2010	2015	2025	2045
ADD	0.0	0.0	0.0	0.0	0.0
MDD	0.0	0.0	0.0	0.0	0.0

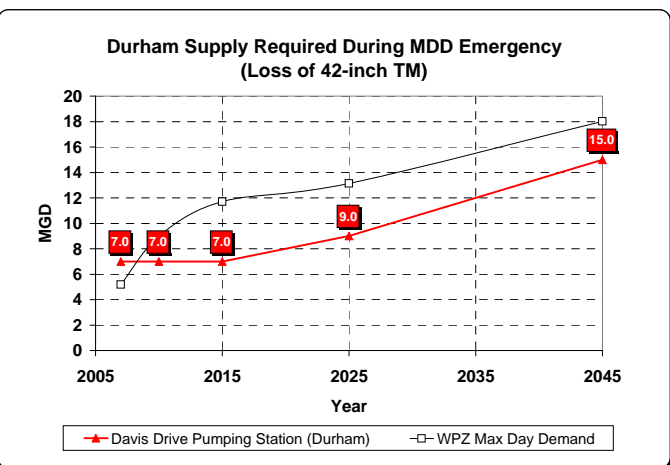
T6 = Supply from CPZ to SPZ

YEAR	2007	2010	2015	2025	2045
ADD	2.03	2.29	2.51	2.62	3.27
MDD	3.33	3.76	4.11	4.30	5.36

Southern Pressure Zone Demand Projections

YEAR	2007	2010	2015	2025	2045
ADD	2.03	2.29	2.51	2.62	3.27
MDD	3.33	3.76	4.11	4.30	5.36

Figure 2 (Appendix E)
 Supply vs. Demand Flow Balance
 Emergency Conditions - Loss of 42" TM
 (Durham and Raleigh Supply Required)
 Town of Cary Water Distribution System

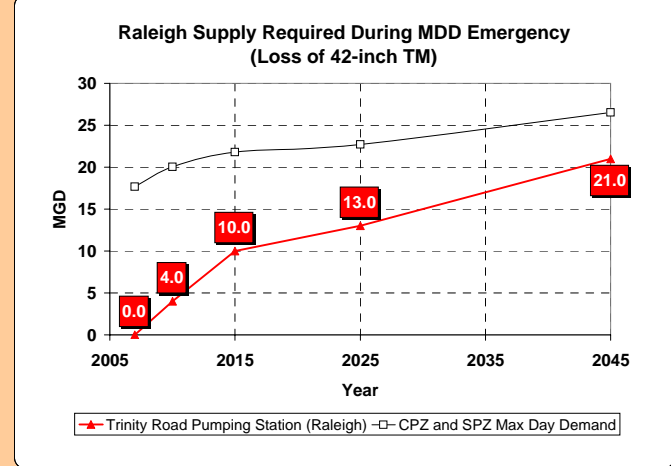


Notes:
 1. Maximum hydraulic capacity from Durham is 7.0 MGD (2008 Inconnect Study)
 2. Potential exceedence of Raleigh and Durham supplies during an MDD emergency.

YEAR	2007	2010	2015	2025	2045
ADD	0.0	0.0	2.8	2.8	7.0
MDD	7.0	7.0	7.0	9.0	15.0

YEAR	2007	2010	2015	2025	2045
ADD	3.16	5.47	7.13	8.01	10.99
MDD	5.18	8.98	11.69	13.13	18.02

YEAR	2007	2010	2015	2025	2045
ADD	8.75	9.93	10.78	11.22	12.90
MDD	14.35	16.28	17.68	18.40	21.16



Instructions for Using Flow Balance Spreadsheet (Emergency Conditions)

1. By trial and error, manually vary Davis Dr BPS and Trinity Rd BPS flows until T2 (30" transmission main) flows equal 24 MGD or less.
2. Attempt to limit Davis Drive BPS flows to 7 mgd based on conclusions of the 2008 Durham Interconnect Study

YEAR	2007	2010	2015	2025	2045
ADD	3.16	5.47	4.33	5.21	3.99
MDD	-1.82	1.98	4.69	4.13	3.02

YEAR	2007	2010	2015	2025	2045
ADD	13.58	15.62	13.69	15.54	17.17
MDD	22.44	21.82	19.27	19.39	20.82

YEAR	2007	2010	2015	2025	2045
ADD	10.78	12.22	9.29	9.84	8.17
MDD	17.68	16.04	11.79	9.70	5.52

Assuming 24 MGD maximum capacity in 30-inch TM (head loss=107-ft; vel=7.56 fps)

YEAR	2007	2010	2015	2025	2045
ADD	16.74	21.10	18.02	20.75	21.16
MDD	20.62	23.80	23.96	23.53	23.84

YEAR	2007	2010	2015	2025	2045
Firm	6.10	12.50	12.50	12.50	19.00
Total	10.80	19.00	19.00	19.00	25.00

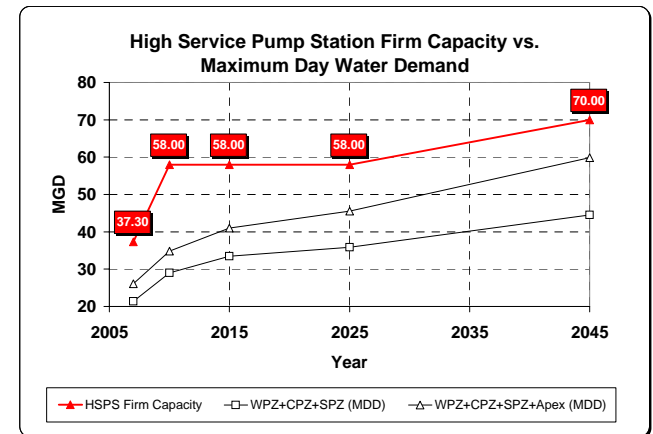
YEAR	2007	2010	2015	2025	2045
ADD	2.8	3.4	4.4	5.7	9
MDD	4.76	5.78	7.48	9.69	15.3

YEAR	2007	2010	2015	2025	2045
ADD	0.00	0.00	0.00	0.00	0.00
MDD	0.00	0.00	0.00	0.00	0.00

YEAR	2007	2010	2015	2025	2045
Firm	26.50	39.00	39.00	39.00	45.00
Total	32.40	44.00	44.00	44.00	45.00

YEAR	2007	2010	2015	2025	2045
Firm	37.30	58.00	58.00	58.00	70.00
Total	43.20	63.00	63.00	63.00	70.00

Note 1: Firm capacity assumes only one large CPZ pump is out of service



YEAR	2007	2010	2015	2025	2045
ADD	2.03	2.29	2.51	2.62	3.27
MDD	3.33	3.76	4.11	4.30	5.36

YEAR	2007	2010	2015	2025	2045
ADD	2.03	2.29	2.51	2.62	3.27
MDD	3.33	3.76	4.11	4.30	5.36

