



Photo by Town of Coventry DPW

Coventry Lake Gate Project

presented at

State of the Lake Forum

September 19, 2017

Lake Elevation References

- **Historic lake levels were based on an assumed reference elevation. The historically reported “normal” summer lake level of 93 ft is based on this reference. For convenience historically, a point on the site was randomly assigned an elevation of 100 ft.**
- **For design and construction we used the 1929 National Geodetic Vertical Datum or NGVD29 reference elevation rather than a random, assumed datum because it references sea level and can be compared to surrounding land and town and state-wide elevations.**

Relating Historic to Recent Elevations

- **The elevation of the old gate house floor based on this historic reference is known (99.8 ft)**
- **The elevation of the old gate house floor based on NGVD29 is also known (521.2 ft).**
- **By subtracting one from the other, we can convert the historic lake level elevations to NGVD29-based elevations.**

Historic Lake Elevations

- **Historically, the summer lake level was maintained at 93. Sometimes, in dry periods, the water level dropped lower. When it got higher the DPW opened the old lake gate to release water.**
- **The summer water level chosen for design of the new dam was 514.5 ft, which is elevation 93 when the old reference is converted to the NGVD29 reference.**

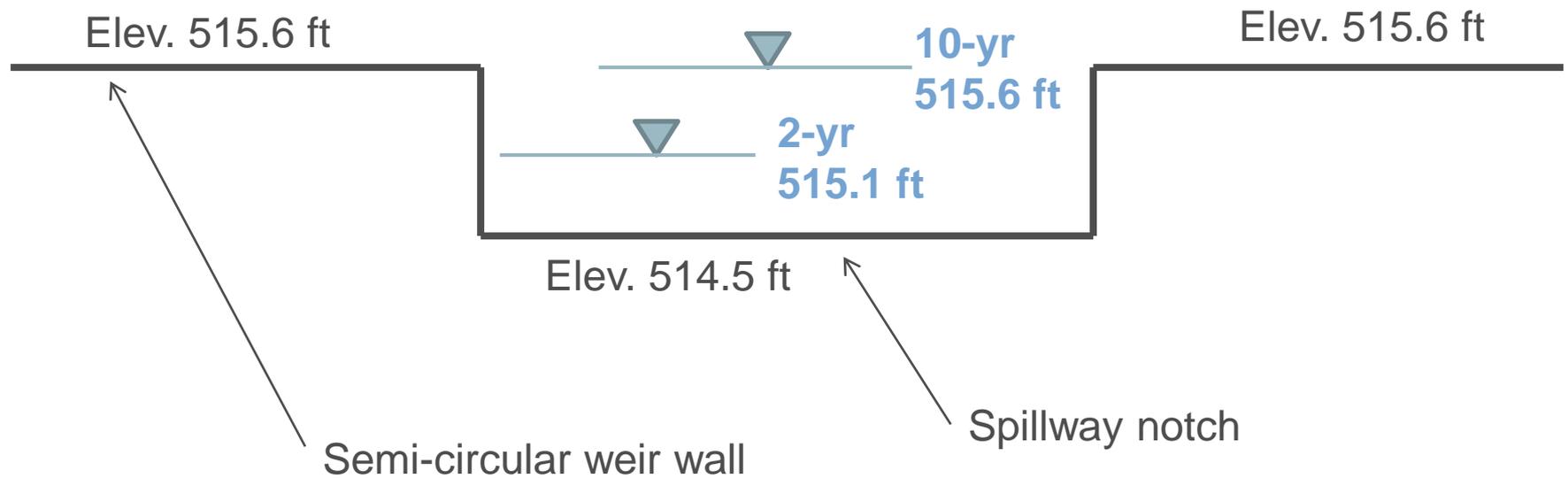
Design of the New Dam

- **A spillway notch was designed at elevation 514.5 ft. An as-built survey was done following construction. The spillway notch elevation is 514.5, as designed.**
- **The spillway notch elevation is the same as the historic summer water level.**

Design of the New Dam

Storm Event	Old Dam		New Dam	
	WSE (ft)	Flow (cfs)	WSE (ft)	Flow (cfs)
2-year (50% chance in any one yr)	515.1	9.0	515.1	9.0
10-year (10% chance in any one yr)	515.6	19.9	515.6	19.9

Design of the New Dam



Summary - Lake Elevations

Source	Date	WSE (NGVD29)	Description
USGS Quadrangle	1984	515	South Coventry Quadrangle
Coventry DPW	Feb. 1988	514.73	Letter to Town Manager
Field survey	April 1988	514.4	By Gardner & Peterson Assoc.
Field survey	April 2001	514.4	By Golden Aerial
Coventry DPW	2005-2010	514.4	Water level logs
Field survey	May 2015	513.78	By Towne Engineering
Field survey	June 2017	514.7 *	By Towne Engineering

* 0.7" rain fell on 6/8 [Weather Underground], field survey done on 6/12

Precipitation Frequency-Duration Data



NOAA Atlas 14, Volume 10, Version 2
 Location name: Coventry, Connecticut, USA*
 Latitude: 41.7701°, Longitude: -72.305°
 Elevation: 520.04 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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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	0.326 (0.251-0.423)	0.394 (0.303-0.511)	0.505 (0.387-0.658)	0.597 (0.456-0.782)	0.724 (0.536-0.988)	0.822 (0.597-1.14)	0.920 (0.651-1.33)	1.04 (0.701-1.53)	1.21 (0.782-1.83)	1.33 (0.843-2.06)
10-min	0.461 (0.355-0.599)	0.558 (0.429-0.724)	0.715 (0.549-0.932)	0.846 (0.645-1.11)	1.03 (0.760-1.40)	1.17 (0.846-1.62)	1.30 (0.922-1.88)	1.48 (0.992-2.17)	1.71 (1.11-2.59)	1.89 (1.19-2.91)
15-min	0.543 (0.418-0.704)	0.656 (0.505-0.852)	0.842 (0.645-1.10)	0.995 (0.759-1.30)	1.21 (0.894-1.65)	1.37 (0.995-1.91)	1.53 (1.09-2.21)	1.74 (1.17-2.55)	2.01 (1.30-3.05)	2.22 (1.41-3.43)
30-min	0.744 (0.573-0.966)	0.900 (0.692-1.17)	1.15 (0.885-1.50)	1.36 (1.04-1.79)	1.65 (1.23-2.26)	1.88 (1.36-2.61)	2.10 (1.49-3.03)	2.38 (1.60-3.50)	2.76 (1.79-4.18)	3.04 (1.93-4.70)
60-min	0.946 (0.728-1.23)	1.14 (0.880-1.48)	1.47 (1.12-1.91)	1.73 (1.32-2.27)	2.10 (1.56-2.87)	2.39 (1.73-3.32)	2.67 (1.89-3.85)	3.03 (2.03-4.45)	3.51 (2.27-5.31)	3.87 (2.45-5.97)
2-hr	1.22 (0.946-1.58)	1.47 (1.14-1.90)	1.88 (1.45-2.44)	2.22 (1.70-2.89)	2.69 (2.00-3.66)	3.05 (2.23-4.23)	3.40 (2.44-4.92)	3.92 (2.64-5.72)	4.60 (2.98-6.92)	5.11 (3.24-7.83)
3-hr	1.42 (1.10-1.82)	1.70 (1.32-2.19)	2.17 (1.68-2.81)	2.56 (1.97-3.33)	3.10 (2.32-4.21)	3.51 (2.58-4.88)	3.92 (2.82-5.67)	4.54 (3.06-6.60)	5.35 (3.48-8.02)	5.96 (3.79-9.10)
6-hr	1.82 (1.42-2.34)	2.19 (1.71-2.81)	2.79 (2.16-3.58)	3.28 (2.53-4.24)	3.96 (2.98-5.36)	4.49 (3.32-6.20)	5.01 (3.62-7.20)	5.80 (3.92-8.38)	6.84 (4.46-10.2)	7.62 (4.86-11.6)
12-hr	2.31 (1.81-2.94)	2.77 (2.17-3.54)	3.53 (2.76-4.52)	4.17 (3.23-5.36)	5.03 (3.80-6.76)	5.70 (4.22-7.82)	6.37 (4.61-9.07)	7.33 (4.98-10.5)	8.59 (5.62-12.7)	9.55 (6.11-14.4)
24-hr	2.75 (2.16-3.48)	3.33 (2.62-4.23)	4.28 (3.36-5.45)	5.07 (3.95-6.49)	6.16 (4.67-8.22)	7.00 (5.20-9.54)	7.83 (5.69-11.1)	9.03 (6.16-12.9)	10.6 (6.97-15.6)	11.8 (7.59-17.7)
2-day	3.08 (2.44-3.89)	3.79 (3.00-4.78)	4.94 (3.89-6.26)	5.90 (4.62-7.51)	7.22 (5.50-9.61)	8.24 (6.17-11.2)	9.25 (6.78-13.1)	10.8 (7.38-15.3)	12.9 (8.46-18.8)	14.4 (9.28-21.4)
3-day	3.34 (2.65-4.20)	4.12 (3.26-5.18)	5.39 (4.25-6.80)	6.44 (5.06-8.17)	7.89 (6.03-10.5)	9.01 (6.77-12.2)	10.1 (7.44-14.3)	11.9 (8.12-16.8)	14.2 (9.34-20.6)	15.9 (10.3-23.5)
4-day	3.58 (2.84-4.49)	4.40 (3.50-5.53)	5.76 (4.56-7.26)	6.88 (5.42-8.71)	8.43 (6.46-11.2)	9.62 (7.25-13.0)	10.8 (7.97-15.3)	12.7 (8.69-17.9)	15.1 (10.00-22.0)	17.0 (11.0-25.1)
7-day	4.23 (3.38-5.29)	5.17 (4.12-6.47)	6.71 (5.33-8.41)	7.98 (6.30-10.1)	9.73 (7.48-12.8)	11.1 (8.37-14.9)	12.4 (9.18-17.4)	14.5 (9.99-20.4)	17.3 (11.4-24.9)	19.4 (12.5-28.4)
10-day	4.89 (3.92-6.10)	5.89 (4.71-7.36)	7.53 (6.00-9.42)	8.89 (7.04-11.2)	10.8 (8.28-14.1)	12.2 (9.21-16.3)	13.6 (10.1-19.0)	15.8 (10.9-22.0)	18.6 (12.3-26.8)	20.8 (13.5-30.3)
20-day	6.98 (5.61-8.66)	8.05 (6.47-10.00)	9.81 (7.86-12.2)	11.3 (8.97-14.1)	13.3 (10.2-17.2)	14.8 (11.2-19.6)	16.4 (12.0-22.3)	18.3 (12.7-25.4)	20.9 (14.0-29.9)	22.9 (14.9-33.2)
30-day	8.75 (7.06-10.8)	9.85 (7.94-12.2)	11.7 (9.36-14.5)	13.1 (10.5-16.4)	15.2 (11.7-19.6)	16.8 (12.7-22.0)	18.4 (13.4-24.7)	20.1 (14.0-27.7)	22.4 (15.0-31.8)	24.2 (15.7-34.9)
45-day	11.0 (8.87-13.5)	12.1 (9.78-14.9)	13.9 (11.2-17.2)	15.5 (12.4-19.2)	17.6 (13.0-22.5)	19.2 (14.5-24.9)	20.8 (15.1-27.7)	22.3 (15.6-30.6)	24.3 (16.3-34.3)	25.7 (16.8-37.0)
60-day	12.8 (10.4-15.8)	14.0 (11.3-17.2)	15.9 (12.8-19.6)	17.4 (14.0-21.6)	19.6 (15.1-24.9)	21.2 (16.0-27.4)	22.9 (16.6-30.2)	24.2 (16.9-33.1)	25.9 (17.4-36.5)	27.2 (17.8-39.0)

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.

Monthly Precipitation – Data and History

Month	Monthly (inches)	Historical Monthly Average (inches) **
March 2017	2.73	4.32
April 2017	3.90	4.54
May 2017	4.63	3.96
June 2017	3.34	4.25
July 2017	4.27 *	4.08
August 2017	2.17	4.07
Totals	21.04	25.22
* Took place in one storm. Lake level impact was significant		
** www.intellicast.com		